Preparation of criteria and proposed selection of townships for SAIL Project in Northern Myanmar

Final Report on Scoping Mission and Township Selection

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1. **Consultancy Deliverables.**

All the principal deliverables (see Annex 1) are stages in formulating, presenting and agreeing the main outputs of the consultancy, (ie criteria and selection of project townships) acquisition and preparation of the data, formulation of a feasible and transparent selection methodology based on a linear data combination, and the weighting and ranking of eight relevant variables into 5 selected townships per project region.

These 6 deliverables are fully accounted for in the following files that have already been submitted to WorldFish:

- An excel workbook containing the 8 sets of variables, (and the actual data) the weighting mechanism used and the output ranking, that identifies the final townships selected.

- A draft power point presentation covering the proposed methodology, criteria and draft selection, presented to USAID on 3 December 2019.

- An amended final power point presentation including updated security and nutrition information presented to all stakeholders at the final scoping workshop on 21 January 2020.

2. **Criteria and data used in the proposed SAIL township selection.**

Most of the data for the criteria used (see items 1-8 in table 1 below) in the selection were obtained either directly from Government Websites; MoPI (Census 2014), GAD, or, in the case of township and village tract boundaries from the MIMU website. Data on Land Use (Smithsonian/EcoDev) was already acquired by the consultants.

The selection criteria are based on the following priorities:

2.1. **Overall risk – project implementation risk and security**. In terms of physical security from conflict and the practical limitations of travelling and operating a long term project where official security constraints impose unfeasible difficulties from a long term perspective. Risk is of importance in Shan North, Shan East and Kachin states. The initial risk estimates provided by the project were updated following field visits to Shan East, Kachin, and further evidence (from MoaLIP) on Shan North.

2.2. **Population per township**. Total numbers of population per township, are necessary to quantify the total potential beneficiaries from project interventions.

2.3. **Internally Displaced Persons** (IDPs). Numbers of persons living in poverty, displaced by conflict. Total numbers of persons in camps was available from OCHA, and the camp locations were referenced to specific townships

2.4. **Low levels of sanitary hygiene.** Levels of poverty and inequality evident from low levels of hygiene and exposure to disease. Source data obtained from the 2014 MoPI census.

2.5. **Dominant land use** present per township. As the project intends to augment and balance food production and income from farming (especially where rice/fish production is feasible) it is important to prioritise townships which are predominantly agricultural rather than those that consist mainly of forest land or upland taung ya farming. The land use data were summarised for each separate township.

2.6. **Area of fish ponds**. Townships in which fish production / aquaculture is already present are clearly advantageous in terms of existing knowledge, capacity and market connections on the ground, representing real practical opportunities for the project to support and strengthen rather than townships in which this does not exist at all. Although data on numbers of fish ponds was available, the total area of ponds was selected as the more important variable. DoF data, acquired from GAD statistics per township. Given the significance given to on fish pond data in determining township selection and the acknowledgement by DoF that op to 50% of the ponds (in Kengtung) were unlicenced, a comparison was made between the official statistics, and what would be reported by high resolution satellite imagery, covering the same date. (see section 3).

7. **Low Per Capita Income**, PCI. PCI, also reported by GAD was used as the primary indicator of poverty.

8. **Low levels of nutrition**. Ministry of health statistics on malnourished children below the age of 5 years was specifically requested by the project and made available by the Ministry of Health.

All the above data were brought together into Excel for each of the 5 project regions and scored into quartiles in order the data are ‘normalised’ from 1 to 4. Variables were then given a weight (Fig , and the combination (ie all variables multiplied together) then ranked in descending order.

The townships selected were those identified as the top scoring five in each region. Weightings were set to take into account factors specific to certain regions (IDPs occurring only in parts of Shan North and Kachin) and to favour the selection towards townships in which aquaculture (in terms of fish pond area) is already established. Selected townships were linked to the Township data from MIMU and printed as maps.

	Criteria and data used in TS selection	**Data source**	**Variable calculated / Purpose / comment**
1	Level of Risk	Via Worldfish	Ability to work in TS, exclusion / revised after field visits
2	Population	Census 2014	Population Calc of pop density Km2
3	Number of IDPs	OCHA (2017)	IDP numbers
4	Level of safe sanitation (only bucket, pit latrine etc (WASH)	Census 2014	Percent households in townships without safe sanitation.
5	Land Use present	ECODEV / Smithsonian Institute 2016	Percent agricultural land per TS
6	Area of Fish Ponds	GAD / DoF (2017)	Area (acres) of existing fish ponds
7	Per Capita Income	GAD (2017)	Basic income index
8	Children < 5 yrs old underweight	Min of Health	Low nutrition
	Data available, not used	**Source**	
9	Stream density	Survey Department	Water availability / variability in stream density cartographic rather than real variation
10	Mean annual rainfall	Worldclim	Possible water variability
11	Soil type	MoALI	Suitability for fishponds
12	Mean slope	SRTM 30	General topographic limitation
13	Presence / absence of any toilet	MoPI Census 2014	Safe sanitation (No.4 above) used as better overall indicator
14	House construction materials	MoPI Census 2014	PCI preferred (No.7 above) as overall poverty indicator
15	Roof construction material	MoPI Census 2014	
16	No. of ponds and fish farmers	GAD 2017	Area of ponds (No.6 above) preferred as more stable indicator
17	Mother and infant mortality	GAD 2017	Total underweight (No.8 above) preferred as indicator
18	No <3 YO's malnourished(Shan_E and Sagaing only)	Min of Health	
19	Canal networks	2003 1:50,000 topo sheets	Data appears old and unreliable

Table 1, Data used (1-8) and not used (9-18) for township selection criteria

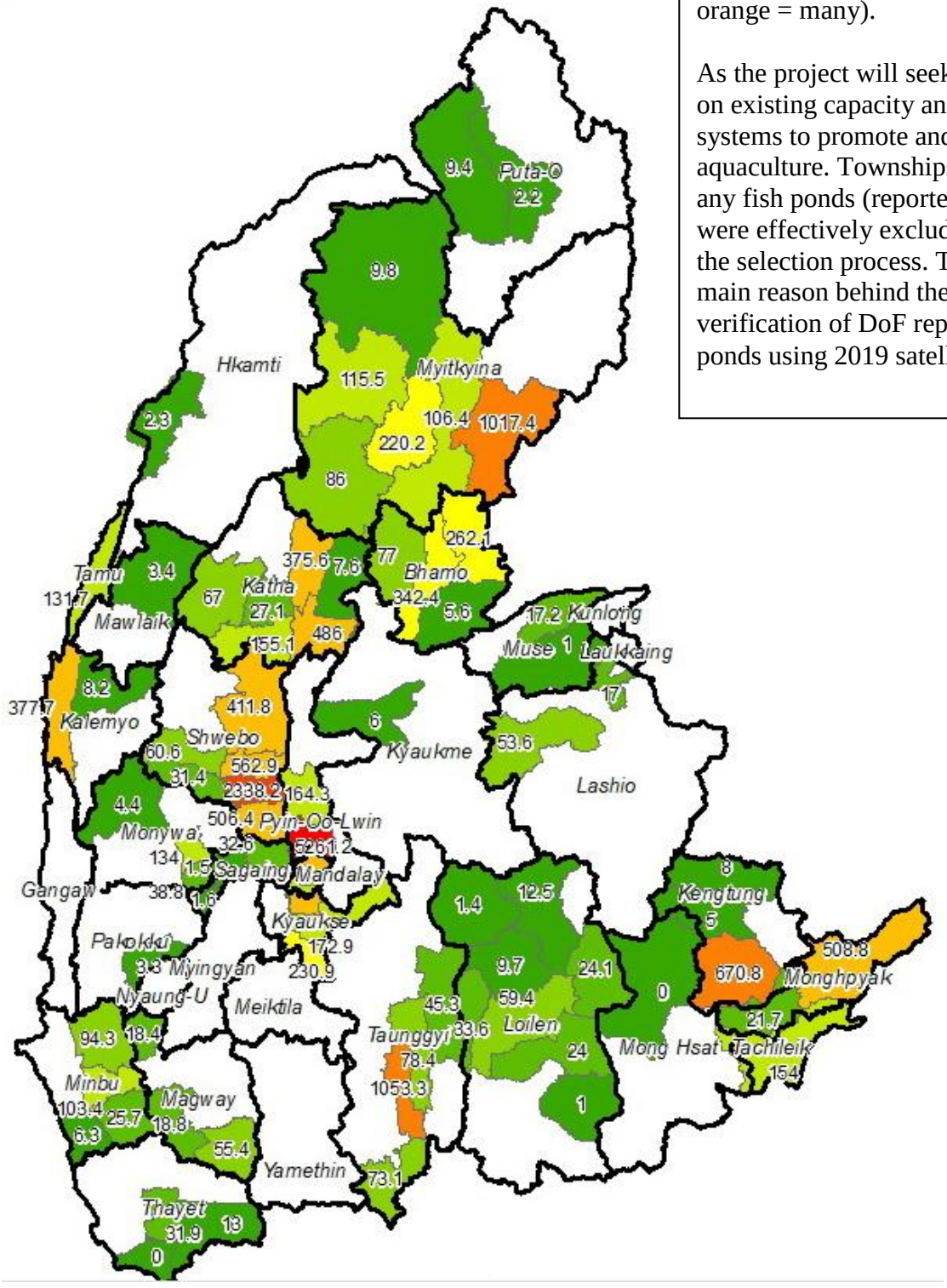


Fig 1 Townships with fish ponds and number within. (green = few, orange = many).

As the project will seeks to build on existing capacity and marhet systems to promote and strengthen aquaculture. Townships without any fish ponds (reported by DoF) were effectively excluded during the selection process. This was the main reason behind the test and verification of DoF reported fish ponds using 2019 satellite data

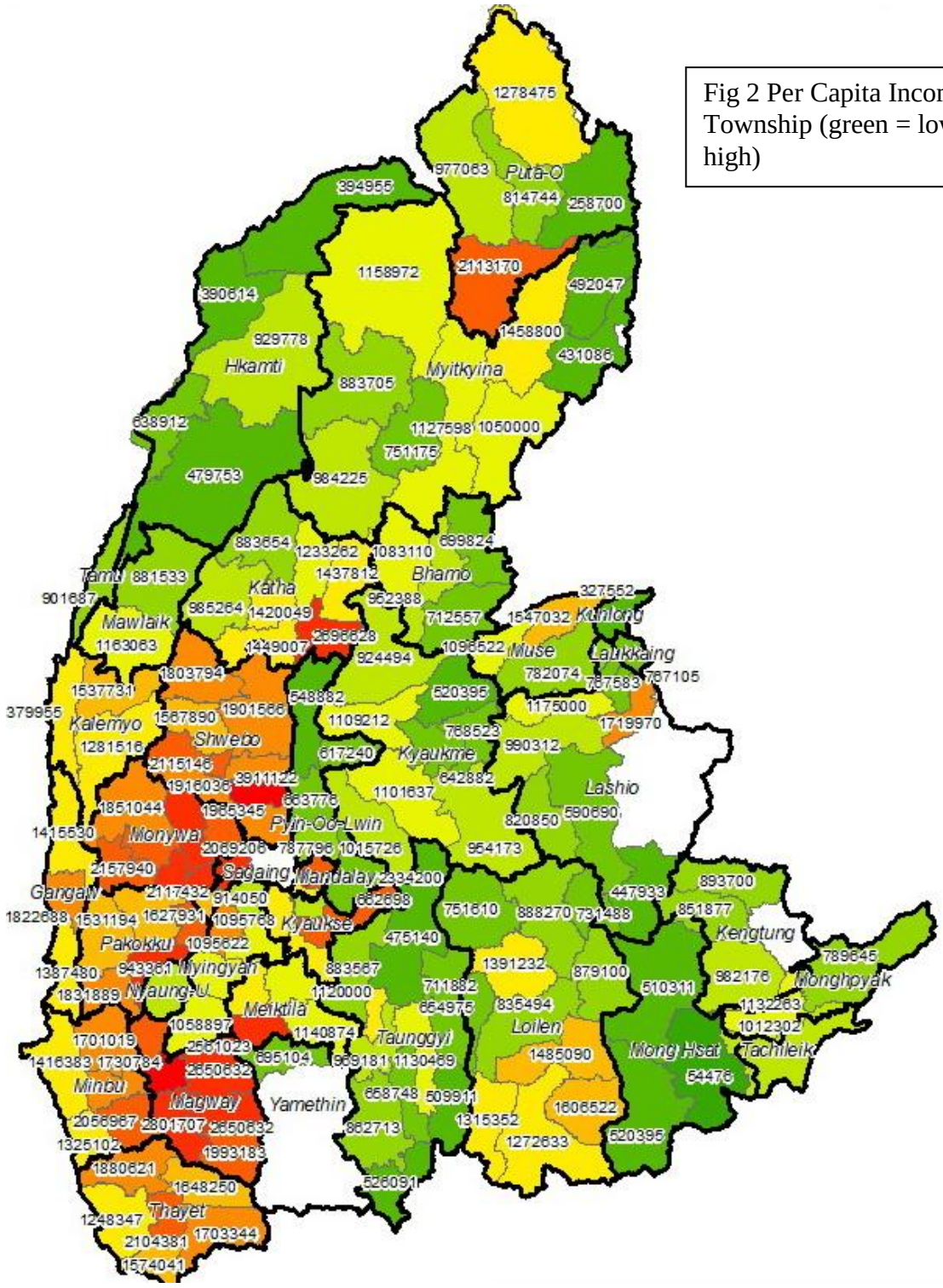


Fig 2 Per Capita Income per Township (green = low, red = high)

Fig 3 reported Fish production per township (in Viss / yr) . DOF 2019

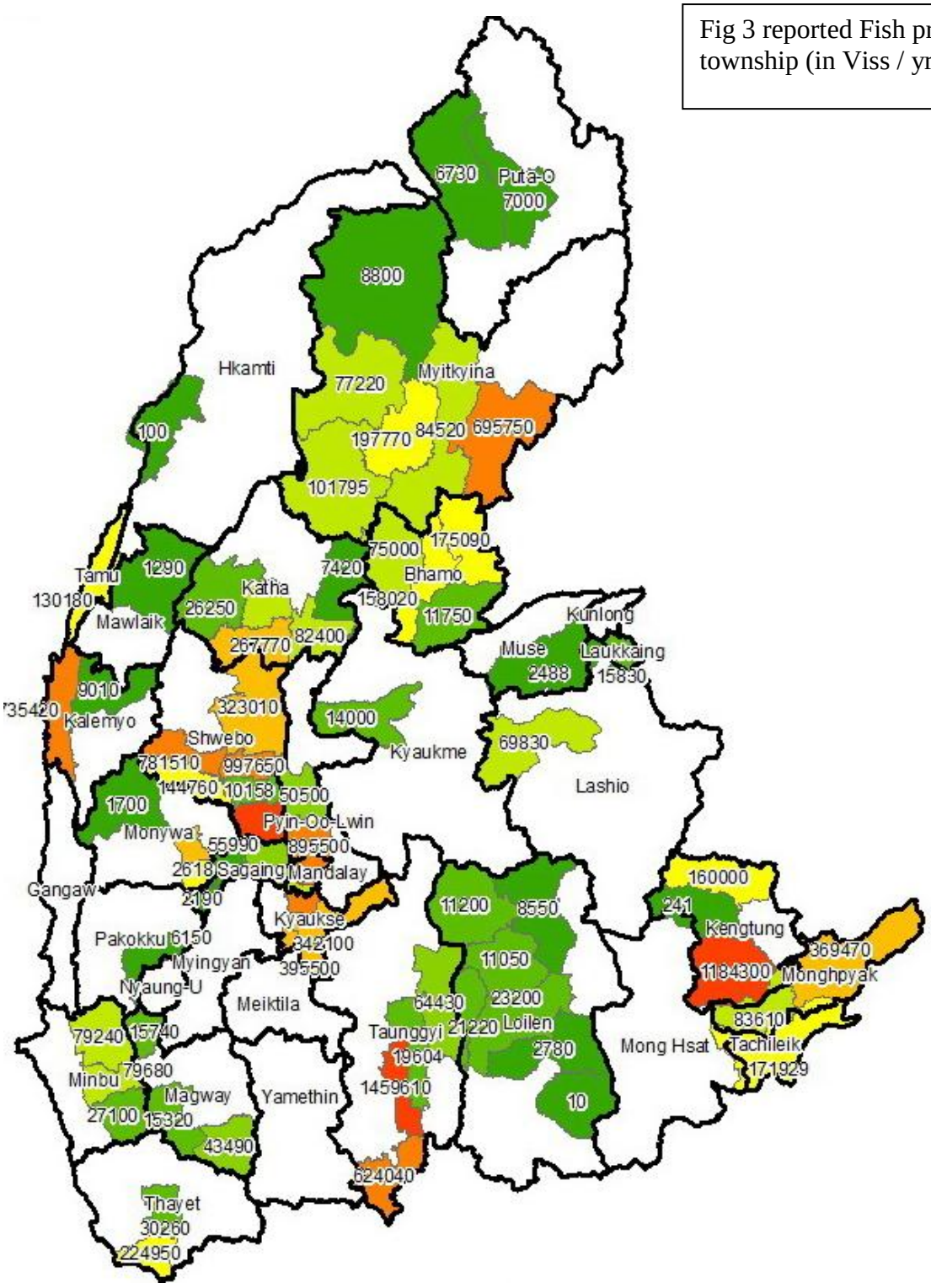
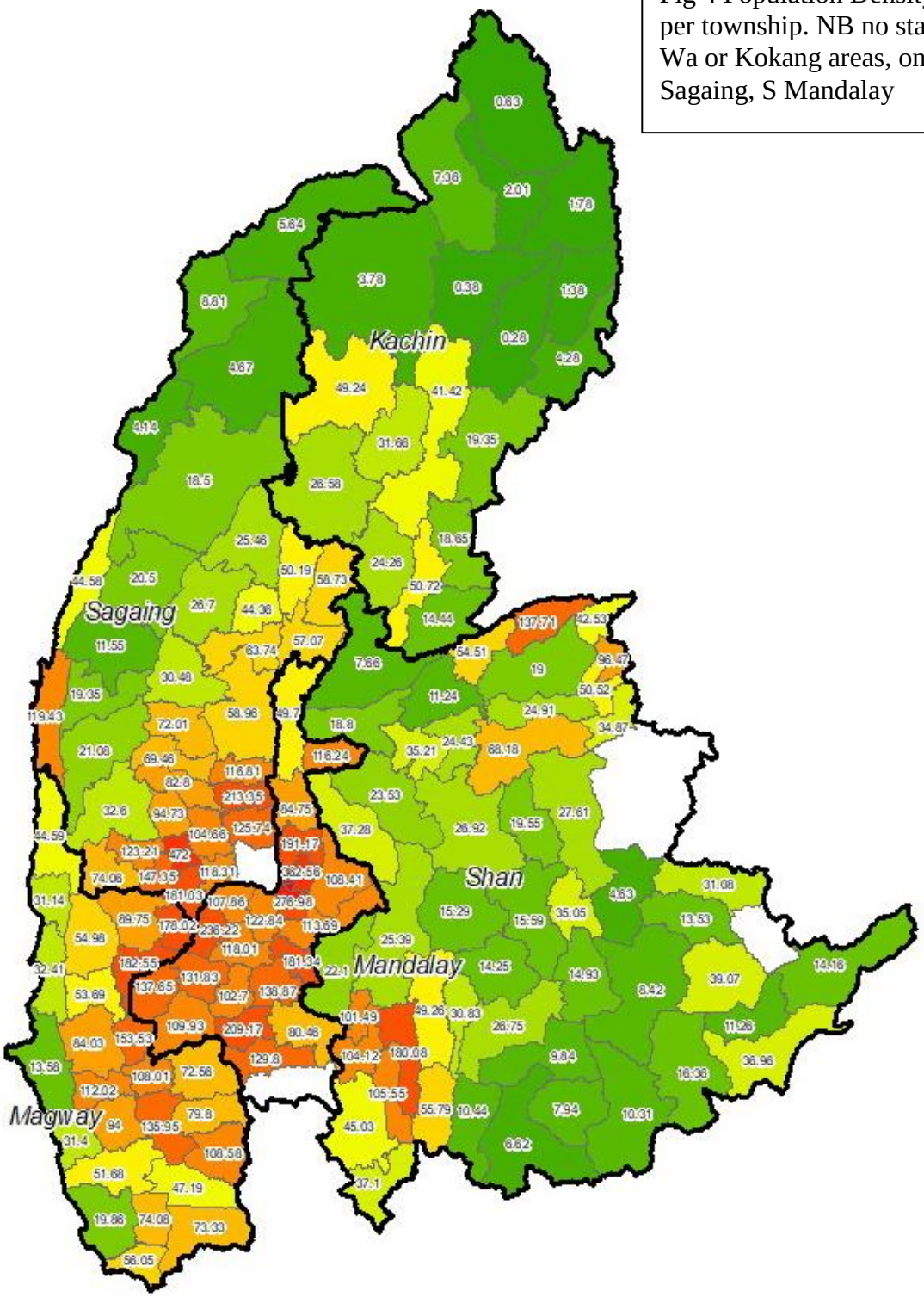


Fig 4 Population Density per Km2 per township. NB no statistics for Wa or Kokang areas, one each in S Sagaing, S Mandalay



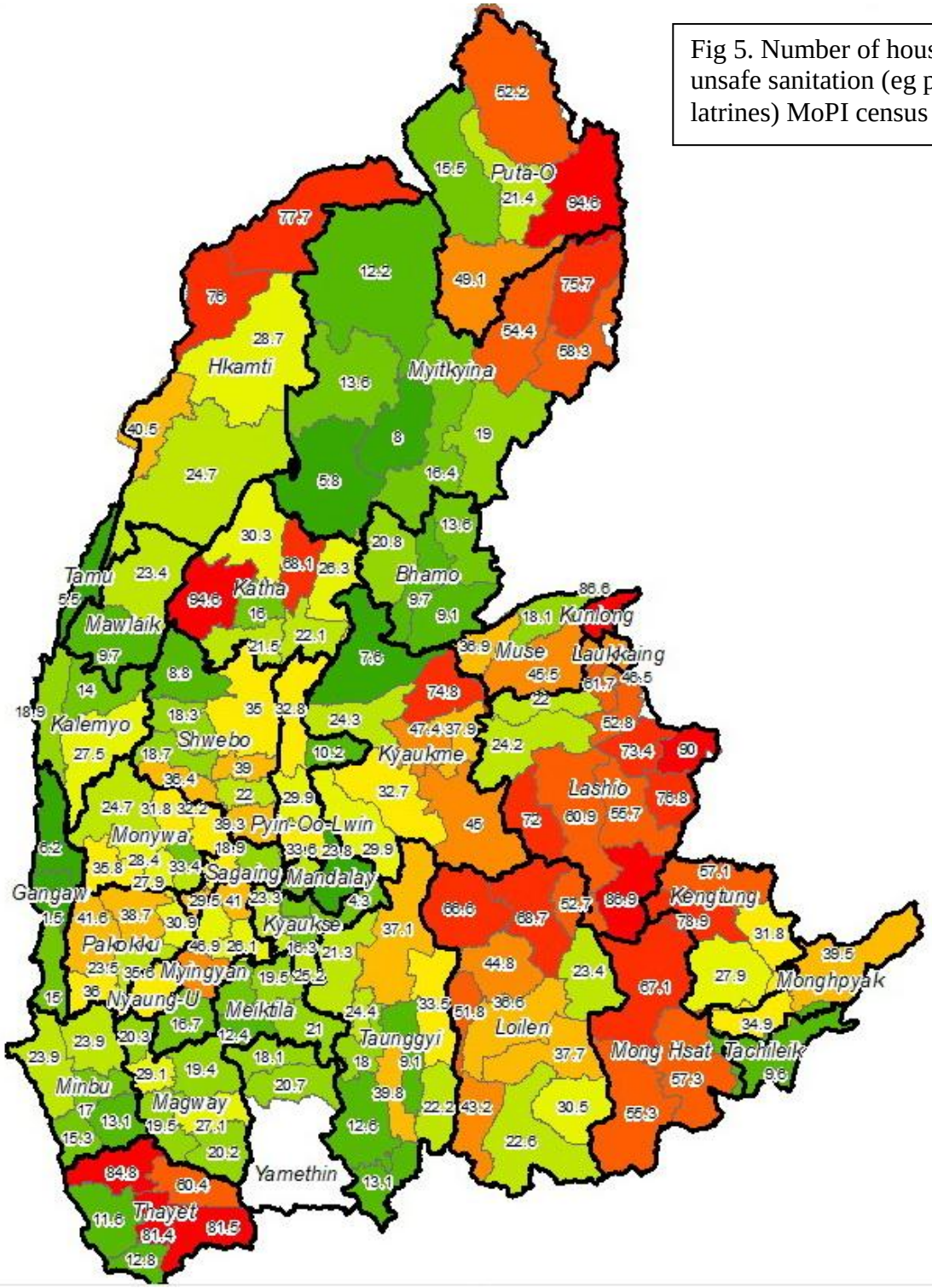


Fig 5. Number of households with unsafe sanitation (eg pit or bucket latrines) MoPI census 2014

SAIL NM Townships Selection Criteria and Weighting									
		Criteria							
	State/ Region	Population Density Km2	% HH No Access Safe Sanitation	No. of IDPs	Percent Agricultural Land	Area Fish Ponds	Per Capita Income	Children_Percent _Undernourished	Total
Weighting	Kachin	15%	10%	5%	5%	40%	10%	15%	100%
	Shan North	15%	10%	5%	5%	40%	10%	15%	100%
	Shan East	15%	10%	0%	5%	40%	10%	20%	100%
	Shan South	15%	10%	0%	5%	40%	10%	20%	100%
	Mandalay	15%	10%	0%	5%	40%	10%	20%	100%
	Magway	15%	10%	0%	5%	40%	10%	20%	100%
	Sagaing	15%	10%	0%	5%	40%	10%	20%	100%

Table 2. Weightings allocated to the 7 selection variables.

Shan South			Shan East		
Townships	Score	Ethnic groups	Townships	Score	Ethnic groups
Nyaungshwe	39.52	3	Monghpyak	31.87	2
Pekon	1.14	2	Kengtung	22.51	2
Nansang	1.12	2	Mongkhet	2.71	1
Taunggyi	1.11	2	Tachileik	0.42	1
Loilen	0.51	2	Mongton	0.20	1
Kachin			Magway		
Townships	Score	Ethnic groups	Townships	Score	Ethnic groups
Mohnyin	5.18	2	Ngape	37.13	2
Mogaung	2.62	3	Myothit	9.22	1
Waingmaw	1.48	2	Salin	6.79	1
Bhamo	0.78	3	Seikphyu	5.86	2
Mansi	0.51	3	Sinbaungwe	4.94	1
Sagaing			Mandalay		
Townships	Score	Ethnic groups	Townships	Score	Ethnic groups
Shwebo	42.14	1	Madaya	42.29	1
Khin-U	4.83	1	Sintgaing	1.37	1
Wetlet	3.63	1	Patheingyi	1.24	1
Tigyaing	3.61	1	Myittha	0.61	1
Kale	3.19	1	Singu	0.50	1

Table 3 Final selected townships and approximate number of ethic groups in each.

3. Ethnic Groups in the project regions

At the presentation of draft methodology meeting (03 December) USAID indicated there should be less emphasis or weighting on the IDP variable, but if data on township ethnic composition could be integrated and could used to emphasize townships of high ethnic diversity this would allow project benefits to concentrate around fish trade and commerce, bringing about prosperity by promoting a shared enterprise in a multi ethnic setting.

As there is no official data collected on ethnicity at the township level (ie census data), an alternative online source was found that included township boundaries that could be used to more accurately georeference the map with the project data

https://www.reddit.com/r/MapPorn/comments/9c9al7/ethnic_groups_of_myanmar/

It is reported Myanmar may have more than 100 ethnic groups and sub-groups so the data used can only be seen as a gross generalisation and although not therefore used in the selection, is nonetheless an indicator or which townships are more or less ethnically diverse and which are comparatively homogeneous (see Table 3 for ethnic groups by selected townships).

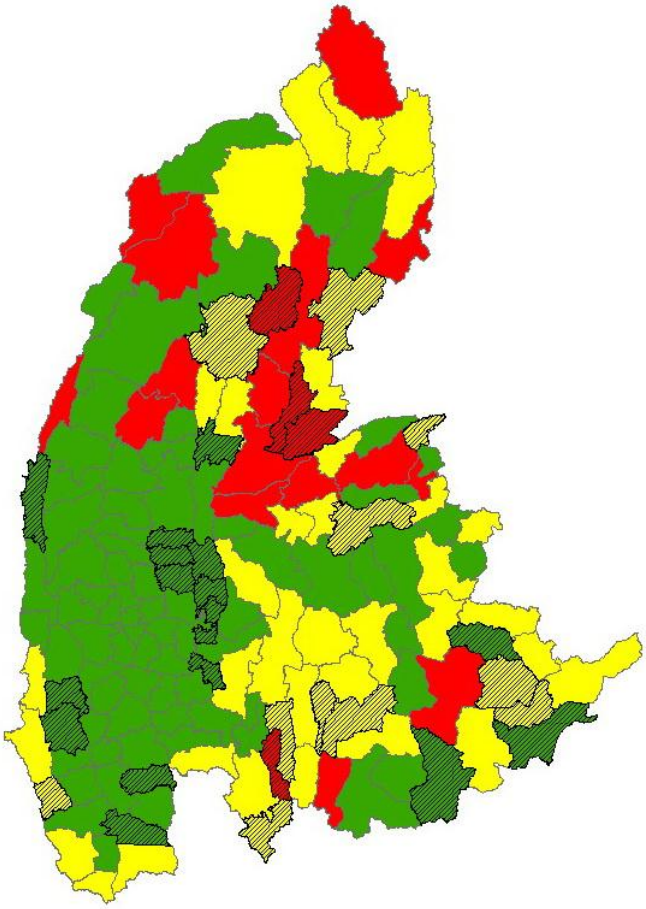


Fig 6. Ethnic diversity in project region and selected townships

Red 3 or more
Yellow 2
Green 1

Grey = selected townships

4. General water assessment of project region

4.1 Rainfall, surface water and canals.

This assessment of water resources has been somewhat constrained by data availability within the time frame of the consultancy, especially relating to water sources and distribution systems. Field visits to aquaculture sites in Mandalay (Madaya and Sintgaing townships) and Kengtung demonstrated that most fish farmers are entirely dependent on supplementary water functioning within the dry season to replenish their ponds.

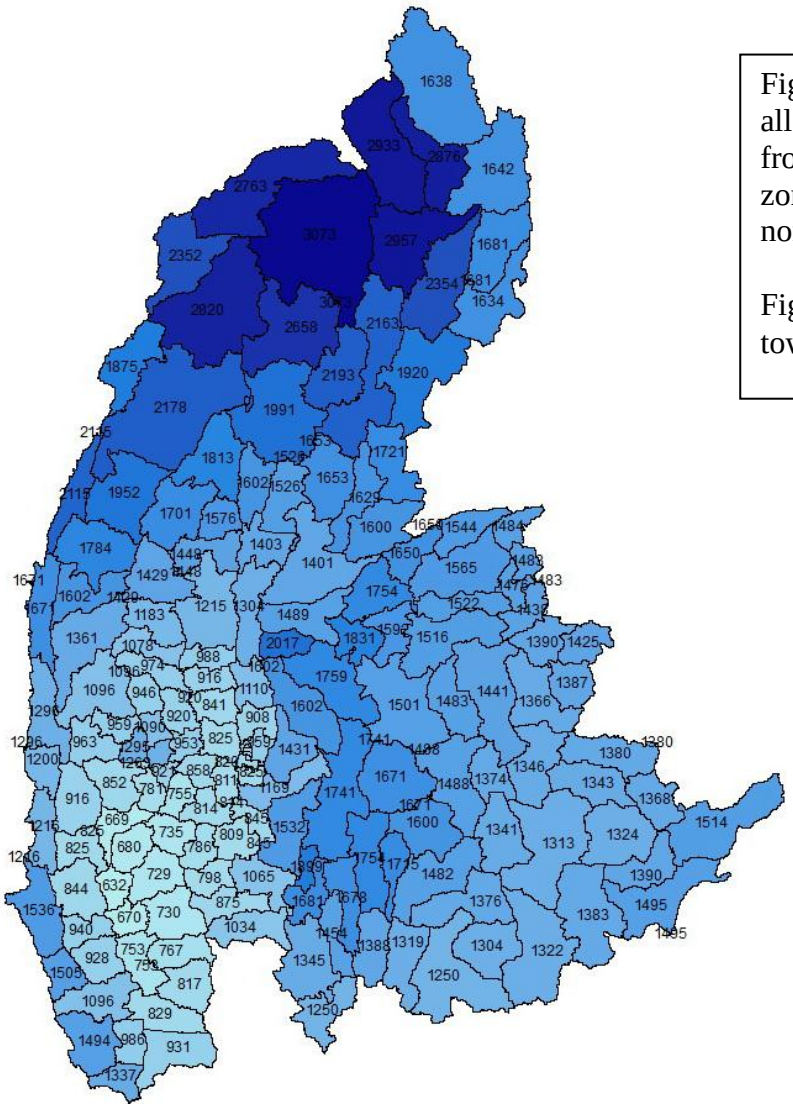


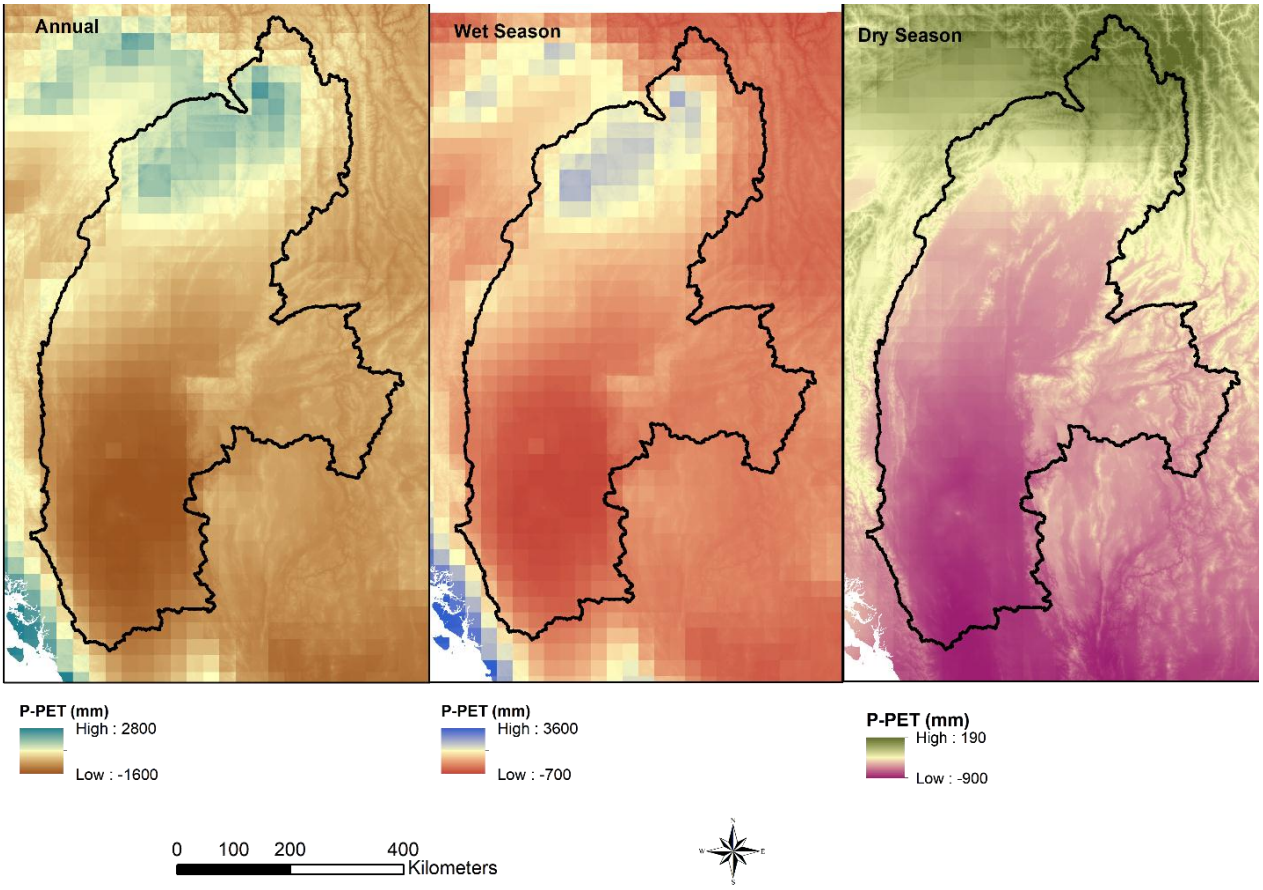
Fig 7. Mean annual rainfall within all townships of the project area from a low of 640 mm/yr in the dry zone to more than 3200mm/yr in northern Sagain and Kachin.

Figures = mean annual rainfall per township

This is shown more effectively in the difference between mean annual rainfall and mean annual evapotranspiration, indicating the levels of water deficit.

In Kengtung, the sole private hatchery is forced to move their brood stock around different ponds to ensure their survival, while in Madaya amd Sintgaing, all fish farmers obtained supplementary water from irrigation reservoirs and their distribution networks. Mapping suitability for aquaculture, as defined by irrigation water access would have been improved if maps of the irrigable land downstream from major reservoirs (ie the 'command areas') would have been available through MoALI. A request for this was made through IWMI but to no response within the consultancy period. Discussions within the project team indicate that actual water supply from dams in any given area is likely to be a complex issue affected by numerous factors and the mere presence of water supply systems does not necessariliy guarantee availability. A recent example was cited from Southern Sagaing where due to low rainfall the irrigation dam was unable to provide water to rice farmers within its scheme, less so to the aquaculture farmers present.

Fig 8 shows the water balance of rainfall minus potential evapo-transpiration only in northern Sagain and Kachin is there a water surplus, while for most townships, there is an annual water deficit, which extends far north in the dry season (Fig 4 far right image)



Rainfall minus average annual potential evapotranspiration (P-PET) Annual (Left) Wet Season (Middle) Dry Season (Right)

Table 4 shows only Magaung, Waingmaw and Mohnyin townships have a net annual water surplus, while all other townships are in deficit, those of southern Sagaing, magway and Mandalay especially so.

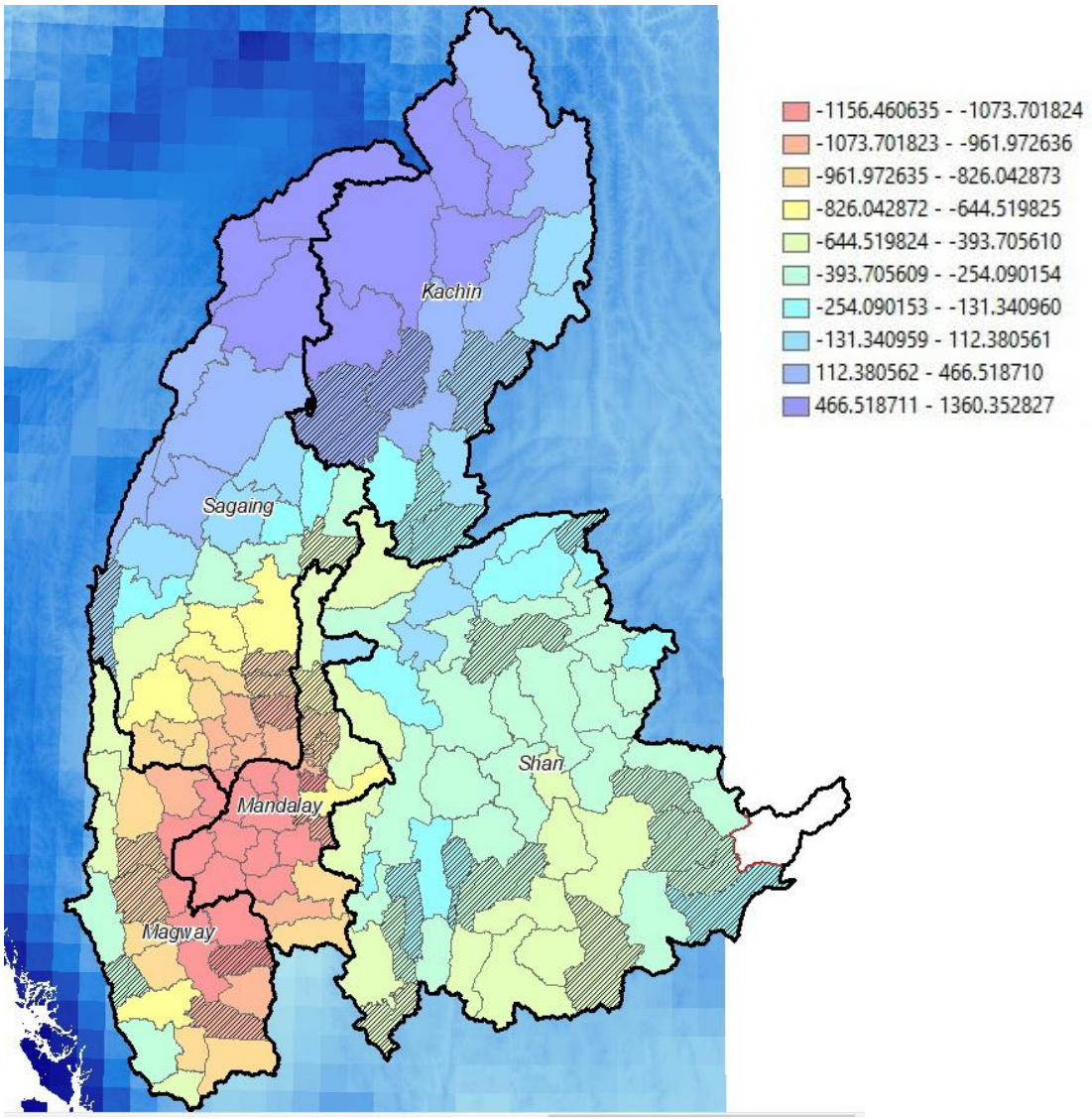


Fig 9 Water balance in selected project townships (grey)

State	Township	Annual WB (mm)
Shan South	Loilen	-181.1
Shan South	Taunggyi	-230.7
Shan South	Nansang	-335.0
Shan South	Nyaungshwe	-352.2
Shan South	Pekon	-456.5
Shan North	Konkyan	-216.1
Shan North	Lashio	-311.9
Shan East	Tachileik	-221.1
Shan East	Monghpyak	-254.1
Shan East	Kengtung	-274.2
Shan East	Mongkhet	-300.4
Shan East	Mongton	-446.9
Sagaing	Kale	-94.4
Sagaing	Khin-U	-854.7
Sagaing	Shwebo	-920.0
Sagaing	Wetlet	-1006.5
Mandalay	Tigyaing	-445.3
Mandalay	Singu	-788.8
Mandalay	Madaya	-884.8
Mandalay	Patheingyi	-912.0
Mandalay	Myittha	-1042.1
Mandalay	Sintgaing	-1073.7
Magway	Ngape	-361.4
Magway	Seikphyu	-915.5
Magway	Salin	-936.5
Magway	Sinbaungwe	-1013.2
Magway	Myothit	-1094.0
Kachin	Mogaung	359.6
Kachin	Mohnyin	179.9
Kachin	Waingmaw	100.4
Kachin	Bhamo	-173.2
Kachin	Mansi	-173.3

Table 4. Annual water balance for each of the selected townships.

4.2. Fish ponds. Irrigation supply canals and water distribution systems

Although accurate spatial data from MoALI on the command areas and distribution networks of major dams was unavailable during the consultancy, this was available from other sources, notably the national 1:50,000 topo sheets, although these date back to year 2003 and are possibly inaccurate. While unusable as a basis for project planning are still useful as an indicator of irrigable area within water could be delivered. It is expected by the time of the project baseline assessment that the MoALI data will have become available, if not the case information at the site level and from field work would be needed, if necessary supplemented by remote sensing or drone data for verification and cross checking.

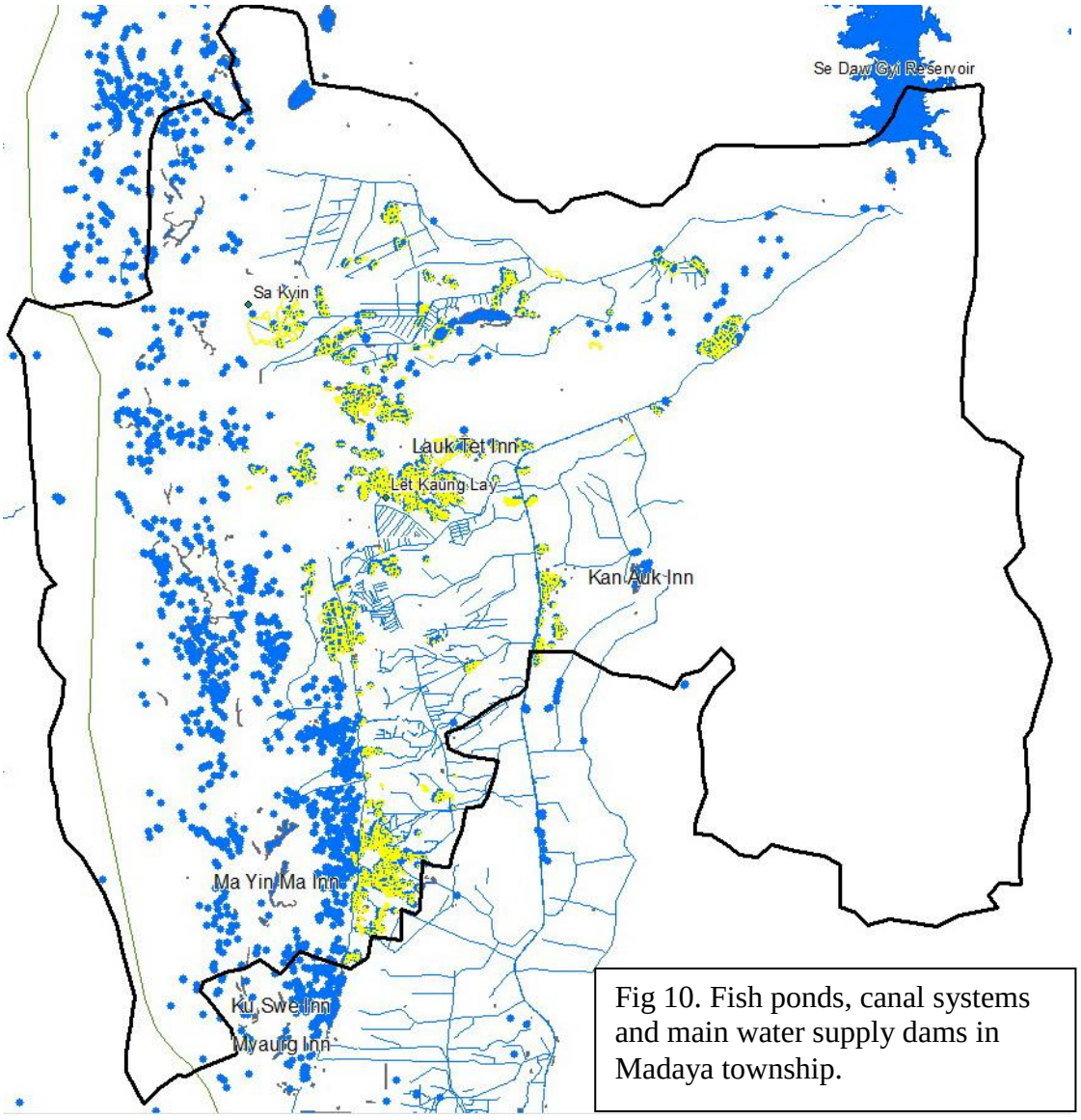


Fig 10. Fish ponds, canal systems and main water supply dams in Madaya township.

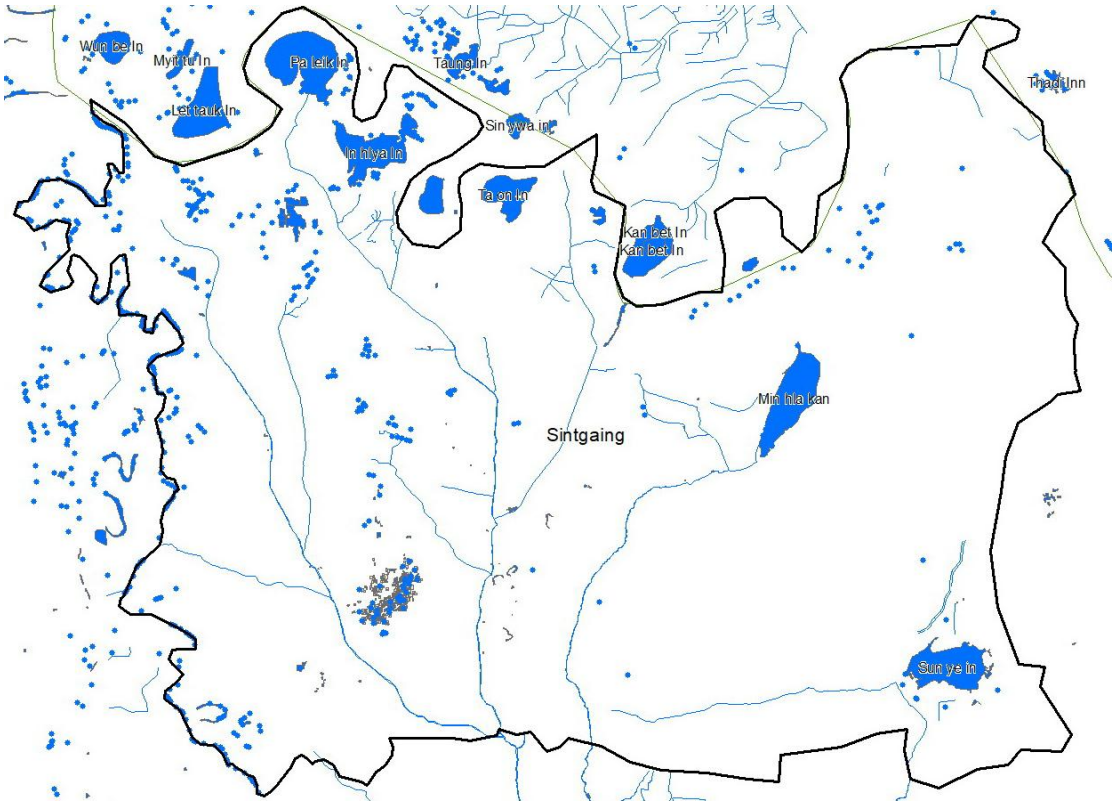


Fig 11. Fish ponds, canal systems and main water supply dams in Sintgaing township.

4.3. Validation and verification of DoF data on pond areas in Kengtung, Madaya and Sitgaing..

During the Kengtung field visit, the team were told that only 50% of fish ponds in the township were officially licenced and registered by DoF, raising the possibility that official statistics for ponds, pond area and production could be potentially be twice the reported figured used in the selection process.

Given the significance given to fish pond data in determining township selection and the acknowledgement by DoF that op to 50% of the ponds (in Kengtung) were unlicenced, a comparison was made between the official statistics, and what would be reported by high resolution satellite imagery, covering the same date

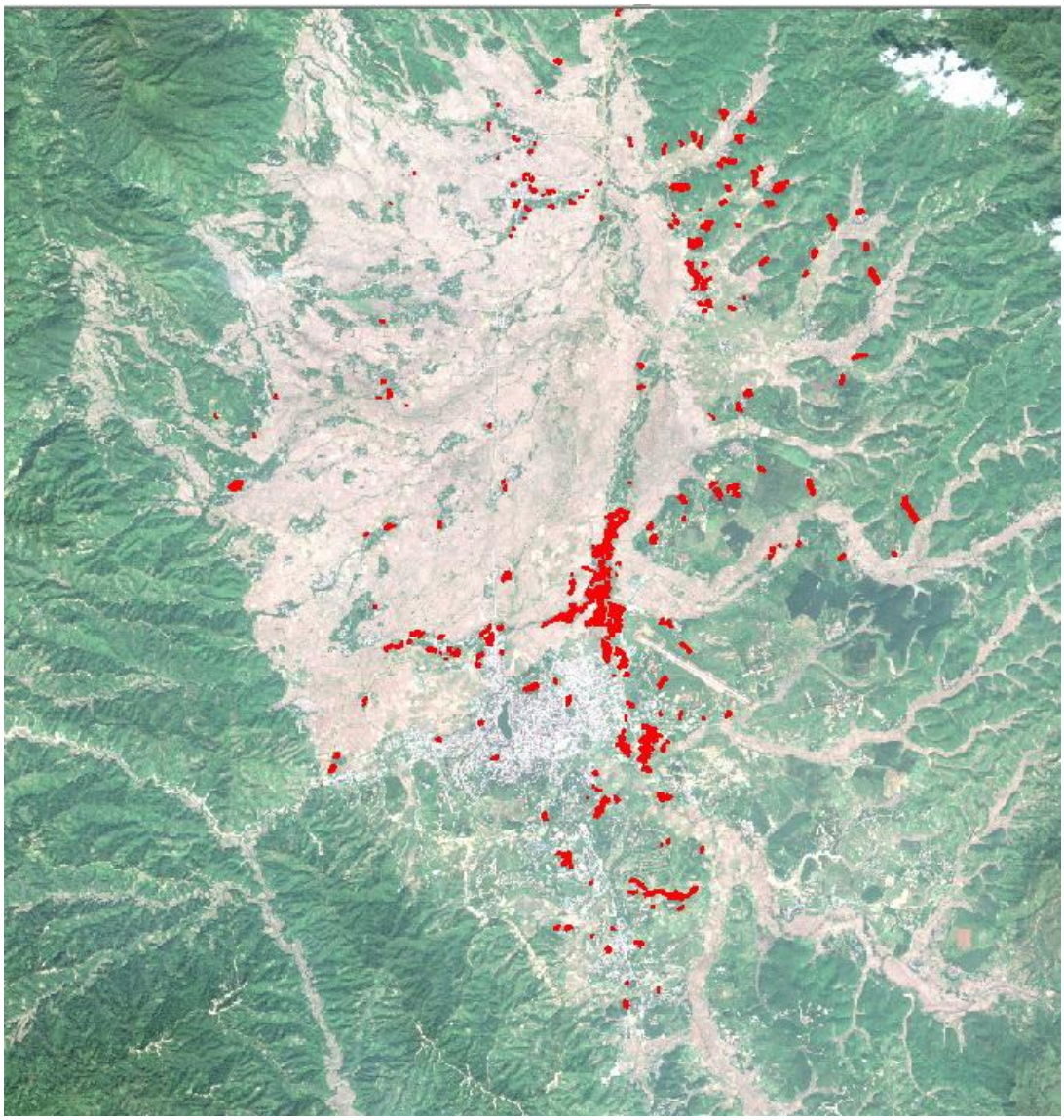


Fig 12. Map of fish ponds, Kengtung Township, derived from Sentinel imagery dated December 2019.

Sentinel 2 data at 10m resolution was processed to ptoduce polygons from which the size and area of fish ponds in Kengtung could be derived.

Kengtung	Sentinel	DoF
Ponds	348	317
Area (acres)	730	690

Table 5. Reported versus observed data on fish ponds and area, Kengtung

Results are for indicative purposes only, as satellite derived measurements themselves cannot be used as ‘ground truth’ without adequate field checking and accuracy assessment. The results (above) confirm the DoFs assessment that there are indeed a higher number and area of ponds than those which are officially reported. The closeness of the two sets of figures means DoF data in this instance can confidently be used in the selection process.

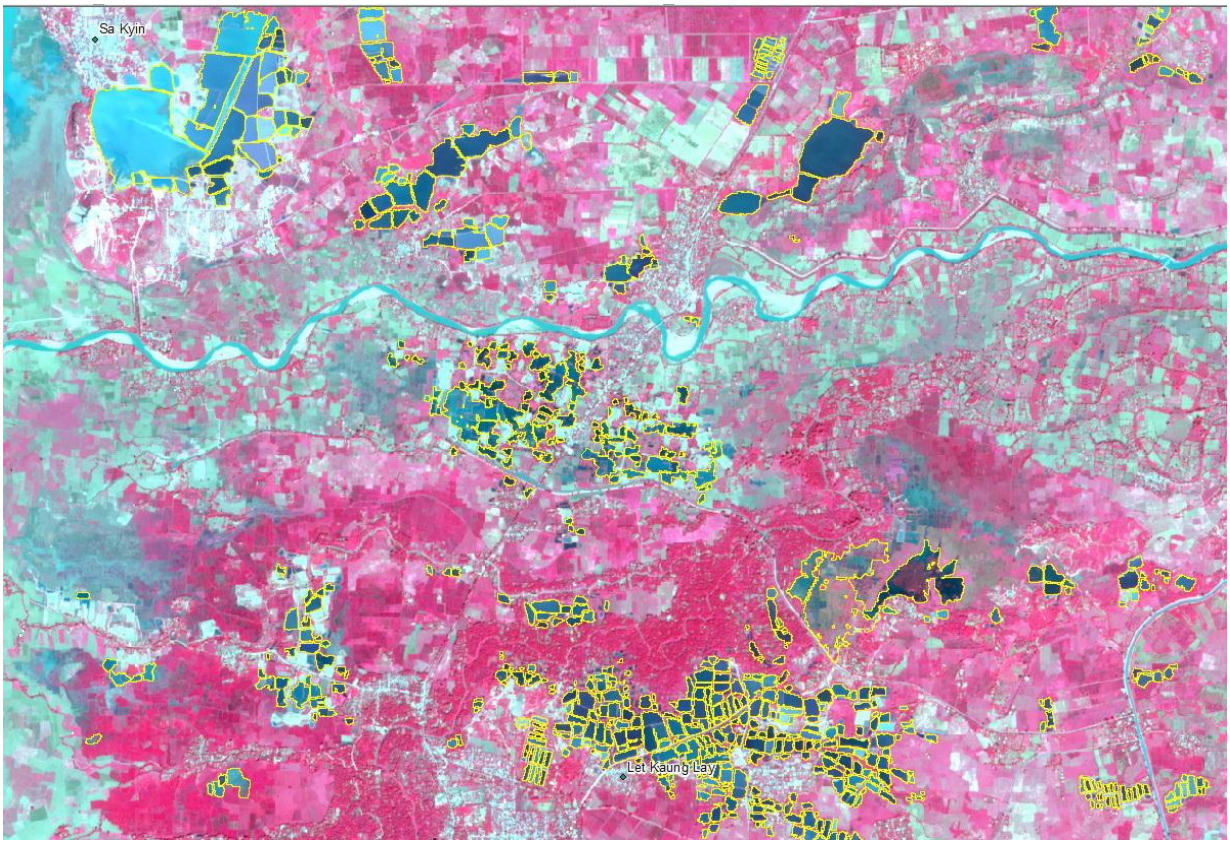


Fig 2. Pond areas (yellow) identified in Madaya township by satellite observation..

The same procedure was followed for Madaya township, producing a much greater difference in the reported number of ponds, but a relatively close estimate of the total pond area, possible due to the issuing of multiple licences for different parts of the same large area of natural water bodies (lanns), which the satellite identifies as a single unit.

Table 6. Reported versus observed data on fish ponds and area, Madaya Township

Madaya	Satellite	DoF
Ponds	1,302	2,710
Area	4,772	5,281

There was inadequate time available to repeat this procedure for the entire project regions, but it is recommended this should be done for the 30 selected townships as part of the baseline survey

4.3 Validation and verification of ponds and wetlands as points using EU global surface water data.

An important additional data source for this task is the EU global data set on global surface water, https://global-surface-water.appspot.com/
which identifies surface water over 3 decades in terms of extent and occurrence. 'Extent' being whether surface water has *ever* occurred at a location, occurrence being an indicator of water surfaces which are persistence over time. Evaluating the two data sources indicates the extent variable gives an over estimate of water which the occurrence data, thresholded at 20% gives a realistic assessment of actual water area. The occurrence data, set with a 20% threshold, when converted from polygons to points and edited against high resolution data (eg Google Earth) provides an indicator of actual pond locations. This data is currently unavailable from any other source, and the data could usefully be used with the Sentinel derived polygon data to accurately verify and locate all pond areas in the selected townships. Fig 3

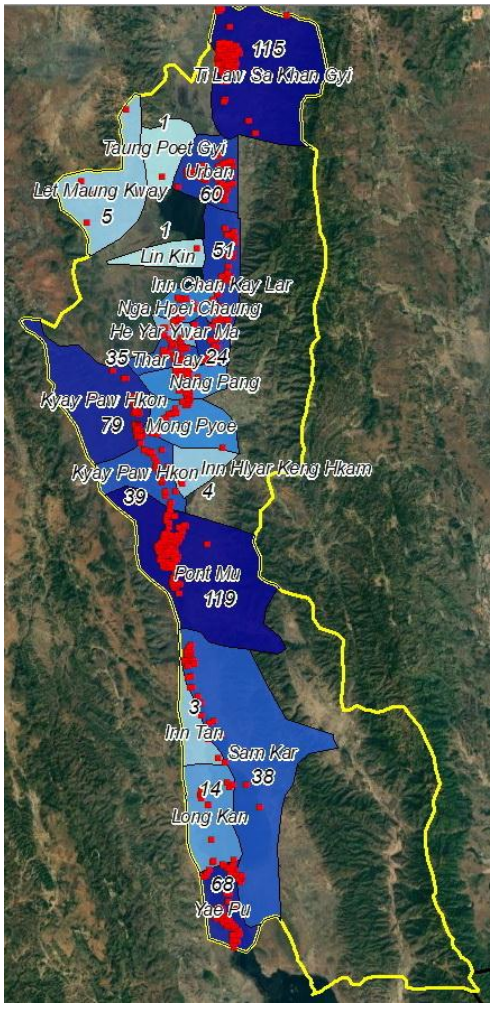


Fig 14. Pond locations (red) and pond quantities per village tract in Nyaung Shwe Township. Village tracts without ponds are not displayed.

4.4 Groundwater Assessment

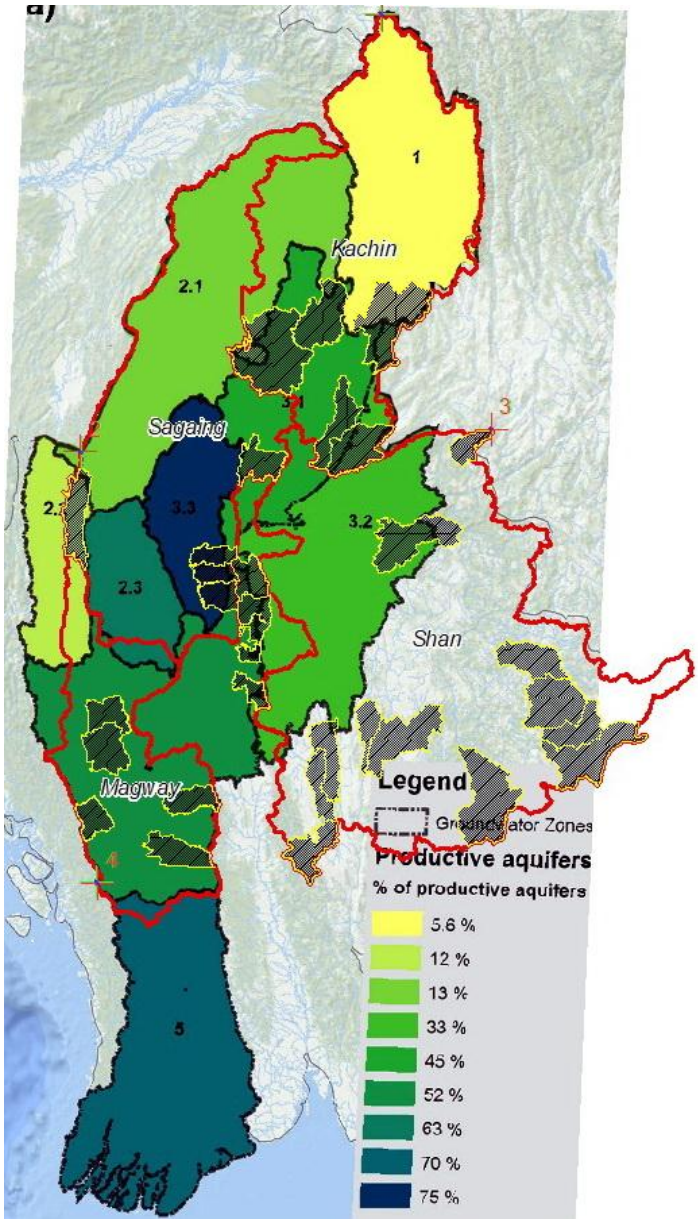


Fig x shows that all selected townships except those in Shan East and South lie fully or partially (Shan North) within the Ayeyarwaddy basis. Fix x also shows that many of the most water deficient townships are located where there are also productive aquifers that would potentially be used to supply and overcome the dry season water deficit. The issues of expected yield, artesian (ie free flowing) wells compared with supply from pumped wells, and potential water salinity are fully discussed in the report 'The Ayeyarwady State Of The Basin Assessment (Soba) Report' which is the source for this figure. Townships in Shan East and South drain into the Thanlwin or Sintang basis.

5. Agro-ecological assessment of project region

Agro-ecology takes into account a number of integrated physical factors which collectively define an area into similar characteristics including soils, geomorphology, relief, temperature, climate, rainfall, and temperature. Currently there is no single data set combining all these factors in Myanmar with sufficient detail to support the township assessment. Only one major agro-ecology components was used in the selection, the percentage of agricultural land per township (Fig x) was derived from a land use map of the whole of Myanmar produced by Myanmar NGO Ecodev in cooperation with the Smithsonian Institution, prepared by remote sensing methods and analysis of Landsat 8 data acquired in 2015.

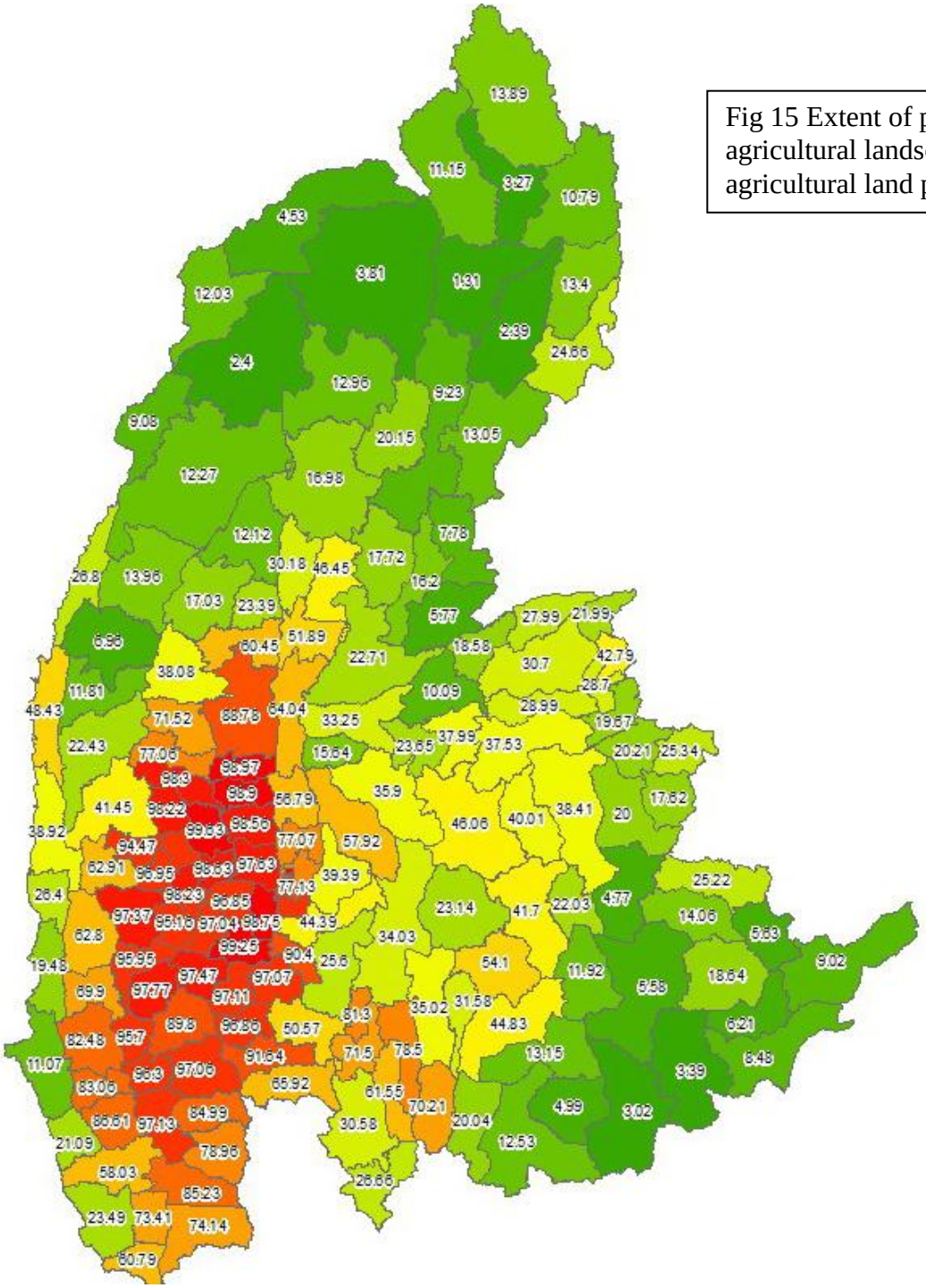


Fig 15 Extent of predominantly agricultural landscapes (percent agricultural land per township)

Other data defining agro-ecology of the project region include percent slope, indicating the general topographic limitations present (fish ponds cannot be developed on sloping land).. Fix x indicates slope limitations common in Shan, north west Sagain and Kachin, less so in Mandalay and Magway. National soil maps describing major soil groups were available, but did not contain sufficient detail on clay or sand

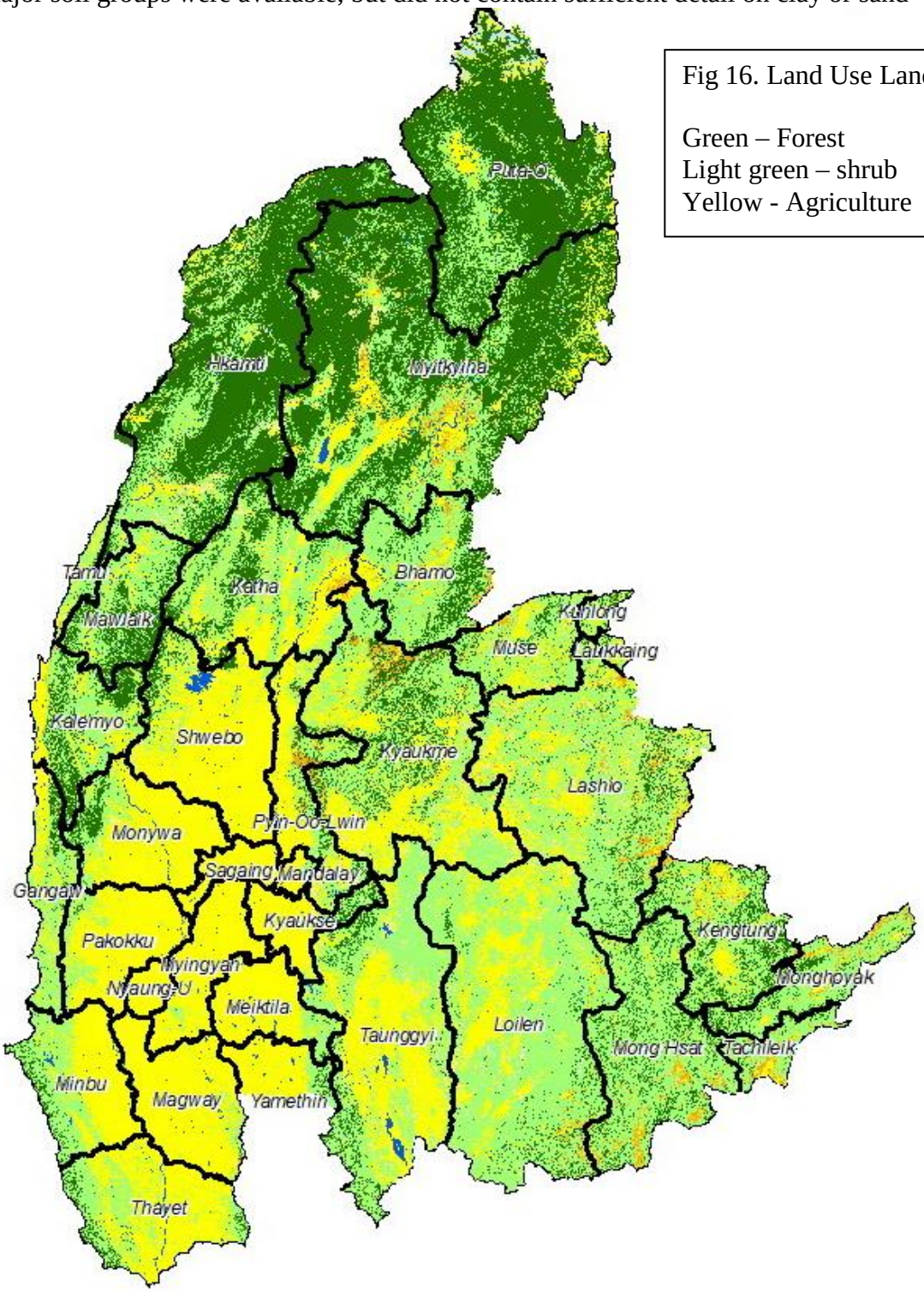


Fig 16. Land Use Land Cover

Green – Forest
Light green – shrub
Yellow - Agriculture

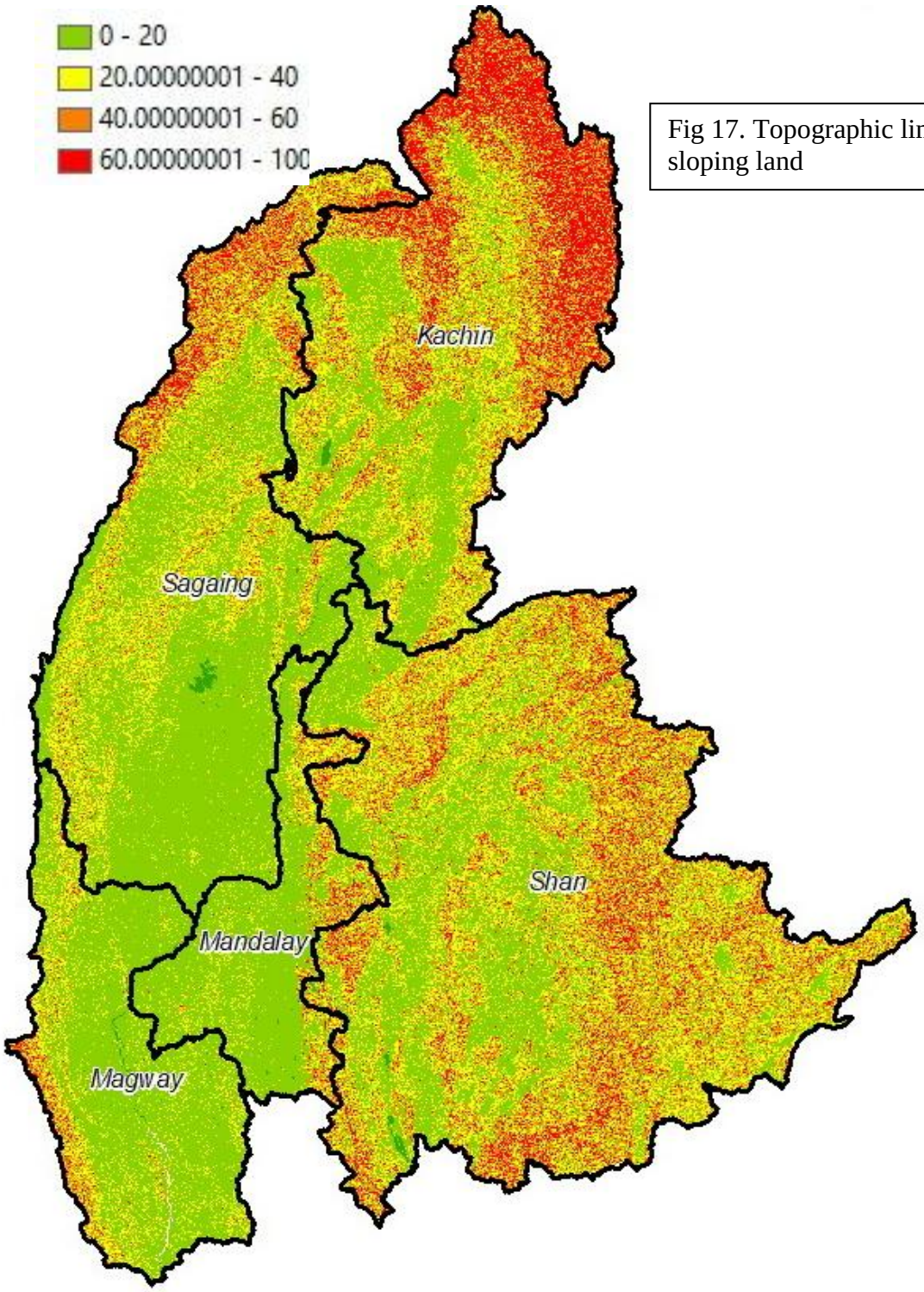


Fig 17. Topographic limitations: sloping land

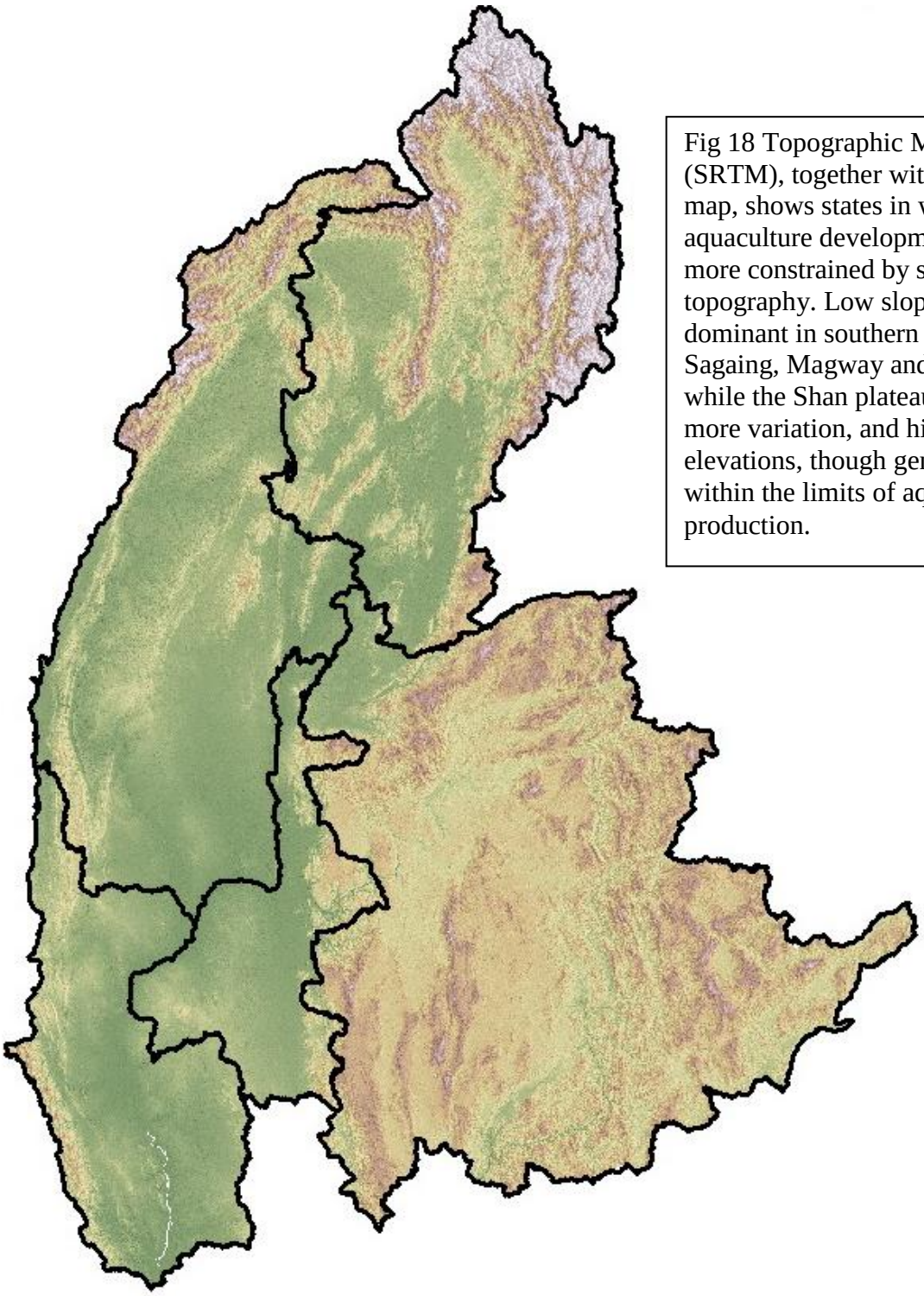
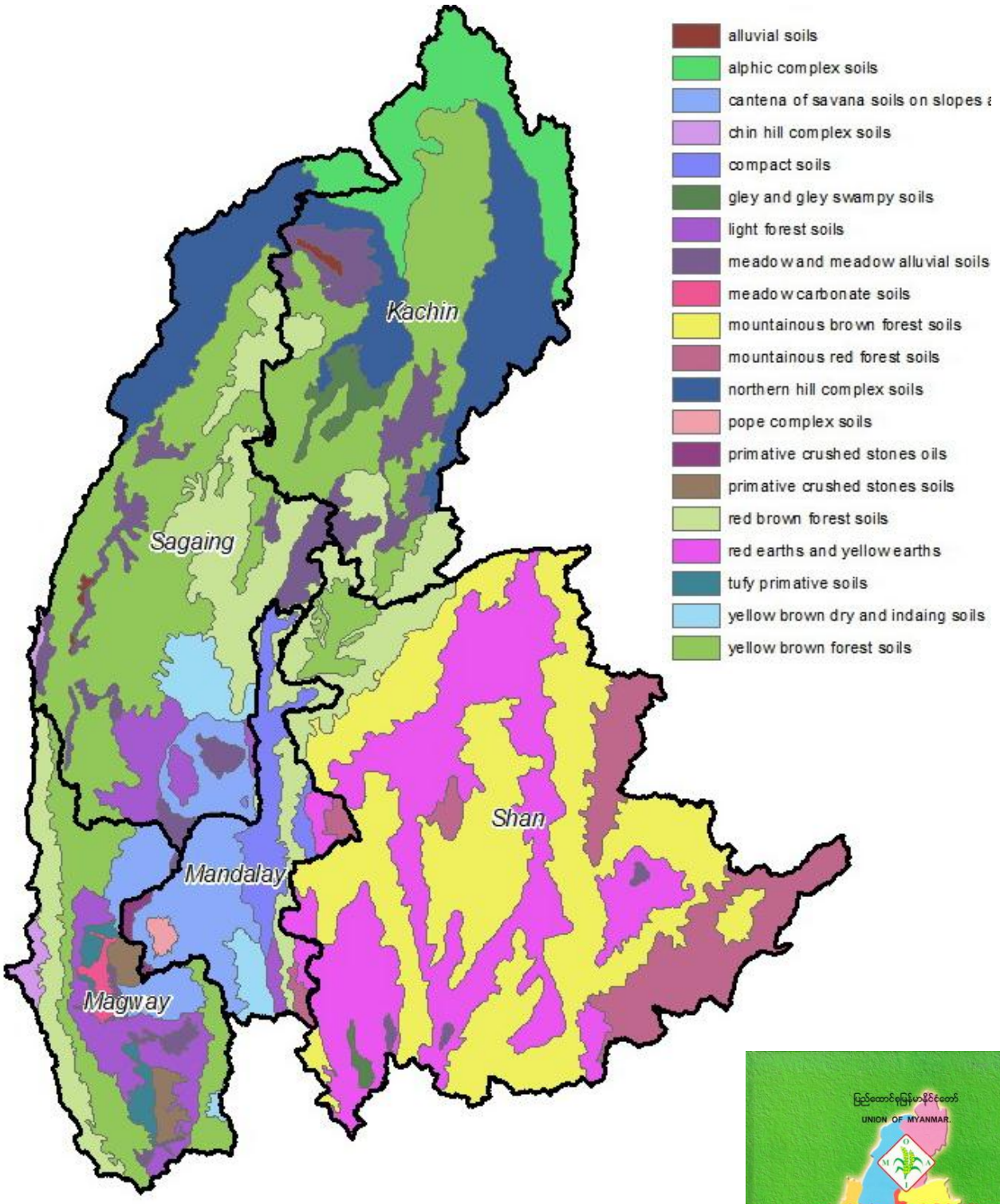


Fig 18 Topographic Map (SRTM), together with the slope map, shows states in which aquaculture developments are more constrained by slope and topography. Low slope angles are dominant in southern Kachin, Sagaing, Magway and Mandalay, while the Shan plateau contains more variation, and higher elevations, though generally all within the limits of aquaculture production.



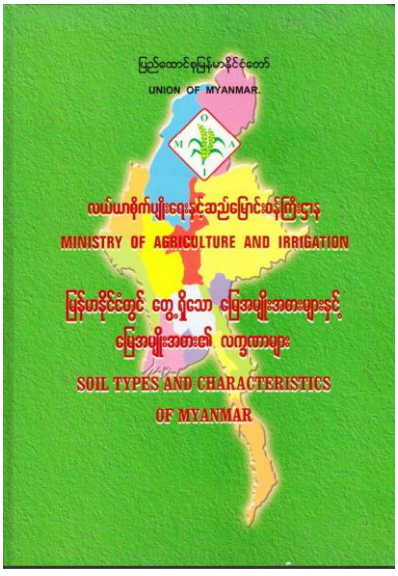
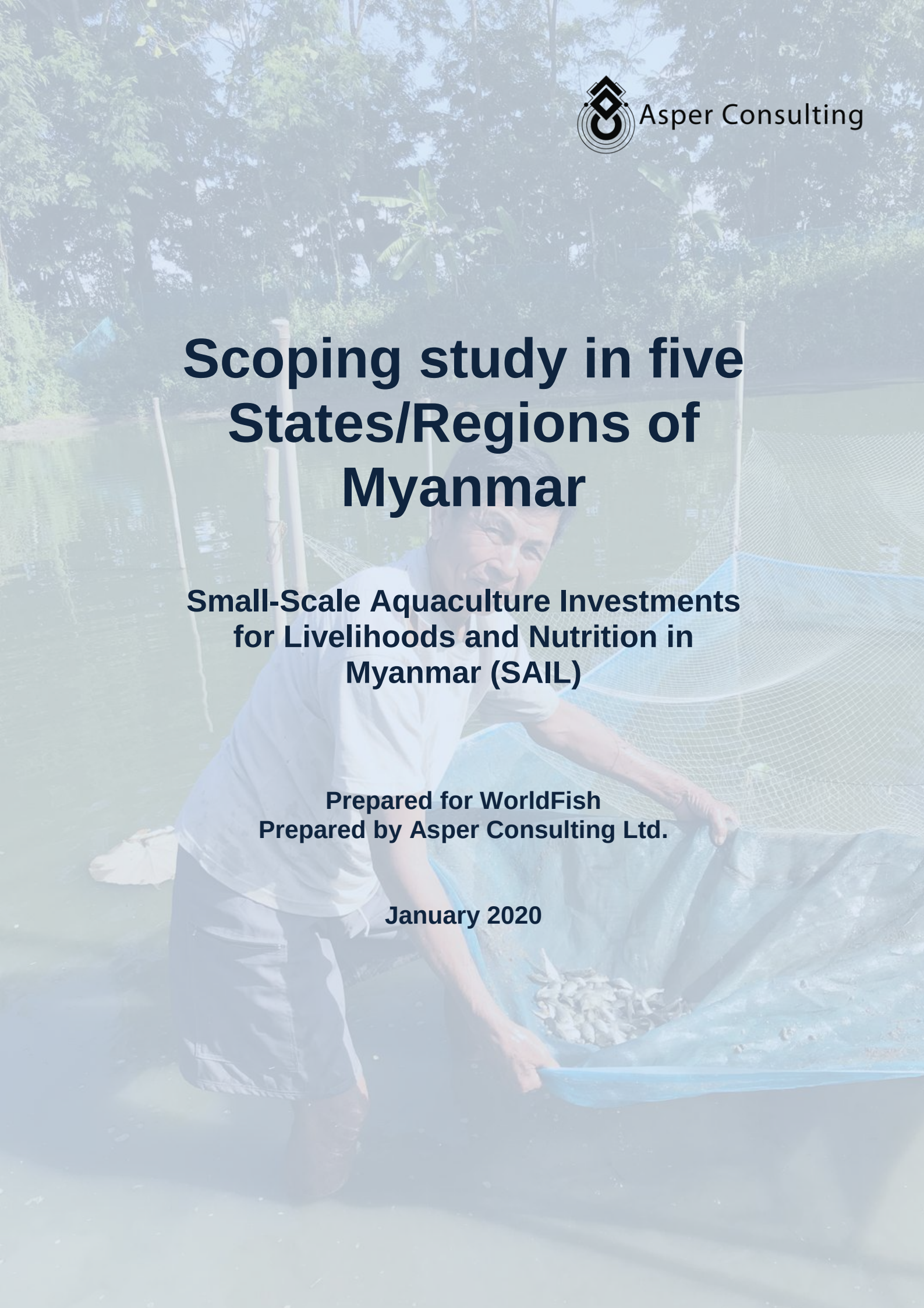


Fig 19 Soils data of project region, from the National Soil Map Atlas (MoALI) provides rather limited soil information usable for guiding potential pond locations

Annex 1: List of Deliverables.

#	Due date	Deliverable	Status
1	14 Nov 2019	Meeting and work in close coordination with WorldFish-IWMI-IFPRI and the USAID mission in Myanmar. Select township intervention selection criteria designed to ensure the project can contribute significantly to improved food and nutrition security for poor households.	Completed
2	14 Nov 2019	Using Myanmar fish market system – review and agreed township selection criteria, carry out a desk-based spatial analysis of possible target townships. Provide analysis in the form of a series of maps to the CGIAR / USAID team for discussion and agreement.	Completed
3	15 Nov 2019	Broad scale scoping, team and network development, security assessment/verification, preliminary data collection and methods testing leading to preliminary township selection.	Completed
4	18 Nov 2019	Provide PowerPoint presentation and seek comments/approval of methodologies.	Completed
5	20 Nov 2019	Proceed with team training and finalize methods and approach followed by detailed data collection using approved methodology/tools developed in Phase 1.	Completed
8	18 Jan 2020	Present the township selection recommendations at a debriefing in Yangon: a half-day workshop is envisaged.	Completed

6	18 Jan 2020	Provide institutional analyses, stakeholder mapping and poverty assessments as well as preliminary water resource assessment (1) and agro-ecosystem assessment (2).	*(see Sebastien Moineau report)* Completed
7	18 Jan 2020	Present a series of township maps, and associated descriptive text, with as much secondary GIS information as possible including land cover, digital elevation and climate and hydrological data.	Completed



Asper Consulting

Scoping study in five States/Regions of Myanmar

Small-Scale Aquaculture Investments for Livelihoods and Nutrition in Myanmar (SAIL)

Prepared for WorldFish
Prepared by Asper Consulting Ltd.

January 2020

Disclaimer

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I. Project background

WorldFish is leading a 'Small-Scale Aquaculture Investments for Livelihoods and Nutrition in Myanmar (SAIL)', a project which aims to provides a means of ensuring the improved availability of diverse, safe, affordable nutrient-rich foods, especially for women and young children from poor and vulnerable households. This will be achieved by ensuring that poor households have an increased ability to purchase accessible nutritious foods due to improved incomes from entrepreneurial activities including improved small-scale aquaculture in the intervention areas and the strengthening of aquaculture market systems with particular attention to expanding opportunities for women and youth. In addition, behavioural change work will prioritize nutritious-conscious household decisions by means of both home production and local markets.

Specifically, it is expected that the adoption of fish culture technologies would contribute to improved food and nutrition security for poor households in several ways:

- Generating income from fish culture which would be used to purchase nutritious food
- Creating alternative employment generating activities and increasing labour productivity
- Increasing available food supply and fish consumption

The geographical areas to be covered include Kachin, Mandalay, Magway, Shan and Sagaing Regions/States. The project has three main outputs:

- Small-scale aquaculture production increased through strategic activities including improved land and water use, increased access to high quality inputs (feed, seed and equipment), capacity development and research into production, and access to credit.
- Market-based system approaches (MSA) further developed and utilized to increase access to food safe fish and fish products by poor people. Capacity building will ensure that market systems function more effectively, sustainably and to the benefit of the poor.
- Enhanced nutrition and WASH practices delivered via social behaviour change communication. Capacities developed into the production, processing and consumption of food safe aquaculture and other fish-based products.

To kick start this project, WorldFish has hired Asper Consulting Ltd. and an independent consultant to assist with the scoping study in five States/Regions in Myanmar. Asper Consulting Ltd, hereinafter refer to as Asper, was hired based on its extensive experience in market systems and systems thinking. This report encapsulates the deliverables that were part of Asper's scope of work. These deliverables are the stakeholder mapping, the institutional analysis and the market systems status report. Asper's key deliverables also included a provisional selection of townships and a proposed township selection. The process and outcome of the townships selection process were presentations and a township selection software handed over to SAIL on 21st January 2020.

II. Purpose

This report presents the findings and recommendations of the scoping study that was conducted in Myanmar from 18th November 2019 to 22nd January 2020. The scoping study involved desk study, data collection and analysis of primary and secondary data. The list of secondary data consulted during the scoping study is presented in Appendix A. The primary data was collected from 19th to 20th November in Shan East, from 27th to 30th November in Mandalay Region, from 2nd to 4th December in Sagaing Region, from 5th to 7th December in Magway Region, from 6th to 8th January in Shan South and from 9th to 12th January in Kachin State. The field notes from the scoping study are presented in Appendix B. The workplan prepared by Asper for the scoping study is presented in Appendix C. The structure of the report is as follows:

Section III Methodology: describes the methodology used to create the deliverables for this scoping study.

Section IV Township Selection: describes the approach taken to develop, test, refine and validate the proposed selection of townships in the five States/Regions where SAIL plans to operated.

Section V Institutional Analysis: identifies major institutions and players in the aquaculture sector and the status of their relationship with SAIL.

Section VI Market Status: identifies market players in the aquaculture and marine capture markets in the regions/states where SAIL will operate, their incentives to transform the market systems and their current performance.

Section VII: Conclusion and recommendations

III. Methodology

Phase 1: Township selection & method testing

- Evaluate and prepare primary data available for township selection criteria (poor households, IDPs, Gender). The secondary data was collected and evaluated by the consultant hired directly by WorldFish to handle the spatial data and mapping. In November, Asper and the consultant hired directly by WorldFish agreed on proposed selection of criteria, and created a software for the selection of townships using these criteria. The initial selection method was tested in Shan East in November 2019.

- Carry out a desk study and analysis of primary & secondary market systems literature from Myanmar, covering the spectrum of fish systems from "capture" to "culture" and prepare thematic data for spatial analysis and selection of target townships. A bibliography of the report and publications reviewed is provided in Appendix A. The desk study analysis carried out in November 2019, shows that there is no market systems literature available on aquaculture in Myanmar. Secondary data is available on value chains and market studies but not on Market Systems Development or Market Systems Approach (MSA) in the aquaculture sector in Myanmar. Secondary data was collected and prepared for thematic spatial analysis in November 2019 and January 2020 with the consultant hired directly by WorldFish.

- Broad scale scoping, team and network development, security assessment/verification, preliminary data collection and methods testing leading to preliminary township selection. The methodology for the field research of this Scoping study was first tested in Shan East. Shan East was not originally part of the scope of work. This area was selected by SAIL to test the scoping methodology. SAIL also decided to exclude Shan North over security concerns. Instead the project decided to add Shan East and Shan South to the SAIL programme area. The decision to add these two areas was made based on their aquaculture potential and existing seed suppliers.

- Contribute expert knowledge to a fish market systems status report of relevance to the five States/Regions where the project will be operating. The fish market systems status is included in section VI of this report.

- Review and agree, with the SAIL team, provisional township selection criteria, and carry out a desk-based spatial analysis of possible target townships. The provision selection criteria were agreed and reviewed in November 2019.

- Present this analysis in the form of a series of maps to the WorldFish -USAID team for discussion and agreement. This analysis and the maps were presented to WorldFish and USAID on 26th November 2019 at the SAIL office in Yangon. Selection criteria and weighting were revisited twice in December 2019 based on the comments received during the meeting. These were essentially to acquire the nutrition data that was initially only available for two States/Regions (Sagaing and Shan East) during the provisional analysis of data, and to reconsider the weighting of some criteria such as Internally Displaced Persons (IDPs). It is important to note that USAID has made clear that SAIL can work in townships where productive assets (e.g. hatcheries) are available even if these are located outside the proposed selection of townships provided there is a justification to do so.

Phase 2 - Data collection, analysis and visualization

- Finalise methods and approach followed by detailed data collection using methodology/tools developed in Phase 1. The scoping study involved sites visits, key informant interviews and focus groups.

- Provide institutional analysis: Asper identified SAIL stakeholders and established a list of key institutions and individuals who might impact the outcome of SAIL's engagement - including all those delivering and supporting the changes, those directly impacted by the change and those for which an indirect interest or influence was identified. This is presented in Section V of this report

- Mapping of stakeholders: Asper elaborated a stakeholder matrix, based on key institutions. This matrix helps to group the stakeholders into subsets reflecting the important characteristics of those stakeholders and forming the basis of the approach to managing them most effectively during SAIL. The stakeholder r matrix is presented in Section V of this report.

- Market systems status: Asper mapped key market players, incentives and performance and created a list of all key institutions/organisations who might impact the outcome of SAIL - including all those delivering and supporting the changes, those directly impacted by the change and those who have an indirect interest or influence. The market systems status is presented in Section VI of this report.

- The scope of work also included poverty assessment as well as a preliminary water resource assessment and agro-ecosystem assessment. During the course of the scoping study, it was agreed with WorldFish, that the poverty assessment originally envisaged will not be performed. This decision was made based on the limited time that was available to recruit and train local enumerators in all five States/Regions. The team spend two to three days in each location and scope the potential to engage with the Myanmar Fisheries Federation (MFF), the Department of Fisheries (DoF), farmers and market wholesalers and vendors in States/Regions. The preliminary water resource assessment was to be provided by the International Water Management Institute (IWMI), a WorldFish partner on SAIL. The preliminary water assessment was provided on 18th January after the township selection was completed and presented to WorldFish and USAID during a meeting at the SAIL office in Yangon on 14th January 2020. The preliminary water assessment provided useful data on water availability and climate. However, this assessment did not provide township level data, hence Asper could not integrate any water-related indicator in the township selection process. The agro-ecosystem assessment was to be provided by the consultant hired directly by WorldFish.

- Present a series of township maps, and associated descriptive text, with as much secondary GIS information as possible including land cover, digital elevation and climate and hydrological data. This deliverable was to be provided by the consultant hired directly by WorldFish.

- Present the township selection recommendations at a debriefing in Yangon. Asper led the presentation during a meeting with WorldFish, USAID and IWMI on 14 January 2020 at the WorldFish SAIL office in Yangon, and during a workshop with WorldFish, USAID, IWMI, MFF, DoF and other relevant stakeholders on 21 January 2020 at Novotel, Yangon. The township selection software created by Asper was handed over to SAIL on 21 January 2020.

IV. Township selection

Most of the data for the criteria used (see items 1-8 in Table 1 overleaf) in the selection were obtained either directly from Government Websites; Ministry of Labour Population and Immigration (MOLIP, formerly the Ministry of Immigration and Population, MoPI), Census 2014, General Administration Department (GAD), or, in the case of township and village tract boundaries from the Myanmar Information Management Unit (MIMU) website. Data on Land Use (Smithsonian/EcoDev) was already acquired by the independent consultant.

The selection criteria are based on the following priorities:

1. Overall risk – project implementation risk and security. In terms of physical security from conflict and the practical limitations of travelling and operating a long-term project where official security constraints impose unfeasible difficulties from a long-term perspective. Risk is of

importance in Shan North, Shan East and Kachin states. The initial risk estimates provided by the project were updated following field visits to Shan East, Kachin, and further evidence (from the Ministry of Agriculture, Livelihoods, Irrigation, MOALI) on Shan North.

2. Population per township: Total numbers of population per township, are necessary to quantify the total potential beneficiaries from project interventions.

3. IDPs: Numbers of persons living in poverty, displaced by conflict. Total numbers of persons in camps was available from OCHA, and the camp locations were referenced to specific townships

4. Low levels of sanitary hygiene: Levels of poverty and inequality evident from low levels of hygiene and exposure to disease. Source data obtained from the 2014 MoPI census.

5. Dominant land use present per township: As the project intends to augment and balance food production and income from farming (especially where rice/fish production is feasible) it is important to prioritise townships which are predominantly agricultural rather than those that consist mainly of forest land or upland taung ya farming. The land use data were summarised for each separate township.

6. Area of fish ponds: Townships in which fish production / aquaculture is already present are clearly advantageous in terms of existing knowledge, capacity and market connections on the ground, representing real practical opportunities for the project to support and strengthen rather than townships in which this does not exist at all. Although data on numbers of fish ponds was available, the total area of ponds was selected as the most important variable. DoF data, acquired from GAD statistics per township. Given the significance given to fish pond data in determining township selection and the acknowledgement by DoF that up to 50% of the ponds (in Kengtung) were unlicensed, a comparison was made between the official statistics, and what could be reported by high resolution satellite imagery, covering the same date (see section 3).

7. Low Per Capita Income (PCI): PCI, also reported by GAD was used as the primary indicator of poverty.

8. Low levels of nutrition: Statistics on malnourished children below the age of five years was specifically requested by the project and made available by the Ministry of Health.

All the above data were brought together into Excel for each of the five project States/Regions and scored into quartiles in order to 'normalise' the data from 1 to 4. Variables were then given a weight (%) and the combination (i.e. all variables multiplied together) then ranked in descending order.

The townships selected were those identified as the top scoring five in each region. Weightings were set to take into account factors specific to certain regions (IDPs occurring only in parts of Kachin states) and to favour the selection towards townships in which aquaculture (in terms of fish pond area) is already established. Townships were aquaculture is not reported were excluded to avoid irrelevant township selection. Selected townships were linked to the township data from MIMU and printed as maps.

Table 1: Data used for township selection criteria

#	Criteria and data used in TS selection	Data sources	Variable calculated / purpose
1	Level of Risk	Worldfish, MoLIP, Field (Kachin)	Ability to work in township, exclusion
2	Population	Census 2014	Population density Km2
3	Number of IDPs	OCHA (2017)	IDP numbers
4	Level of safe sanitation (only bucket, pit latrine etc (WASH)	Census 2014	Percent of housegolds in townships without safe sanitation.
5	Land Use present	ECODEV / Smithsonian Institute 2016	Percent agricultural land per township
6	Area of Fish Ponds	GAD (2017)	Area (acres) of existing fish ponds
7	Per Capita Income	GAD (2017)	Basic income index
8	Total percent children underweight	Min of Health	Under five malnourished

Table 2: Weightings allocated to the 7 selection variables.

States/ Regions	Criteria							
	Population Density Km2	% HH No Access Safe Sanitatio	No. of IDPs	Percent Agricultural Land	Area Fish Ponds	Per Capita Income	Children <5 Undernourished	**Total**
	Weighting							
Kachin	15%	10%	5%	5%	40%	10%	15%	100%
Shan East	15%	10%	0%	5%	40%	10%	20%	100%
Shan South	15%	10%	0%	5%	40%	10%	20%	100%
Mandalay	15%	10%	0%	5%	40%	10%	20%	100%
Magway	15%	10%	0%	5%	40%	10%	20%	100%
Sagaing	15%	10%	0%	5%	40%	10%	20%	100%

Table 3: Final selected townships and approximate number of ethnic groups in each.

Shan South			Shan East		
Townships	Score	Ethnic groups	Townships	Score	Ethnic groups
Nyaungshwe	39.48	3	Monghpyak	31.87	2
Pekon	1.13	2	Kengtung	22.51	2
Nansang	1.12	2	Mongkhet	2.71	1
Taunggyi	1.11	2	Tachileik	0.42	1
Loilen	0.51	2	Mongton	0.20	1
Kachin			Magway		
Townships	Score	Ethnic groups	Townships	Score	Ethnic groups
Mohnyin	5.18	2	Ngape	37.13	2
Mogaung	2.62	3	Myothit	9.22	1
Waingmaw	1.48	2	Salin	6.79	1
Bhamo	0.78	3	Seikphyu	5.86	2
Mansi	0.51	3	Sinbaungwe	4.94	1
Sagaing			Mandalay		
Townships	Score	Ethnic groups	Townships	Score	Ethnic groups
Shwebo	42.14	1	Madaya	42.29	1
Khin-U	4.83	1	Sintgaing	1.37	1
Wetlet	3.63	1	Patheingyi	1.24	1
Tigyaing	3.61	1	Myittha	0.61	1
Kale	3.19	1	Singu	0.50	1

It is important to note that the variation of scores between townships is due to the significant variability in pond areas. For example, for the highest scoring township in Shan South, Nyaungshwe, the reported area of fish ponds is 1,053.3 acres. For the second and third townships selected in Shan South, Pekong and Nansang, the reported are of fish ponds is 73.1 acres and 59.4 acres respectively.

V. Institutional analysis

A. Stakeholders list

Table 4: Stakeholders List

Job title	**Profile** *(Decision Maker/ Sponsor/ Influencer)*	**Status**	**WorldFish relationship owner**
Minister MoALI	*Decision Maker*		Dr. Mike Akester, WorldFish Country Director
Dep. Minister MoALI	*Influencer*		Dr. Mike Akester, WorldFish Country Director
Permanent Secretary MoALI	*Decision Maker*		Dr. Mike Akester, WorldFish Country Director
Director General DoF D-DG U Myint Zin Htoo myintzinhtoo@gmail.com	*Decision Maker*		Dr. Mike Akester, WorldFish Country Director
DoF Aquaculture Director, Saw Lah Pah Wah, Mruslbwedof@gmail.com	*Decision Maker*		Dr. Mike Akester, WorldFish Country Director
DoF Naypyitaw – U Kyaw Moe Aung, Assistant Director Aquaculture Division DoF Tel 09595117086 and kyawma@gmail.com	*Influencer*		Dr. Mike Akester, WorldFish Country Director
Department of Planning, Director General, U Kyaw Swe Lin	*Influencer*		Dr. Mike Akester, WorldFish Country Director
Department of Planning, Deputy Director Generals Dr. Thandar Kyi and Dr. Khin Mar Oo	*Influencer*		Dr. Mike Akester, WorldFish Country Director
Chairman MFF Yangon	*Decision Maker*		Dr. Karim Manju, SAIL Chief of Party (CoP)
Deputy Chairman MFF Yangon	*Decision Maker*		Dr. Karim Manju, SAIL Chief of Party (CoP)
Chairman MFF Mandalay	*Sponsor*		Dr. Karim Manju, SAIL Chief of Party (CoP)
Deputy Chairman MFF Mandalay	*Sponsor*		Dr. Karim Manju, SAIL Chief of Party (CoP)
Chairman MFF Kachin	*Sponsor*		Dr. Karim Manju, SAIL Chief of Party (CoP)
Deputy Chairman MFF Kachin	*Sponsor*		Dr. Karim Manju, SAIL Chief of Party (CoP)

Chairman MFF Nyaung Shwe	*Sponsor*		Dr. Karim Manju, SAIL Chief of Party (CoP)
Deputy Chairman Nyaung Shwe	*Sponsor*		Dr. Karim Manju, SAIL Chief of Party (CoP)
DoF in SAIL six project areas	*Influencer*		SAIL Area Managers
Private hatchery owners	*Decision Maker*		SAIL Area Managers
Seed companies	*Decision Maker*		TBC
LIFT-UNOPS Policy Officer Ms. Mary Nan Myint marynanm@unops.org Tel. 09966887209	*Sponsor*		Dr. Mike Akester, WorldFish Country Director
NGO Directors	*Decision Maker*		Dr. Karim Manju, SAIL Chief of Party (CoP)
NGO Partners locally	*Influencer*		SAIL Area Managers

Status key		*Strong*		*Needs work*		*Weak*		*None but required*

B. Stakeholders matrix

Table 5: Stakeholders Matrix

INFLUENCE- Extent of Power	**High**	**Keep Satisfied** ▪ Ministry of Agriculture Livelihoods and Irrigation (Minister and Permanent Secretary)	**Key Players** ▪ DoF (Director General and Deputy Director General) ▪ MFF Yangon & Mandalay ▪ MFF Nyaung Shwe & Kachin ▪ MFF associations (not all associations shall be a key player for SAIL – organizational & institutional assessment needed to determine which one(s) can/should work with SAIL) ▪ Hatcheries and feed producers ▪ Producers & women (nutrition) ▪ Fish and Seed traders ▪ Ingredient suppliers
	Low	**Minimal Effort** ▪ The World Bank ▪ ILO ▪ UN-FAO ▪ UMFCCI	**Keep Informed** ▪ LIFT, MYSAP, IOM, IFPRI ▪ Ministry of Labour, Immigration and population ▪ Consumers ▪ Transporters
		Low	**High**
		Level of Interest- IMPACT	

VI. Market systems status

Table 6: Key market players, incentives and performances

Type of Player	Player	Incentive	Performance
Core Value Chain Players			
Suppliers	Ingredient suppliers	Limited incentive to develop and process specific/innovative/low cost fish feed as current demand is mostly for unprocessed by-products from peanut and sesame oil production (cakes), rice barns and chicken drops from poultry farm. Linkages with feed processors needs to be assessed. Brewery waste not assessed.	Performance of ingredient suppliers need to be assessed to understand their incentives to develop fish-feed to improve the nutritional value, hence the conversion ratio, of oil-cakes, rice barns, chicken drops and brewery waste.
	Feed companies (sinking pellets and floating pellets)	To provide affordable feed to large aquaculture farmers and, possibly, to SSA farmers using local products, and by products and reaching out to more customers using a cost effective last mile distribution system (e.g. De Heus). The adoption of pellets feeding practice by farmers seem to be driven by price but also by perception (farmers prefer floating pellets as they can see the fish feeding).	Feed company from Myanmar not assessed yet. Small local pilot feed mill supported by MYSAP and My Cultures seem to face social and economic barriers to scale. Demand for overseas feed companies (e.g. Vietnam & Thailand) and some farmers are prepared to pay a premium for high-protein content. There seems to be general lack of understanding of the cost:benefit ratio of using different feed formulation at different growth stage of the fish (fingerlings, fries, growth).
	Fish Health product company	Not assessed	Not assessed
	Department of Fisheries (DoF)	Meet their production and revenue targets, maintain their offices and facilities in working conditions, award licenses for ins. The incentives for DoF to support SSA and larger aquaculture farms are not clear. Collect license fees from ponds of more than 50 feet by 25 feet.	Varies according to region/state but overall technical and managerial capacity seems to be limited. The alignment of DoF with the Myanmar Agriculture Development Strategy does not seem obvious. Most DoF visited, except Magwe, seem to be struggling with the licensing of existing and new ponds. This is due to the lengthy process involved for farmers. Lack of capacity to license ponds and provide training to farmers.
	DoF Hatcheries	Produce seeds to cover their production and revenue targets. Provide seeds to farmers, and in some instances (Magwe where JICA has supported DoF and farmers' hatcheries) provide hatchery training and extension to farmers. Focus seems to be on renovating or building new outdated tanks and office facilities rather than modernizing production techniques.	Outdated hatchery technology and generally ineffective production systems.
	Private Hatcheries	Modernise their hatcheries, expand their customer based to improve their performance. Generally keen to work with	Outdated hatchery technology, limited access to quality brood stock, inbreeding (sometimes), no quality control, potential

Type of Player	Player	Incentive	Performance
		DoF. Capacity to invest ranges from high to low. Do not seem to technically benefit from being members of MFF.	cross contamination (poultry and other domesticated animals near tanks), poor book and record keeping, including list of customers (except in Kachin), vulnerability to climate change (e.g. Kengtung). Business seems generally viable but fragile unless they are vertically or horizontally integrated to other businesses.
	Backyard Hatcheries	We did not come across any backyard hatcheries during the scoping mission	NA
	Nursery (Vertically integrated nursery ponds & Specialised nursery ponds)	Provide fingerlings to local farmers at an affordable cost and improve return on ponds investment (compare to grow out ponds)	Nurseries outperformed financial performance of grow out ponds but could be further improved through better feeding and management practices and record/book keeping. Market demand seems high (Mandalay region)
	Mechanical excavator hire	We did not engage with any mechanical excavator hire. However, the new law on the conversion of 15%, and may be up to 30%, or land into pond could open a new market for mechanical excavator hire. Difficulties to obtain Form 7 (ownership of land) and Form 37 (conversion of aquaculture land for other utilization) is currently undermining the expansion of licensed aquaculture. However, the market for backyard ponds seems to remain open for mechanical excavator hire.	Performance of mechanical excavator hire not assessed. They may lack an understanding of the opportunity to dig small backyard ponds (that do not require licenses) and may not market their services for this, or provide loan payment options. There might be a market for small mechanical excavator hire service providers.
	Equipment suppliers (net, pump, etc.)	No particular incentives to support SSA or to provide loans or other payment options. It can be assumed that they fulfil the current demand and limited capacity for innovation.	Not assessed.
Producers	'Invisible' Homestead ponds	These ponds are hard to track using sat imagery or data provided by the General Administration Department	Unknown
	Small <10 acres 10-50 acres	Varies according to regions but generally provide main, additional or new (Pekong Southern Shan) source of income for the Household. Most farmers understand the benefit of quality seeds but have no means to control the quality (e.g. seeds from China) and cannot afford fish feed beyond rice barns and/or oil cakes and or chicken drops. Limited incentives to take up aquaculture due to issues associated with licensing, the lack of capacity to market fish – meaning traders get the greatest benefits. Access	Generally poor, except when there has been a long history of aquaculture (Sagaing farmers) and water availability is not an issue. Lack of modern production techniques, microcredit (Mandalay), pond management, nets, cold chain and transportation/cooperative for fish transportation. Generally, price takers at farm gate/in village and at the local market.

Type of Player	Player	Incentive	Performance
		to nets (Eastern Shan) makes farmers reliant on traders.	
	Medium 50-100 acres	Vertical integration through the creating of hatcheries, nurseries, feed meal and through trial and errors. Incentives to fulfill the gap in the market demand we encounter in most States/Regions (e.g. Southern Shan import 5-10,000 viss of fish from Yangon every day)	Performance seems to be ok but can surely be improved through better management practices, exposure to new production techniques, market linkages and innovation.
	Large 100-500 acres >500 acres	As above	As above
Traders	Seed trader	Provide farmers in remote areas/poor farmers with seeds from larger hatcheries. No incentive to check quality as demand seems to outstrip supply.	No assessed.
	Pelleted feed trader	Not met	Not assessed
	Rice bran/oil cake trader	Not met	Not assessed
	Fish traders & retailers	Respond to the market demand for consumers that are generaly not aware of food safety and fish quality. Local demand often met by fish exported from other regions except in Shan East. Most marine and fresh water fish in Mandalay, Kachin, Southern Shan, Magway and Sagaing come from Yangon.	Limited cold chain and utilization of ice (except in Mandalay and Sagaing where ice is used by a number of retailer/wholesalers), poor fish handling practices, limited book keeping and handling.
	Ice factory	Not met	Not assessed
Fish Traders	In local markets	To understand market demand in neighboring townships and regions/states and to understand local demand. Largest trade volumes are between traders/wholesalers to traders/wholesalers (business to business). Fresh fish from fresh water source or aquaculture is often transported on/in ice and cool boxes.	Limited understanding of food safety issues and fish quality leading to a lack of incentives for traders and retailers to improve handling and hygiene practices (except in Magwe where most fish are on ice and not traded directly on the floor in the main market. This practice could well have been introduced by the largest and most innovative wholesaler of the market and then copied by others)
	In villages	Buy fish from aquaculture farmers at the best price. Buy fish from farmers who do not own a cast net (est. 60-80% of farmers visited) and rely on the nets owned by the traders, and from those who own a cast net. Traders come and harvest the fish as and when needed during the harvesting time. Small traders buy small quantities of fish and go from village to village on motorbikes to sell fish and other food items (e.g. snacks	Not assessed. However, it is important to note that small traders are going into the "hard to reach" areas and therefore might be an interesting target group for SAIL (re nutrition but also fish seeds).

Type of Player	Player	Incentive	Performance
		and vegetables)	
Transporters	Truck for hire	Not met	Not assessed
	Express bus	Not met	Not assessed
Consumers	Restaurants	Buy specific size and type of fish to match their menu. No incentive to provide quality or live fish to customers whom expectations are overall very low.	Fish dishes are popular in all five States/Regions visited and the health benefit of fish seem to be well understood. Food safety is a big issue for most restaurants and cold chains for fresh animal proteins are almost nonexistent.
	Home consumption	Buy fish protein for health benefit in line with the Government and NGO campaigns to promote fish intake. Generally prepared to pay a price premium of up to 1,000 Kyatt per viss to access fish protein directly in their villages (from ambulant vendors or local aquaculture farmers)	Fish related human-disease might be well documented (check) but does not seem to be well communicated by the Ministry of Health and Sports or DoF. Lack of understanding of the nutritional benefits of different species of fish and different parts of the fish (head, filet, etc.). Food safety concern over bones for babies eating fish and general lack of understanding of the importance of nutrition in the 1,000 first days.
Supporting Actors			
Government of Myanmar	Ministry of Agriculture Irrigation and Livestock, Department of Fishery	Aquaculture is part of the 7 prioritized National Value Chain Programs in the ADS. Interested in promoting aquaculture. SSA. Agreed to conversion of up to 15- 30% of land to aquaculture. Limited incentives to issues form 7 and form 37 to avoid a decrease in rice production. Limited incentives and capacity to resource the DoF properly. Limited incentives to develop SSA aquaculture due to licensing issue and limited resourcing of DoF by MoALI.	Mostly involved in brood production (limited to Mandalay) and seed production. Handling of procurement for ins and restocking of natural bodies of water in line with central government instruction. Poor data recording, limited capacity to collect aquaculture data, poor quality and outdated extension services. Lack of awareness of the GAqP and more generally lack of awareness of the content of the ADS on aquaculture.
	Ministry of Labour, Employment and Social Security	Increased employment, better worker conditions and stronger realization of social security - which has minimal existence	Working actively on minimum wage. Collaborates with the ILO. Technically has the mandate to inspect fish farm (?) to check if workers are properly treated (good working conditions) but have no capacity in terms of technical expertise or staffing to conduct such inspections.
Commercial body	Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI) and regional chambers	Increased FDI into the country is good for the UMFCCI. Joint ventures and partnerships with members are considered positive.	Fishery and Aquaculture interests are represented at the UMFCCI through various sister organization under the former.
Industry bodies	Myanmar Fisheries Federation (MFF)	MFF incentives are not clear but seem to vary from one region to another. Their members meet one a year. The benefit businesses and producers get	MFF performance seem weak as they keep limited records of aquaculture activities, and can hardly articulate a vision and mission at the Union or

Type of Player	Player	Incentive	Performance
		from being part of MFF do not seem obvious. MFF members pay a life-long member ship fee. SAIL plans to conduct a detailed institutional analysis of MFF is planned. The role of the different association seating under MFF is not clear either.	State/region level, save from Kachin that could clearly articulate their three objectives and seem rather organized, dynamic and proactive (comparatively).
Research Bodies	UN-FAO	Not met	Not assessed
	International Water Management Institute (IWMI)	Part of SAIL consortium of partners.	High technical capability globally.
	International Food Policy Research Institute (IFPRI)	Not met yet	Not assessed yet
Donor programmes	MYSAP Inland	EU and GIZ funded project implemented by GIZ with WorldFish as an implementing partner. Increase affordable nutritious aquaculture products supplied by small-scale farmers to provide food and income for the poor and vulnerable households in the Shan State, Sagaing Region and Mandalay Region. Theoretically operates in five townships Kengtung (Shan East), Pinlaung, Shan South e, Kale and Shwebo (Sagaing Region), Amarapura (MandalayRegion)	Currently operating in two townships. Project run until the end of 2021. Project in Kengtung will be implemented directly by Malteser International from 2020. Need to capture learning/lessons learned into a capitalization report/presentation
	The World Bank	Not sure they are still working in fisheries	NA
	Livelihood and Food Security Trust Fund (LIFT)	Funded MyCulture an aquaculture programme implemented by WorldFish	Should have lots of learning for SAIL. Need to capture learning/lessons learned into a capitalization report/presentation
Regulatory bodies	ILO	International organization focused on the development of improved labour standards globally through support to governments and other organizations.	Not reviewed.

VII. Conclusion & Recommendations

WorldFish is uniquely placed to promote Small Scale Aquaculture farming in Myanmar. WorldFish is also the first organization applying market systems to the aquaculture sector in Myanmar through SAIL.

Aquaculture offers tremendous potential for farmers to diversify their sources of income and improve water management to increase the resilience and diversity of their production systems in the face of climate change (droughts and floods). However, to be efficiently integrated into production systems, existing and new ponds should be carefully designed, managed and integrated into the production and market systems.

The following section provides short-term recommendations to lay down the foundations of an inclusive and resilient aquaculture market system in the States/Regions where SAIL will operate.

Recommendations

1. Consider applying a flexible/ blended Market Systems Approach to all three components of SAIL (production, markets and nutrition). Market Systems Approach is an holistic and systemic approach that aims to address the root causes of market dysfunction and underperformance and that should include production systems and nutrition. Market Systems is not limited to physical markets and transactions of goods.

2. Acknowledge the need for the nutrition component of SAIL to consider private sector incentives (in addition to Government and NGOs incentives) to promote good nutrition practices (e.g. food diversity for under five years old and breast feeding) that are not driven by large Multinational Companies objectives to sell processed food to poor and lower-middle class consumers.

3. Engage with MFF and DoF in the States/Regions targeted by SAIL to share the township selection criteria, methodology/approach taken during the scoping study, and proposed township selection with relevant decision makers and influencers from MFF and DoF. It is important for SAIL to build ownership of the programme by local partners from the onset. This should be done prior to the SAIL inception workshop currently scheduled on 20th February 2020.

4. From the list of 30 proposed townships, select 10-15 priority townships in which the project should focus its efforts in the first year one (2019-2020). SAIL should consider having prioritisation criteria and may engage with MFF and/or DoF to define these criteria. Prioritisation criteria should focus on areas where SAIL can deliver 'quick wins'.

5. Conduct spatial analysis of selected townships to geo-locate registered and unregistered ponds (Small Scale Aquaculture), hatcheries, trade routes, and markets, and produce corresponding maps. This will be useful for the project to engage with SSA farmers during participatory processes and will reduce information asymmetry.

6. Follow-up on the request by SAIL, during the scoping study, for MFF Nyaung Shwe to submit a proposal for collaboration, and for MFF Kachin to prepare a five-year strategic plan by the end of January 2020.

7. Engage with MFF to agree on the modalities of conducting a detailed organisational and institutional assessment of the federation and its associations. If possible, let them lead the process by asking them to reflect on how this assessment could support their organization before preparing the scope of work and expected deliverables.

8. Consider integrating Do No Harm/Conflict Sensitivity in all aspect of the programme cycle, including operations and staff training.

9. Engage with the UN Internal Organisation for Migration (IOM) in Myanmar to access data on IPD camps' history, populations, locations, livelihoods, NGO & church support, source of water, access to land, access to finance, etc., for SAIL to visit and select IPD camps that offer the greatest potential for aquaculture while improving nutrition's status of under five years old and facilitate market access/linkages.

- End -

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Appendix B: Field Notes

Shan East

Meeting with DoF
Kengtung - 20/11/19

District fishery officer highlighted the cross-boarders trade dynamic that exist between China and Thailand in Shan East. DoF monitor imports of seeds from other countries. However, it seems like seeds import from 'China' are imported from a Chinese owned Myanmar factories located in the Wah-controlled areas.

Three seeds are sold for 1 TH Bath or 18 Kyatt. Seeds are traded by middlemen who aggregate orders, or taxi drivers who, go to China and Thailand and brings the seeds back to Myanmar. According to DoF 40,000 seeds of Tilapia were imported from 'China' between July and Oct/Nov. 2019. The only seed suppliers in Kengtung tried to breed monosex tilapia but failed to grow them to BBQ size.

According to DoF there are 300 hectares (ha) of ponds and 400 pond operators in Kengtung district, and 50 % of them have form 7. Form 7 is a land ownership certificate. Only large ponds (>25 x 50 feet= 1,250 sq feet) have to be licenses. According to DoF there are 683.2 acres of Small Scale Aquaculture and 10 fish traders in Kengtung. Local ponds produce common carp, blue barb, rohu and aeroplane fish.

Consumers preference is for bbq size tilapia grown locally with seeds from Thailand (monosex). Middle man import larger tilapia and prawns from Thailand and Grass Carp and hybrid from China. It was not possible to get data on import of seed of fish into Kengtung district. Import supply chain exist due to the lack of reliability of the local supply.

According to DoF the local demand is 4,000 viss per week, of which 2,000 is imported from Thailand

Visit local aquaculture farms
Kengtung - 21/11/19

Clarification on forms needed for aquaculture:
Form 7 licence to exploit land
Form 37 conversion of paddy land into pond or other farm use

Focus group discussion

The following tables provides an overview of the production and pond area from the participants:

Occurrence (farmers)	Quantity harvested per acres (estimate)	Occurrence (farmers)	Pond areas
0	<500 viss	8	< 1acre
6	500-1,000 viss	3	> 1 acre
2	>1,000 viss		

Fish produce most for household consumption; excess production is sold. They would like to increase their production to eat and sale more fish. Their main source of income is aquaculture. Rice is their 2nd priority. Fish is sold to one or more of the three traders that come to their village at the time of harvest, which is when the price is the lowest. They cannot go to the market because there is not enough space to seat and sale.

Buy feed sometimes not systematically, only when it is available. The question of the affordability at different times of the year was not was not discussed. They don't know how to calculate the feed requirement, the attrition and don't know how to manage fish and fish ponds. They don't know how

to produce local feed. They buy Thai feed (20 kg for 25,000 Kyatt). Would like to know how to produce their own fish feed. According to them rice barn causes attrition to the fish. They also se chicken and pig manual for feed.

Availability of seeds by local hatchery is not sufficient due to water availability. A new local hatchery would enable them to stock all ponds per them. They stock 10,000 seeds per acres and but monosex tilapia seeds from Thailand but have no means to verify the quality. They can't start they own hatchery because they can't invest, they need a place with reliable water supply and don't know how to build an hatchery.

No tilapia produced by local hatchery that is why farmers want a hatchery/modern technology. Would like to have access to technology to do 2-3 crops per day.
They expect archery and good management because they have heard about this from Inle.

Presence of MFF limited to South and North Shan not in Eastern Shan.

Meeting with feed ingredient supplier
Kentung - 21/11/19

This trader supplied feed ingredients to the 20 feed mills supported by MYSAP through a single order contract. They bought the ingredients (dried fish, corn and rice barn, cake and other ingredients) from Yangon. By the time the ingredients arrive in Kengtung the price is multiplied by seven. According to them the only ingredients available locally are corn and rice barn. Her and her mother main business remains the trade and sale of dried fish at the market.

Meeting with private hatchery
Kengtung - 22/11/19

This private hatchery hatches 1 million seeds of Common Carp, Tilapia and Rohu every year. They sale 500,000 seeds to 90-150 customers in in May-June. Demand dries up in July as farmers start to grow fish at the beginning of the rainy season. They don't feed the seeds so much so they produce small fish. Seeds are produced form their 300 brood stocks (1 into 2). They tried other species such as grass carp and big head carp but were not successful.

A lot of people do not trust their hatchery when it comes to tilapia and prefer to buy monosex tilapia from China. There are interested in GIFT and would like to have another hatchery suitable for monosex tilapia.

Water availability is the main according to the hatchery owner. Water comes from a creek that is fed by a stream. Water becomes an issue from November and by January there is no more water. This forces them to move the broods from one pond to another. Water availability is the main limitation to keep the brood stock alive. They could produce more seeds but are concerned by the lack of water.

According to them the so call 'Chinese hatchery' that is in fact in Myanmar but close to the boarder with China in the Wah controlled areas is actually a nursery not a hatchery.

Meeting with Malteser International (MI)
Kengtung - 22/11/19

MI is an implementing partner of WorldFish MYSAP. Moving forward, they will continue working in aquaculture directly through GIZ. According to MI the main challenges are:

- the low temperatures (10-12 degree Celsius) during the winter,
- the market prices that are very low during the harvest season due to 'over production',
- the lack of local hatcheries.

Taxation is also a problem and one of the reason farmers don't want to work with the project or the government. Farmers are concerned with \ the lack of clarity on taxes and the unpredictability to taxes. Currently farmers pay a flat rate of 900 kyatt/acre

According to MI the aquaculture potential lies in:

- Limited value addition of fish.
- Stronger market component such as hygiene and energy for cold chain
- Market expansion

MI created farmers' groups in villages and those farmers not keen to join in year 1 but want to join in year 2. MI works with 391 farmers including 20 demo farmers. These farmers are not the poorest of the poor and MI want to expand to this market segment. They also want to develop community pond and ponds in/for school. They also stress the importance of integrating special needs of ethnic minorities.

MI wants to run a rice-fish pilot that would lead to productivity increase, higher yields, reduce fertiliser/pesticide, climate resilience.

Meeting with Mauk Kon
Kengtung - 22/11/19

Mauk Kon is a local development organisation that works on human trafficking. They were set up thanks to a grant from LIFT in 2011 to provide food security and nutrition. There main issue is that they don't have the means to access remote areas where human traffickers go to buy women and babies that will become slave and child soldiers.

<u>Mandalay</u>

Meeting with Chairman MFF – Mandalay region
Mandalay 27/11/19

In Mandalay region MFF has 300 members, including three hatcheries. The majority of their members are in Madaya. 60 percent of farmers have less than 5 acres. Farmers with 1 acre are rare. MFF charges a 5,000 MMK lifetime membership. According to MFF the main townships for aquaculture production are:

1. Madaya
2. Patengy
3. Singtaing
4. Kumay
5. Kyaungse
6. Amarapura

The main challenges are:

- Rohu (main species) inbreeding
- Land use policy (some farmers have applied for a licence in 1995 and are still waiting), making it difficult to apply for a loan. Currently bank loans interest is 13.5 percent, while China provides in kind credit at 6 percent. There is a lot of controversy on land ownership between farmers and Gov. According to MFF at the national level, only 10 percent of those farmers who have applied for form 39 have received it.
- Feed quality due to poor technology and understanding of ingredient composition, and the lack of protein source. Farmers needs quality feed at affordable prices. One of the issue now is that Gov. allows export of paddy which reduces the availability of rice barn, one of the main feed ingredient used by farmers, along with peanut cakes. Most farmers cannot afford feed and feed providers cannot afford to provide credit/be in debt for 8 months

The following tables provides an overview of the typology of aquaculture farmers' feed buying patterns

Business size	Feed purchase pattern
Large/Joint venture	Buy from China
Small	Buy feed @credit
SSA (less than 25x50 feet ponds)	Don't buy feed

Market demand in Mandalay city is 20,000 viss per day and the total sales are 30,000, the difference is going to Shan, Kachin and Monwya. Half of the fish sold in Mandalay city (10,000 viss per day) come from Yangon via "river truck".

MFF has no access to innovation and innovation systems are not established. MFF business innovate by creating Joint Ventures with Chinese businesses when they have the capacity to do so. One of the group member is interested in innovative to create value such as baby fresh food, baby snack and fish paste.

Focus Group discussion Patengy township
Medipanda village 27/11/19

Started aquaculture p 30 years ago. Originally some of them had agricultural that were flooded so decided to turn to aquaculture and were sentenced to jail for 2 months. The opportunity for them is to convert flooded lands into ponds. However, some farmers mentioned water scarcity has already forced at least one farmer to give up aquaculture. Farmers have pointed to the construction of the technical institute as the main cause of irrigation water scarcity. Water and feed are the constraints for aquaculture.

Feed is mostly composed of rice barn (18 viss @ 10,000 Kyatt) and peanut cake (1 viss @ 1,400 Kyatt). Feed ingredients and feed are supplied from Mandalay. They sometimes buy "Green Feed", a Vietnamese brand sold in Yangon, for their nurseries (25kg bag @ 27,000 kyatt +1,500 transportation cost per bag). "Green feed" is also supplied through traders in Mandalay. "Green feed" gives better results in nurseries compare to local brand and the price difference is only 2,000 or 3,000 Kyatt.

Seeds are brought from Kumay DoF hatchery, Tayakon DoF hatchery or from the private sector. They tried Tilapia but ended up with mixed sex. Rohu has an 18 months cycle and Tilapia has a six months cycle. Tilapia reproduced organically in the pond so farmers do need to buy seeds.

Farmers have received training on aquaculture from JICA.

When fish is ready for sale they call the middle man who decide the price. There is no direct sale because they don't have customers and getting a space in the market is difficult. They hire "net operators" for the harvest (5,000 per operator, operating in groups of 6 operators, + coffee break + 10,000 net rental). 1 acre of pond can be harvested in three days depending on market demand. Even at time of harvest local producers cannot fulfil the local demand and fish keeps coming from Yangon.

The sales prices to the middleman are as follows:

Species	Price per viss
Rohu	3,000
Pakancia	2,000
Tilapia	3,500

Nursery, Madaya township
Lekonle village 27/11/19

Nursery is a new operation started a couple of year ago. Nursery and ponds are located in 120,000 acres command area serviced by a dam. There 110 fish farmers on 700 acres in this area. Most of them own less than 5 acres. This year the water level is reportedly low.

Seeds are bought from Shwebo (Aung Ze Ya) and Mandalay. Manpower is hired for pond preparation and weeding. Rohu dominates, followed by Pangasias (5-10%) tilapia and siver barb. They produce 100,000 seeds and 400,000 post fingerlings which are sold 12 MMK and 70 MMK respectively. The nursery business is generating more income than the grow-out business.

Feed for nursery include rice bran (400 MMK/viss), peanut oil cake, grinded cotton seed (600 MMK/viss) and chicken drops (2,000 MMK/bag). There are some 120 rice mills around their area.

They sometimes buy feed at 1,000 MMK/viss. When making decision on feed only consider price – not nutrients. They sometimes buy by-products from the local beer factory.

Seeds stay 6-8 months in nursery. Stocking density is 5,000/acres and they can harvest 1,200 viss (4,000 fish @ 0.3 viss) Survival rate is normally 80-90%. Fish grow 1-1.5 year in pond. Buyer come directly to the farm, they own a net and harvest themselves.

The demand for catfish is not important because the availability of seed and feed for this species in limited. Market price for Rohu is currently 3,800 MMK/viss, last year it was 2,600 MMK/viss.

In the past DoF was accepting fees for ponds that were not licensed. This is no longer the case and farmers that do not have a license are worried because they cannot prove the ownership/legality of their ponds.

Fish processing factory
28/11/2019

Produce and process rohu and pangasia. Buy fingerlings because they cannot produce enough, recently set up an hatchery and produced 20,000,000 seed with a survival rate of 15%.

Harvest 2,600 viss on the day of the visit. Typically process 500 vis of filet per day which gives them 100 viss of dry product sold at 2,500 MMK/viss. Filets are salted and dried 8-20 hours to 20% humidity. Employ 20 workers 7 days a week @ 5,000 Kyat per day plus lunch.

Sale all part of the fish: skin is sold to a third party that boils it to make fish oil. Bladders are cleaned and dried and stick together (4-5 pieces) and sold to China for making crackers.

Mandalay wholesale market
29/11/2019

Species	**Size**	**Price (MMK/viss)**
Feather back (also used for processing fish balls)	Large	9,000
	Small	8,000
Cat fish		8,000
Waligo		9,000
Tilapia	Small	3,500
	Large	4,500
Scorpion fish		8,000
Barb/caplet		6,400
Small fresh ware fish		6,000
Dry prawns		1,050
Wild prawns		13,000

Most fish at the wholesale market of Mandalay come from Yangon and is generally transported in refrigerated trucks and preserved and displayed on ice. Local fish species Mola is being brought to the Mandalay market from ponds in the Bago region.

Meeting with MYSAP Inland team
Mandalay, 29/11/19

MYSAP Inland is part of a Euros 22 m programme. My SAP Inland is Euros 2.6 m implemented by WorldFish that started in September 2017 and should run until November 2021. Other components are coastal and health, implemented by GOPA, Education, implemented by GIZ, and National Development Plan implemented by CESD. Work in three states/5 townships

representing 40% of the land area in Myanmar and 30% of the population. Currently active in Kengtung (Shan East), Kale and Shwebo (Sagaing region).

Lessons learned from MYSAP Inland:

- Farmers requires 2 years of support to improve their production systems
- Many households cannot afford all recommendations provided
- Private sector is willing to cooperate

Visit of DoF hatchery
Mandalay 29/11/19

The site used to belong tio the state- owned People's Pearl and Fishery Corporation (PPFC) before it was liquidated in 1990. The fish ponds were transformed into an hatchery

They produce 15-20 million of seeds per year. 10-20 survive. Out of the 1.5 m fried that survive they sale 70%, subsidise lakes 30% and raise fish in ponds 10%. They have two types of buyers:

- Aquaculture farmers (approx. 20 buyers)
- Farmers/companies that win tenders to grow fish in ponds (approx. 25 buyers)

The distribution of their production is as follows:

Species	Distribution
Rohu	60%
Tilapia	10%
Tapia	10%
Big head/silver carp	10%
Common carp	10%

This hatchery has 3,000 Lakh of Government budget from the Model Farm Project. They are also supported by MYSAP Inland who upgraded their hatchery, provided them with brood stocks of GIFT tilapia, as well as training. They harvest tilapia broods from the wild.

Focus group discussion with farmers, Singtang township
Heinju village 29/11/19

This Muslim village has a long tradition of aquaculture. Their typical system is to grow fingerlings during one year in a 1.5-acre pond stocked with 100,000 fingerlings (5 inches or 200g) and feed them with cotton seeds cake. They are then transferred into the grow out pond at a density of 7,000 per acres for two years are fed with rice bran. They harvest 6,000 fish that weigh around 500 g each. Their typical yield is 1,800 viss/acre. Most of them own 1 to 3 acres ponds. According to them, typically 2 kg of fish produce 1 kg of fish.

Their main issues are:

- Degradation of water quality
- Availability of water during the cultivation of summer paddy (October to January) as these farmers are located in a command areas serviced by the Zawgyi dam

They want to:

- improve their nursery system (current survival rate is about 10%)and increase their production and monitoring capacity
- develop an hatchery
- have policy back up
- Financial support

<u>Sagaing</u>

Private Hatchery
Sagaing Township 02/12/19

Well established hatchery of 9.74 acres (16 ponds) on 20 acres of land. Business' current supply is unable to meet the local demand. The gap is filled by seeds coming from Yangon. This business sales seeds between 5 MMK/viss (21 days seeds) up to 100 MM/fingerlings. The business is

currently servicing 1,000 farmers (SSA and commercial farms) and the demand is growing. Some of hs customers retail the seeds in areas located four hours away from the hatchery and to other regions as well. The peak season is June to August.

The distribution of their production is as follows:

Species	Distribution
Rohu	65%
Common carp	10%
Grass carp	15%
Silver carp	10%

DoF Hatchery, Chin State,
Ditein township, 02/12/19

This hatchery produces Rohu/Katla, Common carp, silver carp and silver barb. Their current production is as follows. The hatchery employs five workers. The water quality is an issue to the high level of sedimentation. Have issues with ponds that have a low level of water retention. Their main source of water is from the mountain stream.

Species	Sales price
Rohu	3 MMK/seed
Silver carp	8-10 MMK/seed
Grass carp	8-10 MMK/seed

Kalay University, Kalay township
Kale town, 02/12/19

Meeting with responsible for the zoology department. In average two students per year do their MSc. thesis on fresh water fish. Potential collaboration with WorldFish evoked.

DoF office Kalay, Kalay township
Kale town, 02/12/19

According to DoF there are 883 registered fish ponds in Kalay township covering 730 acres. The main challenges are:

- Licensing, new aquaculture farmers cannot get a license and existing farmers are concerned with penalties they could get
- Capital for seed and feed (farmers cannot afford feed so used rice barn & broken rice)
- Water availability all year round

30% of the fish produced local is consumed locally
70% is smoked and exported to China and India

Ar Yone La, local NGO
Kale town, 03/12/20

Operate in Sagaing and Chin. 70 staff. Only work in Kale township in Sagaing. Work with MYSAP Inland. Provide microfinance to 9,000 clients (7,000 active) average size loan is 300,000-400,000 MMK, interest rate is 2.3%

Hatchery/grow-out farm
Kalay township, 03/12/20

Farm of 15 ponds established on 11 acres. Produce 2.5 to 3 m seeds every year and sale 5 to 100 MMK/seed depending I the size of the seeds to 100 buyers (traders and farmers). Traders come from 15 different townships. Water comes from tube well and spring water. The main challenges are:

- Electricty for the pump
- Investment
- Technology

Smoking Fish operator
Kalay township, 03/12/20

Buy fish 2,300 MMK/viss
Sale visceres 5,000 MMK/viss
Sale smoked fish 14,000 MMK/viss to traders for the Myanmar market
Sale smoked fish 16,000 MMK/viss to traders for the Indian market
Sometimes sales directly at 16,000 MMK/viss

Additional costs include fire wood (5,000 MMK/day) and saw dust (5,000 per truck) and one truck can last 3-4 days.

Dry fresh represents 20-25% of the wet weight

There are three other smoking operators in the village. This operation employs two women from the family paid 5,000 MMK per day plus meal. She does not wish to produce more because she is also tired and 'complete'.

Main challenge: Sometimes difficult to find fish

Magway

MFF Chairman,
Magway town, 04/12/2019

Water availability is a constraint this year. The Chairman lost 100 lakh in new ponds investment that could not be filled with enough water meaning the fish could not grow to their full size. He owns 300 acres of ponds. They are two main types of aquaculture in Magway: ponds (man-made water system) and ins (natural water system). Ponds and ins operate from June to April. Water is available from different source

- Ins water from the Chindwin and Irrawaddy river
- Mountains
- Tube wells
- Irrigation Scheme

The main challenges is investment: loans are not available for smallholders. Minimum land ownership to get a loan is 50-100 acres.

DoF Regional Director, Magway Region
Magway towns, 04/12/2019

DoF manages two hatcheries in Pyenpyu (6.38 m seeds/year) and Tangwinggyi (6.14 m seeds/year). Hatcheries produce rohu, silver carp, common carp and tilapia. Seeds are sold 5 to 10 MMK depending on species. The production of seeds by DoF hatcheries does not cover the demand. Fish and seeds are brought from Yangon and Bago. The DoF plan to expand its production capacity through two new hatcheries in Note and Stotara. In addition to selling seeds they also release seeds in community ponds, rover, dams and ins. Their targets are resource conservation, increase in fish consumption and fish protein.

Few townships haves SSA. DoF does not keep an accurate record of SSA. A survey of SSA was done by My Culture project. My Culture list of ponds is different from that of DoF because DoF cannot survey all ponds. Also, some farmers do not want to declare their ponds because they are afraid of taxes. DoF suggest SAIL should be implement in Pyempyu and the scoping mission should visit a farmer names U Kala.

According to DoF there are 362 licenses pond on 424 acres in Magway region. Farmers can get a license if they pay a flat rate of 700 MMK/acre

Kang Than Market, Magway Region
Magway town, 05/12/19
The retailer/wholesaler we spoke to sales 500 viss per day. The fish sold comes from Yangon. Fish is transported in 50 viss containers with ice. They sale swimming bladders to traders in Mandalay. Do not have much competition in the market as a number of fish monks are members of their families.

DoF hatchery, Tandwinggyi township, Magway Region
05/12/19

This hatchery owner 500 broods (200 rohu, 200 Thai silver carp, 100 common carp), produce 3 m seeds, have a survival rate of 20-50% and produce 1.5 m fingerlings every year. 50% of fingerling produced are sold and 50% is released in nature. Seeds production take place between June and September. 15 batches are normally produced. According to them this DoF hatchery covers 70% of the market and the rest of the demand is covered by farmers. Water is only available 5 months per year and they plan to dig a deep tube well to increase water availability.

This DoF hatchery provide 1 breeder training per year to farmers and 3 grow out training per year. Anyone can attend (aqua farmers or not).

This hatchery was supported by a JICA project that ended in 2017. Their objective was seed production, natural breeding and induced breeding. They provide financial support to the DoF hatchery and provided 500 seeds/household plus material like fishing gears. At the moment four farms are still practicing natural breeding and produce up to 50,000 seeds. These seeds are sold 5 MMK.

Aquaculture farmer, Yam Pin Tha village
05/12/19

This farmer owns three unlicensed ponds (2x0.25 acres and 1 acres). The ponds were originally dug to extract soil for brick making. He grows rohu and tapia and stock the ponds in June with seeds (3.5 inches) he buys. Water is available from June to July (rainwater and irrigation water). He feeds the fish twice a day with rice bran and sometimes had chicken drop to boost the production of phytoplankton. He harvests in November. His wife sale 80% of his production at 3,000 MMK/viss in the village. They consume 20%. He can harvest 250 viss/0.25 acres.

Aquaculture farmer, Yam Pin Tha village
05/12/19

Owns one unlicensed pond of 0.25 acre. The ponds were dug for brick making. He stocks around 400 seeds to get 100 viss per year and does not feed the fish.

Entrepreneur, Yam Pin Tha village
05/12/19

This brick making enterprise has one unlicensed pond. The pond was dug for brick making. They stock 3,000 seeds per year and get around 1,500 fish. They did not fish the feed. They installed a harper around the pond to percent fish from escaping during flooding events.

Farmer, Minbu township
05/12/19

U Kala is the most advanced aquaculture farmers. He took part in the JICA project/training. He owns 6.5 acres of ponds. 0.9 used to be licensed and 1.24 are currently being licensed. The license fee is 2,000 MMK/acre. He started this business 50 years ago. Water comes from the Kyawtiwa dam and is available all year round.

He stocks his ponds with 12,000 seeds and can harvest 7,000 viss per year. His sales peak is between February and March. He feeds the fish with rice barn and cotton seed cake. Disease on the fish are red spot and scale type disease. He solves the problem by spraying pesticide into the ponds.

He tried to set up an hatchery once but seeds did not survive because he could not manage water properly. He has three nurseries that he stocks with 5 m seeds from a hatchery in Mandalay. 30,000 seeds survive and he keeps 10,000 for his own ponds and sales 20,000 seeds.

Farmer, Kalaing village, Minbu township
05/12/19

Owns two ponds, total area of 0.5 acre. Buy seeds from DoF hatchery in Pwyinpyu and U Kala. Grows tilapia (naturally reproducing in ponds), silver carp (1 inch 15 MMK from U Kala) and common carp (1 inch from DoF hatchery). He stocks 500 to 100 seeds depending on the years. He feed the fish 3-4 times a day with rice barn (10,000 MMK/viss) and sesame cake (1,000 MMK).

The license costs him 2,000 MMK/year (including 1,300 for producing the license certificate).

DoF Pwyinpyu
05/12/19

According to DoF there are 75 licensed farmers in the township. There are 89 ponds on 95.16 acres. Before inland revenue department was collecting tax but now it has been handed over to DoF. Focus of this DoF office in on ins licensing/tenders, pond licensing, fishing gears, seed distribute in natural ponds. There are 22 ins licenses: 7 small, 8 medium and 2 big. Would like to received support for the hatchery.

Shan South

DoF and MMF, Nyaung Shwe, 06/01/20

Nyaungshwe has more than 1,000 acres of ponds. The second largest area is Pindaya and Taunggyi. The third largest pond areas is Pekong, followed by Hopong and Kalaw.

There are 6 hatcheries: one DoF, 4 backyard hatcheries (only 2 operating) and five private hatcheries. Backyard hatcheries are season (i.e. not operating 12 months per year). Shan fingerlings are sold in Yangon, China and Thailand.

Feed ingredients available locally are rice barn, peanut cake and corn.

Main issues in aquaculture are:
- Soil quality resulting in weak banks and sometimes flood
- Poaching/security

Shan needs 5-1,000 viss of fish/day from Mandalay and Yangon to meet the local demand. Supply of eels comes from natural sources and is an important source of income. There is an Eel Association is Taunggyi and there is a market for eels in Aunbang and Muse.

MFF needs: good marketing system, feed formulation, new species (i.e. eels), loans with low interest rate, value add processing methods. WorldFish requested MFF to submit a 2-3-page proposal.

Farmers near Nyaungshwe

06/01/20

GIZ support farmers to do rice-fish in this village.

MFF hatchery, Nyaungshwe
06/01/20

Produces 200 m fries/year and 2 m fingerlings per year. Sale to 100 customers including 10 brokers

Farmers focus group discussion
Pekong, 08/01/20

There are 30 Kayin ethnic community farmers operating in a swamp area around lake Pekong. The ponds are ground water fed and also fed by the Pekong lake/reservoir. There are new to aquaculture. They stock the pond in January/February with 5,000 seeds per acres. Seeds come from DoF and their own hatchery. They harvest in June/July when the fish is one kg. they occasionally feed with corn. The fish are harvested by the local fisherman because they don't own fishing gears and don't have the skills to harvest the fish. The price of fish is all follows:

Species	Sales price
Rohu/Thai barb	2,500 MMK/viss
Grass carp	3,500 MMK/viss
Common carp	4,500 MMK/seed
Inthar carp	9,000 MMK/viss

Fish is sold at one of the five days' market buy vendors who but the fish from them directly. The demand for fish outstrip the supply during the winter season.

There are around 200 aquaculture farmers in this area. The Minister if Ethnic Affairs suggested that the community should work on lake conservation. Together, they have created the Pekong lake Conservation Committee to perverse their environment and the water quality. The water quality is monitored by Yezin University. The water quality is affected by pesticide and fertiliser and the Tigyit coal mine upstream in the Pa'o autonomous area. They did try advocacy to deter the use of pesticide and fertiliser and to stopping the coal mine to operate.

They are part of the Tandu Ko Nya/Agri-farmers network.

DoF and farmers participate to restocking the lake with 50,000 and 1 m seeds respectively. Farmers buy the seeds from a private hatchery in Loikaw.

They need fish seeds, investment and recognition from the government (land and business). They have limited technical knowledge on the type of seeds they should use and how to check the quality of the fish net they buy from one of the 3-4 shops selling them in Pekong. The Thaifish net cost 9,000 MMK and the Chinese fish net 4,000 MMK.

Meeting with Karuna Mission Social Solidarity (KMSS)
Pekong town, 08/01/20

Work with 10,000 beneficiaries. A lot of people depend on fishing and around 2,000 household live around the lake. The main issues are the lack of livelihoods and human trafficking. Their main focuses are on food security in poppy cultivation and upland areas, supporting youth and women and health education. Currently implementing nine project funded by Swissaid, Caritas Korea, Caritas Japan, UKaid, Unamano bambino. They have 22 filed level staff.

Private hatchery
Pekong town, 08/01/20

Hatchery established on land from the Christian mission. Produce 100,000 seeds per year; 50% common carp and 50% inthar carp. They cannot manage the broods during the off season so get

new broods from ponds and Pekong lake every year. They are injecting the broods. They use four ponds. The main constraints are the attrition of broods, the water pollution caused by the soap in the water from creeks.

Kachin

Meeting with DoF and MFF, Myitkyina, Kachin state
09/01/20

MFF has 285 members operating in capture fishery and aquaculture. Kachin as around 2,000 acres of fish ponds mostly located in Myitkyina and Bhamo
MFF would like support on Small Indigenous Species (SIS) seed production
There are three DoF hatcheries in Kachin state: Putao. Whaimo and Bhamo) and seven private hatcheries (Myitkyina, Whaimo, Shwegu and Bhamo).

Focus group discussion, IPD camp in Wangmau township
09/01/20

There are five camps in the area. The camp has 350 households. Livelihoods is mostly farm related (slash & burn) on hilly terrain some 18 miles away from the camp. Farmed land size varies from three to seven acres. There is only one 0.5 pond in the camp that has no water during summer.

Focus group discussion, fish farmers and executive from MFF
09/01/20

MFF Kachin was established two years ago and they want to establish to have township level representation. They work with DoF to disseminate technology to farmers such as hatchery training. They take part in the annual MFF meeting in Yangon and convey the demand from the Kachin farmers which is mostly investment. The average sixe of the farms is 5 acres. They record the names and contact details of their members and, according to MFF, those operating hatcheries also record the details of their customers.

According to them there are 13 hatcheries in Kachin distributed as follows:

Township	DoF	MFF
Waimo	1	2
Putao	1	
Shwegu	1	
Mongien	1	2
Bhamo	1	1
Myitkyina		3
Total	5	8

DoF hatchery Waimo
09/01/20

This hatchery starts production on 1st May They produce 500 million fries and 5 m fingerlings per year. =

Myitkyina market
10/01/20
All fish come from Yangon except pangasia and tilapia. In average seller trade 200 viss per day, and wholesaler 10,000 viss.

Species	Sales price
Pangasia (river)	3,500 MMK/viss
Rohu	5,000 MMK/viss
Tilapia (local)	5,000 MMK/seed
Palu	3,500 MMK/viss

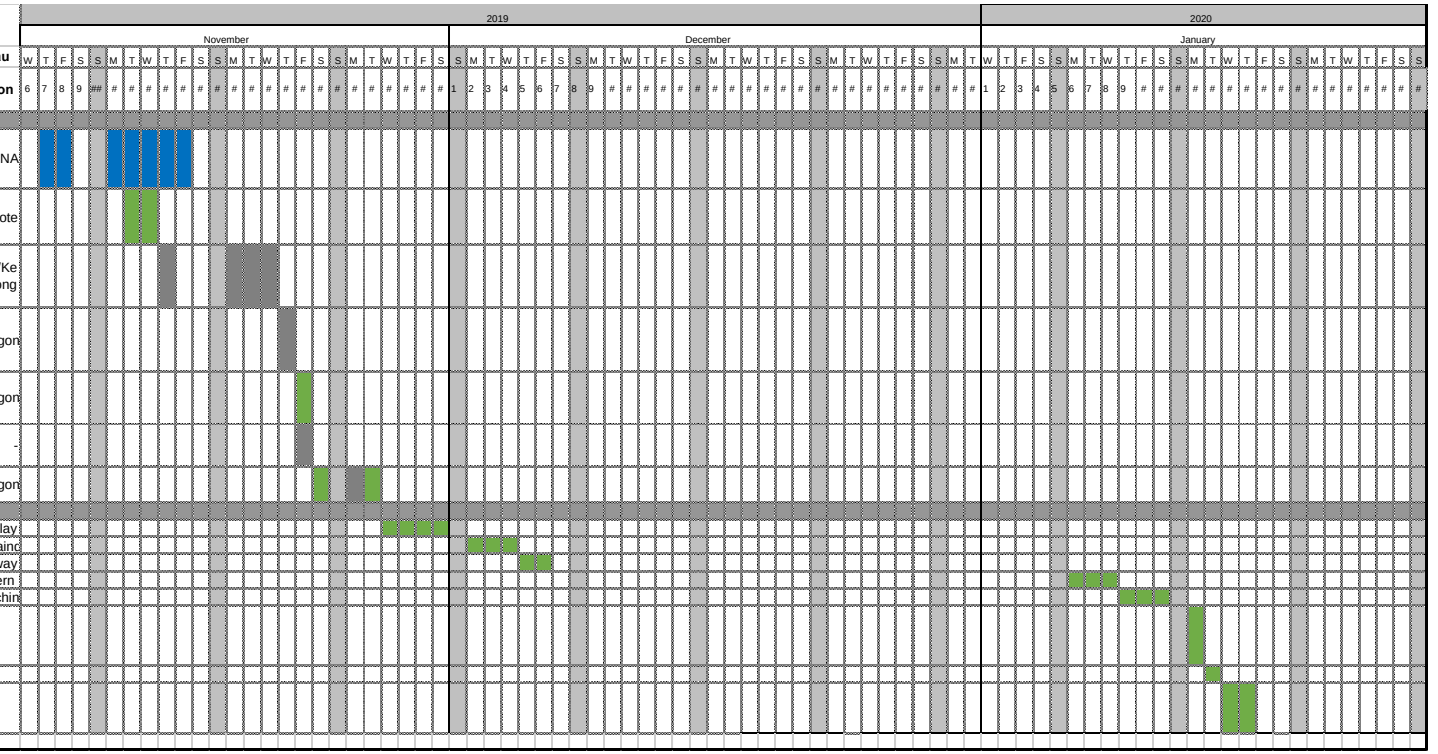
Farmer in Bhamo township, Myitkyina market, 11/01/20

Owns three ponds for a total of 1 acre (0.5 acres x 1 + 0.25 acres x2). Buys seeds (rohu, tilapia and mrigal) from local nurseries who bring fries from Mandalay, nurse them locally and sale them locally. The ground water and Tapin river overflow provides water to the pond. Water is available all year round. The farmer produces 800 kg/year. He harvests the fish himself and takes it to the market. They would like to have safe storage for the fish not to escape the pond.

DoF hatchery, Ins/Pond across the Irrawaddy river, Kachin 11/01/20

Appendix C: Scoping study Phase 1 & 2 – Asper Consullting Work Plan V3

WorldFish " Small-Scale Aquaculture Investments for Livelihoods Nutrition in Myanmar (SAIL NM)' | Scoping Study in Kachin, Manda Magway, Northern Shan and Sagaing Regions/States	Sebastien Moineau	
	Days	**Location**
Phase 1 - Township selection & method testing		
Evaluate and prepare primary data available for township selection criteria (poor households, IDPs, Gender) Evaluate and prepare thematic data for spatial analysis and selection of target townships.	-	NA
Carry out a desk study and analysis of primary & secondary market systems literature from Myanmar, covering the spectrum of fish systems from “capture” to “culture”	2	Remote
Broad scale scoping, team and network development, security assessment/verification, preliminary data collection and methods testing leading to preliminary township selection.	3.5	Remote/Kengtong
Contribute expert knowledge to a fish market systems status report of relevance to the five States and Regions where the project will be operating	0.5	Yangon
Using the Myanmar fish market systems review and agreed Township selection criteria, carry out a desk-based spatial analysis of possible target Townships.	0.5	Yangon
Present this analysis in the form of a series of maps to the CGIAR-USAI team for discussion and agreement	1	-
Provide PowerPoint presentation and seek comments/approval of methodologies	3.5	Yangon
Phase 2 - Data collection, analysis and visualisation		
Proceed with team training and finalize methods and approach followed by detailed data collection using approved methodology/tools developed in Phase 1.	4	Mandalay
	3	Sagaing
	2	Magway
	3	Northern
	3	Kachin
Provide institutional analyses, stakeholder mapping and poverty assessments as well as preliminary water resource assessment and agro-ecosystem assessment.	1	
Present a series of township maps, and associated descriptive text.	1	
Present the township selection recommendations at a debriefing in Yangon: a half-day workshop is envisaged.	2	
Total per consultant	**30**	



Appendix D: List of contracted deliverables and status update

No	Deliverables against which payment is made (reference above)	Due Date	Deliverables	Status update 27/01/20
1	Upon delivery of an agreed work plan, contract sign and invoice.	18 Nov 2019	• Work plan, contract sign and invoice.	• Three iterations of the work plan delivered before contract signature. Contract signed on 13 November 2019 and first invoice submitted on 16 December 2019
2	Upon delivery of deliverables #1 to #4 and submission of an invoice.	10 Dec 2019	• Carry out a desk study and analysis of primary & secondary market systems literature from Myanmar, covering the spectrum of fish systems from "capture" to "culture" • Contribute expert knowledge to a fish market systems status report of relevance to the States and Regions where the project will be operating • Using the Myanmar fish market systems review and agreed Township selection criteria, carry out a desk-based spatial analysis of possible target Townships. • Present this analysis in the form of a series of maps to the CGIAR-USAID team for discussion and agreement • Broad scale scoping, team and network development, security assessment/verification, preliminary data collection and methods testing leading to preliminary township selection. • Provide PowerPoint presentation and seek comments/approval of methodologies	• Desk study and analysis conducted. Bibliography of resources reviewed capture in the Power Point presentation presented to WorldFish, USAID and IWMI on 26 November 2019. • Market systems status covered in the scoping mission report. • Desk spatial analysis conducted with WorldFish GIS/Mapping Consultant. Townships selection criteria selected and township selection software designed • Spatial analysis Map prepared by WorldFish GIS/Mapping Consultant –presentation shared with participants • Broad scale scoping conducted in Shan East from 18 to 22 November 2019 to test methodology. Preliminary selection criteria established • Methodology, analysis and maps presented to WorldFish, USAID and IWMI on 26 November 2019. • Power Point presentation send to WorldFish on 26 November 2019
3	Upon delivery of deliverables	18 Jan	• Proceed with team training and finalize methods	• The timetable for the scoping study did not allow

	#5 & #8 and submission of an invoice.	2020	and approach followed by detailed data collection using approved methodology/tools developed in Phase 1. • Provide institutional analyses, stakeholder mapping and poverty assessments as well as preliminary water resource assessment and agro-ecosystem assessment. • Present a series of township maps, and associated descriptive text, with as much secondary GIS information as possible including land cover, digital elevation and climate and hydrological data • Present the township selection recommendations at a debriefing in Yangon: a half-day workshop is envisaged	sufficient time to hire and train a local team of enumerators (necessary to carry out the survey in the local dialects). The scoping team only spent 2-3 days in each location. Data collection done mostly through FGD and key informant interviews. Field notes are being compiled (WIP) • Institutional analysis and stakeholder mapping included in the scoping mission report • It was agreed with the SAIL Chief of Party, in Kengtung, Shan East, that a poverty assessment was not required at this stage as it would require to hire a team of enumerators and the poverty assessment will be conducted during the baseline • Preliminary water resource assessment and agro-ecosystem assessment should be delivered by WorldFish GIS/Mapping Consultant • Content of the series of townships maps and associate descriptive maps discussed with the WorldFish GIS/Mapping Consultant who should produce the maps • 2nd Power Point presentation during a meeting with send to WorldFish, USAID and IWMI on 14 January 2020 • 3rd presentation – including key findings of the scoping study and next steps to be presented at a workshop in Yangon scheduled on 21 January at Novotel • Agenda for the workshop on 21 January prepared and delivered to the COP

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(SAIL) - Inception workshop (28 February 2020)

WorldFish

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43	U Myo Lwin		MFF	Mandalay			
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Annex: Small-Scale Aquaculture Investment for Livelihoods Activities (Oct 19 - Mar 20)

Figure 1. Scoping Workshop

Figure 2. Market System Workshop, Day 1

Figure 3. Market System Workshop, Day 2

Figure 4. Market System Workshop, Day 3

Figure 5. Market System Workshop, Day 4

Figure 6. Market System Workshop, Day 5

Figure 7. Market System Workshop, Day 6

Figure 8. Inception Workshop

Figure 9. Meeting with Pehkhon Lake Conservation Committee

Figure 10. Fish Processor, Pehkon

Figure 11. Wish Pond at Pehkon

Figure 12. Field Trip, Khin U

Figure 13.U Htun Shwe's Hatchery, Inn Ywar Village, Nyaung Shwe

Figure 14.U Hla Kyaw's Hatchery, Inn Ywar Village, Nyaung Shwe

Figure 15. Ma Nan Win Htwe's Hatchery, Taung Poe Koe Lone Village, Nyaung

Figure 16.U Hla Kyaw's Hatchery, Inn Ywar village, Nyaung Shwe

Figure 17. Hatching Jar Set Up, U Hla Kyaw's Hatchery, Inn Ywar village, Nyaung Shwe

Figure 18. Hatching Jar Set Up, U Hla Kyaw's Hatchery, Inn Ywar Village, Nyaung Shwe

Figure. 19 and 20. GIFT Hatching Facilities Set Up, Ma Ye Ye Lwin's Hatchery, Inn Ywar Village, Nyaung Shwe

Figure 21. Delivering Online Basic Aquaculture Technology Training for Community Facilitators (BRAC Taungyi)

Figure 22. Online Basic Aquaculture Technology Training for Aquaculture Promoters

Figure 23. Inthar Carp Breeding Activity at Pekhon

Figure 24. Nursery Pond Preparation

Figure 25. Breeding Pond

Figure 26. U Tun Kyi's Demo Pond, Pin Laung Shwe Township

Figure 27. Demo Pond, U Myat Moe, Moebye Yae Kar

Figure 28. U Thein Htoo, Aquaculture Promoter, Thin Baw Village, Taungyi

Figure 29. U Saw Palae Hti No, Aquaculture Promoter, Nan Hu Village, Taungyi

Figure 30. U Khun Hla Aung , Aquaculture Promoter, Nan Hu Village, Taungyi

Figure 31. Newly Rice-Fish Pond Method in Pehkon

Annex 3 – Summary of literature review

S.No.	Paper	Study area	Data		GCM				Hydrology		
			Type	Sources	Model	Resolution	Source	Website	Model used	Calibration period	Validation period
1	A Multi-temporal Analysis of Streamflow Using Multiple CMIP5 GCMs in the Upper Ayerawaddy Basin, Myanmar_Ghimire et al. 2019	Upper Ayeyarwaddy River Basin	Rainfall 1975-2014 (Putao, Myitkyina, Bhamo, Katha, Lashio, Mandalay) Discharge 2000-2014 (Myitkyina, Katha, Sagaing)	DHM DHM	BCC-CSM1-1 CCSM4 CNRM-CM5 CSIRO-Mk3-6-0 IPSL-CM5A-MR MIROC5 MPI-ESM-LR MRI-CGCM3	2.78 * 2.81 0.94 * 1.25 1.40 * 1.40 1.85 * 1.87 1.27 * 2.50 1.40 * 1.40 1.85 * 1.87 1.11 * 1.12	BCC, China 2011 NCAR, USA 2010 CNRM and CERFACS 2010 CSIRO, Australia 2009 IPSL, France 2009 MIROC, Japan 2010 MPI, Germany 2009 MRI, Japan 2011	http://forecast.bcccsm.ncc-cma.net/web/channel-34.htm http://www.cesm.ucar.edu/models/ccsm4.0/ http://www.umr-cnrm.fr/spip.php?article126&lang=en http://www.glisaclimate.org/node/2239, https://catalogue.ceda.ac.uk/uuid/17c2d099802f4bd2bc9e9c3664cdab8c https://www.isimip.org/gettingstarted/input-data-bias-correction/details/21/ https://www.mpimet.mpg.de/en/science/models/licenses/ http://www.glisaclimate.org/model-inventory/meteorological-research-institute-cgcm-version-3	HEC HMS	2000-2008	2009-2013
2	Analysis of Rainfall and Flow Extremes under Climate Change Scenarios in Ayerawaddy River Basin, Myanmar_Ghimire and Babel 2019	Poster presentation									
3	Analysis of Streamflow Response to Changing Climate Conditions using SWAT Model_Oo et al. 2020	Upper Ayeyarwaddy River Basin	Ppt and temperature from all 14 stations in UARB 1981-2015 (Hsipaw, Katha, Kyaukme, Lashio, Mandalay, Meikhtila, Moegaung, Moekok, Myitkyina, Putao, Sagaing, Shwebo, Yamethin, YeU) Wind speed, solar radiation, RH 1981-2013 Discharge 1991-2015 (Sagaing) DEM 90m 15 class landcover 90m 17 class soil map 90m	DHM Global Weather Data for SWAT website DHM ? SRTM Servir Mekong Land Cover Portal Servir Mekong Land Cover Portal ?	CanESM2 CCSM4 CMCC-CMS GFDL-CM3 GFDL-ESM2G MRIOC ESM MIROC ESM CHEM MPI ESM LR MPR ESM MR MRI-CGCM3	varying resolution, the author has selected different GCMs for Tmax and Tmin, and rainfall depending on the bias	CMIP5 archive (World Climate Research Program)	https://esgf-node.llnl.gov/search/cmip5/	SWAT 23 sub-watersheds 2000-2001 warm up period	2002-2007	2008-2013
4	Assessment of Future Climate in Upper Ayeyarwady River Basin Using MRI-AGCM3.2S Model_Oo et al. 2019	Upper Ayeyarwaddy River Basin	Ppt and temperature from all 14 stations in UARB 1981-2015 (Hsipaw, Katha, Kyaukme, Lashio, Mandalay, Meikhtila, Moegaung, Moekok, Myitkyina, Putao, Sagaing, Shwebo, Yamethin, YeU)	DHM	MRI-AGCM3.2S	horizontal 20km	JMA-MRI				
5	Assessment of Future Climate Projections Using Multiple Global Climate Models (in Upper Irrawaddy Basin)_Oo et al. 2019	Upper Ayeyarwaddy River Basin	Ppt and temperature from all 14 stations in UARB 1981-2015 (Hsipaw, Katha, Kyaukme, Lashio, Mandalay, Meikhtila, Moegaung, Moekok, Myitkyina, Putao, Sagaing, Shwebo, Yamethin, YeU)	DHM	CanESM2 CCSM4 CMCC-CMS GFDL-CM3 GFDL-ESM2G MRIOC ESM MIROC ESM CHEM MPI ESM LR MPR ESM MR MRI-CGCM3	varying resolution, the author has selected different GCMs for Tmax and Tmin, and rainfall depending on the bias	CMIP5 archive (World Climate Research Program)	https://esgf-node.llnl.gov/search/cmip5/			
6	Discharge and Suspended Sediment Transport in the Ayeyarwady River, Myanmar-Centennial and Decadal Changes_Furuichi et al. 2009	Ayeyarwady Basin	Discharge 1966-1996 (Pyay) Sediment Discharge (L in kg/s) at Pyay Discharge 1978-1988 (Hkamti, Sagaing)	Win (1998) via DHM = 0.0127 Q^1.4264 UNH/GRDC 2000							

7	Effects of Different Precipitation Inputs on Streamflow Simulation in the Irrawaddy River Basin, Myanmar_Sirisena et al. 2018	Ayeyarwady Basin	Discharge 1991-2010 (Hkamti, Homalin, Kalewa, Monywa, Katha, Sagaing, Nyaung U, Pyay) Monthly wind speed, RH data (Hkamti, Homalin, Mawlaik, Kalewa, Monywa) Ppt 2001-2010 (Putao, Hkamti, Myitkyina, Homalin, Katha, Bhamo, Lashio, Hkha, Monywa, Mandalay, Moiktila, Taunggyi, Minbu, Thandwe, Gwa, Ratkein, Maubin, Pyapo, Pyinmana) PERSIANN - CDR CHIRPS DEM 90m Landcover 300m 2009 Soil map 7km Slope classification (undulating land 0-8% slope; hilly areas 8-30% slope; mountainous area >30% slope)	missing ppt data filled using APHRODITE SRTM European Space Agency FAO FAO					SWAT 747 HRUs 1990 and 2001 warm up period
8	Hydrological modeling of large-scale ungauged basin case study- Ayeyarwady (Irrawaddy) basin, Myanmar_Chavoshian et al. 2007	Ayeyarwady Basin	Tmax, Tmin, discharge (Sagaing) Topographic data 4km IGBP 2.0 landover 1km Soil map 5km	GRDC GTOPO30 by USGS USGS FAO					BTOPMC
9	Simulation of Stream Flow Using Soil and Water Assessment Tool (SWAT) in Upper Ayeyarwady Basin_Aung and Aye 2016	Upper Ayeyarwady River Basin	DEM 30m Landcover 5 classes ?? Km 5 classes soilmap ?? Km Weather data 9 stations (Putao, Myitkyina, Katha, Shwebo, Mandalay, Sagaing, Loilem, Homalin, Kengtung) Discharge 3 stations (Myitkyina, Katha, Sagaing)	Global DEM ?? ?? ?? ??					SWAT warmup 3 years 2003-2005 25 sub basins
10	Using Global Datasets to Create Environmental Profiles for Data-Poor Regions- A Case from Irrawaddy and Salween River Basins_Salmivaara et al. 2013	Ayeyarwady and Salween	 Landcover Landcover Landcover Nitrogen loand from industrial fertilizer Proportion of cropland Proportion of human settlements Population density in sub-area	GWSP Digital water atlas 0.5 degrees UNEP 10km ESA 300m GWSP Digital water atlas 0.5 degrees ESA UNEP, ESA LANDSCAN					
11	Assessment of Rainfall Bias Correction Techniques for Improved Hydrological Simulation_Ghimire et al. 2018	Chindwin River Basin	Rainfall 1981-2014 (35 stations)	DMH??	CCSM4 CESM1-BGC CESM1-CAM5 CNRM-CM5 GFDL-CM3 GISS-E2-H HadCM3 HadGEM2-AO inmcm4 IPSL-CM5A-MR MIROC5 MIROC-ESM-CHEM NorESM1-M	1.25 * 0.94 1.25 * 0.94 1.25 * 0.94 1.40 * 1.40 2.50 * 2.00 2.50 * 2.00 3.75 * 2.50 1.87 * 1.25 2.00 * 1.50 2.50 * 1.27 1.40 * 1.40 2.81 * 2.79 2.50 * 1.90	NCAR NSF-DOE-NCAR NSF-DOE-NCAR CNRM NOAA GFDL NASA-GISS MOHC NIMR-KMA INM IPSL MIROC MIROC NCC	
12	Operationalizing a Flood Forecasting Decision Support System for Ayeyarwady River, Myanmar_Agrawal, Ghimire et al. 2020	Ayeyarwady River Basin	DEM 90m Landuse map 900m Soil information Rainfall 2000-2014 (68 stations, 51 used after quality control) Daily discharge, water level and rating tables 2000-2014 (17 stations) Evapotranspiration	HydroSHEDS FAO FAO DMH DMH FAO-CROPWAT					HEC HMS 38 sub basins
13	Applicability of lumped hydrological models in a data-constrained river basin of Asia_Ghimire et al. 2020	Ayeyarwady River Basin	Rainfall (51 stations) Evapotranspiration (coarse monthly)	DMH Global sources					GRJ4 IHACRES CWI HEC-HMS SWAT

Annex 4 – Summary of temporal data collected

S.No.	Station	Latitude	Longitude	Variable	Time step	Start Date	End Date
1	Aunglan	19.367	95.217	Sediment Discharge	daily	1998	2015
2	Ayartaw	21.200	95.470	Evaporation	daily	2009	2016
3	Ayartaw	21.200	95.470	Rainfall	daily	1993	2016
4	Ayartaw	21.200	95.470	Water level	daily	2009	2016
5	Bhamo	24.267	97.200	Tmax and Tmin	daily	1986	2015
6	Bhamo	24.267	97.200	Tmax and Tmin	daily	1975	2014
7	Bhamo	24.294	97.200	Tmax and Tmin	daily	2001	2013
8	Bhamo	24.267	97.200	Rainfall	daily	1986	2015
9	Bhamo	24.267	97.200	Rainfall	daily	1975	2014
10	Bhamo	24.294	97.200	Rainfall	daily	2001	2013
11	Bhamo	24.267	97.200	Relative humidity	daily	1986	2015
12	Bhamo	24.267	97.200	Wind direction, wind speed	daily	1986	2015
13	Bhamo	24.267	97.200	Water level	daily	1986	2015
14	Chit Thu	Not availabl	Not availabl	Rainfall	daily	2009	2011
15	Dothaung	18.920	96.470	Mean Discharge	daily	1978	1988
16	Gangaw	22.167	94.133	Water level	daily	2000	2015
17	Gangaw	22.167	94.133	Tmax and Tmin	daily	1986	2015
18	Gangaw	22.167	94.133	Rainfall	daily	1986	2015
19	Gangaw	22.167	94.133	Relative humidity	daily	1986	2015
20	Gangaw	22.167	94.133	Wind direction, wind speed	daily	1986	2015
21	GWA	17.609	94.583	Tmax and Tmin	daily	1982	2013
22	GWA	17.609	94.583	Rainfall	daily	1982	2013
23	Hinthada	17.667	95.417	Tmax and Tmin	daily	1986	2015
24	Hinthada	17.667	95.417	Rainfall	daily	1986	2015
25	Hinthada	17.667	95.417	Relative humidity	daily	1986	2015
26	Hinthada	17.667	95.417	Wind direction, wind speed	daily	1986	2015
27	Hinthada	17.667	95.417	Water level	daily	1986	2015
28	Hkamti	26.000	95.700	Mean Discharge	daily	1986	2015
29	Hkamti	26.000	95.700	Tmax and Tmin	daily	1986	2015
30	Hkamti	26.026	95.700	Tmax and Tmin	daily	2001	2013
31	Hkamti	26.000	95.700	Rainfall	daily	1986	2015
32	Hkamti	26.026	95.700	Rainfall	daily	2001	2013
33	Hkamti	26.000	95.700	Relative humidity	daily	1986	2015
34	Hkamti	26.000	95.700	Relative humidity	monthly	1982	2014
35	Hkamti	26.000	95.700	Wind direction, wind speed	daily	1986	2015
36	Hkamti	26.000	95.700	Wind speed	monthly	1982	2014
37	Hkamti	26.000	95.700	Mean Discharge	daily	1978	1988
38	Hkamti	26.000	95.700	Mean Discharge	daily	1990	2010
39	Hkamti	26.000	95.700	Sediment Discharge	daily	1986	2015
40	Hkamti	26.000	95.700	Water level	daily	1986	2015
41	Hkha	22.676	93.617	Tmax and Tmin	daily	1989	2013
42	Hkha	22.676	93.617	Rainfall	daily	1989	2013
43	Hnget Pyaw Tie	23.066	95.717	Water level	daily	1986	2001
44	Homalin	24.893	94.917	Relative humidity	monthly	1981	2014
45	Homalin	24.893	94.917	Wind speed	monthly	1981	2014
46	Homalin	24.867	94.917	Mean Discharge	daily	1999	2010
47	Homalin	24.893	94.917	Tmax and Tmin	daily	2001	2013
48	Homalin	24.893	94.917	Rainfall	daily	2001	2013
49	Kalewa	23.200	94.300	Mean Discharge	daily	1990	2010
50	Kalewa	23.200	94.300	Relative humidity	monthly	1981	2014
51	Kalewa	23.200	94.300	Wind speed	monthly	1981	2014
52	Katha	24.167	96.333	Mean Discharge	daily	1986	2015
53	Katha	24.167	96.333	Tmax and Tmin	daily	1986	2015
54	Katha	24.167	96.333	Rainfall	daily	1986	2015
55	Katha	24.167	96.333	Relative humidity	daily	1986	2015
56	Katha	24.167	96.333	Wind direction, wind speed	daily	1986	2015
57	Katha	24.167	96.333	Mean Discharge	daily	1990	2010
58	Katha	24.167	96.333	Tmax and Tmin	daily	1982	1985
59	Katha	24.193	96.333	Tmax and Tmin	daily	2001	2013
60	Katha	24.167	96.333	Rainfall	daily	1982	1985
61	Katha	24.193	96.333	Rainfall	daily	2001	2013
62	Katha	24.167	96.333	Sediment Discharge	daily	1986	2015
63	Katha	24.167	96.333	Water level	daily	1986	2015
64	Khaing Kang	Not availabl	Not availabl	Water level	daily	2009	2012
65	Kyauk Talone	22.841	96.549	Rainfall	daily	2009	2012
66	Lashio	22.960	97.750	Tmax and Tmin	daily	1975	2014
67	Lashio	22.960	97.750	Tmax and Tmin	daily	2001	2013
68	Lashio	22.960	97.750	Rainfall	daily	1975	2014
69	Lashio	22.960	97.750	Rainfall	daily	2001	2013
70	Magway	20.133	94.917	Mean Discharge	daily	1993	2015
71	Magway	20.133	94.917	Rainfall	daily	1986	2015
72	Magway	20.133	94.917	Relative humidity	daily	1986	2015
73	Magway	20.133	94.917	Wind direction, wind speed	daily	1986	2015
74	Magway	20.133	94.917	Water level	daily	1993	2015
75	Magwe	20.133	94.917	Tmax and Tmin	daily	1986	2015
76	Mahu	21.745	95.198	Rainfall	daily	2009	2011
77	Mandalay	21.983	96.100	Tmax and Tmin	daily	1986	2015
78	Mandalay	21.983	96.100	Tmax and Tmin	daily	1975	2014
79	Mandalay	22.010	96.100	Tmax and Tmin	daily	2001	2013
80	Mandalay	21.983	96.100	Rainfall	daily	1986	2015
81	Mandalay	21.983	96.100	Rainfall	daily	1975	2014
82	Mandalay	22.010	96.100	Rainfall	daily	2001	2013
83	Mandalay	21.983	96.100	Relative humidity	daily	1986	2015
84	Mandalay	21.983	96.100	Wind direction, wind speed	daily	1986	2015
85	Mandalay	21.983	96.100	Water level	daily	1986	2015
86	Manipura	Not availabl	Not availabl	Water level	daily	2007	2012
87	Mawlaik	23.633	94.417	Mean Discharge	daily	1986	2015
88	Mawlaik	23.633	94.417	Tmax and Tmin	daily	1986	2015
89	Mawlaik	23.633	94.417	Rainfall	daily	1986	2015
90	Mawlaik	23.633	94.417	Relative humidity	daily	1986	2015
91	Mawlaik	23.633	94.417	Relative humidity	monthly	1981	2014
92	Mawlaik	23.633	94.417	Wind direction, wind speed	daily	1986	2015
93	Mawlaik	23.633	94.417	Wind speed	monthly	1981	2014
94	Mawlaik	23.633	94.417	Sediment Discharge	daily	1986	2015
95	Mawlaik	23.633	94.417	Water level	daily	1986	2015
96	Meitktila	20.360	95.833	Tmax and Tmin	daily	2001	2013
97	Meitktila	20.360	95.833	Rainfall	daily	2001	2013
98	Minbu	20.193	94.883	Tmax and Tmin	daily	2001	2013
99	Minbu	20.193	94.883	Rainfall	daily	2001	2013
100	Minbu	20.167	94.883	Tmax and Tmin	daily	1986	2015
101	Minbu	20.167	94.883	Rainfall	daily	1986	2015
102	Minbu	20.167	94.883	Relative humidity	daily	1986	2015
103	Minbu	20.167	94.883	Wind direction, wind speed	daily	1986	2015

104	Minbu	20.167	94.883	Water level	daily	1986	2015
105	Monywa	22.100	95.133	Mean Discharge	daily	1986	2015
106	Monywa	22.100	95.133	Mean Discharge	daily	1990	2010
107	Monywa	22.100	95.133	Tmax and Tmin	daily	1986	2015
108	Monywa	22.126	95.133	Tmax and Tmin	daily	2001	2013
109	Monywa	22.100	95.133	Rainfall	daily	1986	2015
110	Monywa	22.126	95.133	Rainfall	daily	2001	2013
111	Monywa	22.100	95.133	Relative humidity	daily	1986	2015
112	Monywa	22.100	95.133	Relative humidity	monthly	1981	2014
113	Monywa	22.100	95.133	Wind direction, wind speed	daily	1986	2015
114	Monywa	22.100	95.133	Wind speed	monthly	1981	2014
115	Monywa	22.100	95.133	Water level	daily	1970	1985
116	Myitkyina	25.367	97.350	Mean Discharge	daily	1999	2015
117	Myitkyina	25.367	97.350	Tmax and Tmin	daily	1986	2015
118	Myitkyina	25.367	97.350	Tmax and Tmin	daily	1973	2014
119	Myitkyina	25.394	97.400	Tmax and Tmin	daily	2001	2013
120	Myitkyina	25.367	97.350	Rainfall	daily	1986	2015
121	Myitkyina	25.367	97.350	Rainfall	daily	1973	2014
122	Myitkyina	25.394	97.400	Rainfall	daily	2001	2013
123	Myitkyina	25.367	97.350	Relative humidity	daily	1986	2015
124	Myitkyina	25.367	97.350	Wind direction, wind speed	daily	1986	2015
125	Myitkyina	25.367	97.350	Water level	daily	1972	1985
126	Myitkyina	25.367	97.400	Mean Discharge	daily	1990	2010
127	Nyaung Oo	21.200	94.917	Mean Discharge	daily	2004	2015
128	Nyaung Oo	21.200	94.917	Mean Discharge	daily	1991	2010
129	Nyaung Oo	21.200	94.917	Tmax and Tmin	daily	1986	2015
130	Nyaung Oo	21.200	94.917	Rainfall	daily	1986	2015
131	Nyaung Oo	21.200	94.917	Relative humidity	daily	1986	2015
132	Nyaung Oo	21.200	94.917	Wind direction, wind speed	daily	1986	2015
133	Nyaung Oo	21.200	94.917	Water level	daily	1986	2015
134	Pakokku	21.333	95.083	Tmax and Tmin	daily	1986	2015
135	Pakokku	21.333	95.083	Rainfall	daily	1986	2015
136	Pakokku	21.333	95.083	Relative humidity	daily	1987	2015
137	Pakokku	21.333	95.083	Wind direction, wind speed	daily	1995	2015
138	Pakokku	21.333	95.083	Water level	daily	1998	2015
139	Paytawlay	21.541	96.093	Water level	daily	2009	2016
140	Putao	27.360	97.417	Tmax and Tmin	daily	1975	2014
141	Putao	27.360	97.417	Tmax and Tmin	daily	2001	2013
142	Putao	27.360	97.417	Rainfall	daily	1975	2014
143	Putao	27.360	97.417	Rainfall	daily	2001	2013
144	Pyay	18.800	95.217	Mean Discharge	daily	1990	2010
145	Pyay	18.826	95.217	Tmax and Tmin	daily	2001	2013
146	Pyay	18.826	95.217	Rainfall	daily	2001	2013
147	Pyay	18.800	95.217	Mean Discharge	daily	1986	2015
148	Pyay	18.800	95.217	Tmax and Tmin	daily	1986	2015
149	Pyay	18.800	95.217	Rainfall	daily	1986	2015
150	Pyay	18.800	95.217	Relative humidity	daily	1986	2015
151	Pyay	18.800	95.217	Wind direction, wind speed	daily	1986	2015
152	Pyay	18.800	95.217	Sediment Discharge	daily	1986	2015
153	Pyay	18.800	95.217	Water level	daily	1986	2015
154	Pyinmana	19.743	96.217	Tmax and Tmin	daily	2001	2013
155	Pyinmana	19.743	96.217	Rainfall	daily	2001	2013
156	Sagaing	21.867	95.983	Mean Discharge	daily	1986	2015
157	Sagaing	21.867	95.983	Tmax and Tmin	daily	1986	2015
158	Sagaing	21.867	95.983	Rainfall	daily	1986	2015
159	Sagaing	21.867	95.983	Relative humidity	daily	1986	2015
160	Sagaing	21.867	95.983	Wind direction, wind speed	daily	1986	2015
161	Sagaing	21.867	95.983	Mean Discharge	daily	1978	1988
162	Sagaing	21.867	95.967	Mean Discharge	daily	1990	2010
163	Sagaing	21.867	95.983	Sediment Discharge	daily	1986	2015
164	Sagaing	21.867	95.983	Water level	daily	1986	2015
165	Sagyo	20.598	94.938	Water level	daily	2011	2012
166	Shweli 1 Hydropower Station	23.698	97.506	Rainfall	daily	2008	2016
167	Shweli 1 Hydropower Station	23.698	97.506	Water level	daily	2008	2016
168	Si-Thaung	24.108	96.746	Water level	daily	2003	2012
169	Tat Ywa	22.227	95.981	Water level	daily	1987	1992
170	Taunggyi	20.810	97.050	Tmax and Tmin	daily	2001	2013
171	Taunggyi	20.810	97.050	Rainfall	daily	2001	2013
172	Thabeikkyin	22.883	95.983	Sediment Discharge	daily	1986	2015
173	Thandwe	18.493	94.350	Tmax and Tmin	daily	2001	2013
174	Thandwe	18.493	94.350	Rainfall	daily	2001	2013
175	Toungoo	18.920	96.470	Mean Discharge	daily	1978	1988
176	Yeywa Hydropower Station	21.674	96.474	Water level	daily	2010	2016
177	Yeywa Hydropower Station	21.674	96.474	Rainfall	daily	2011	2016
178	Yeywa Hydropower station	21.674	96.474	Tmax and Tmin	daily	2010	2016
179	Ywatha	22.715	95.764	Rainfall	daily	1980	2016
180	Zalun	17.486	95.565	Sediment Discharge	daily	1997	2015

Sources:

HIC Myanmar - part 1

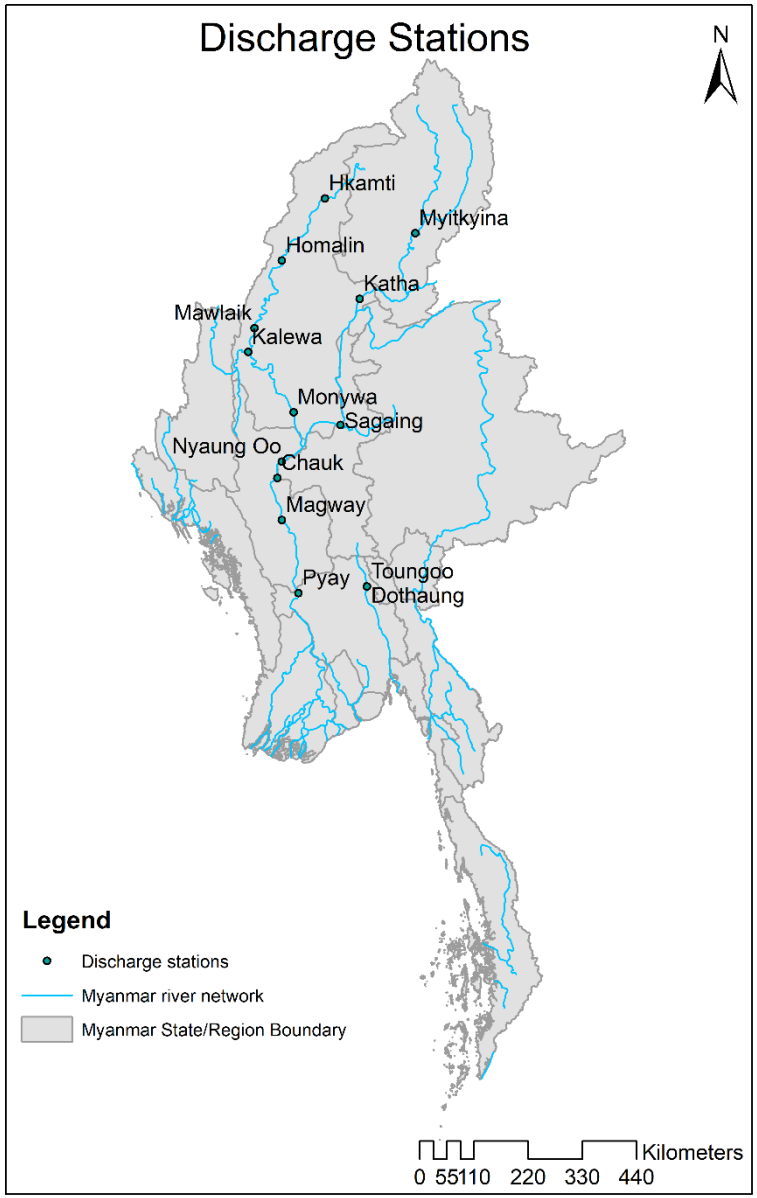
HIC Myanmar - part 2

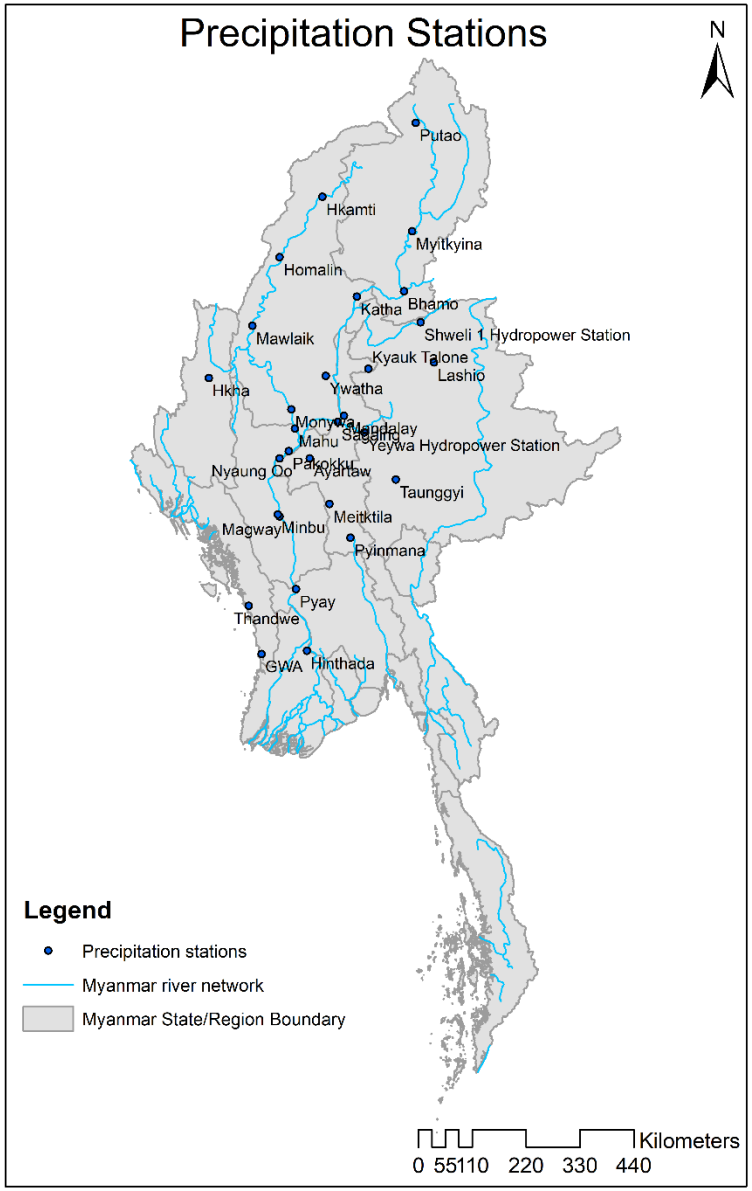
Dry zone study - IWMI

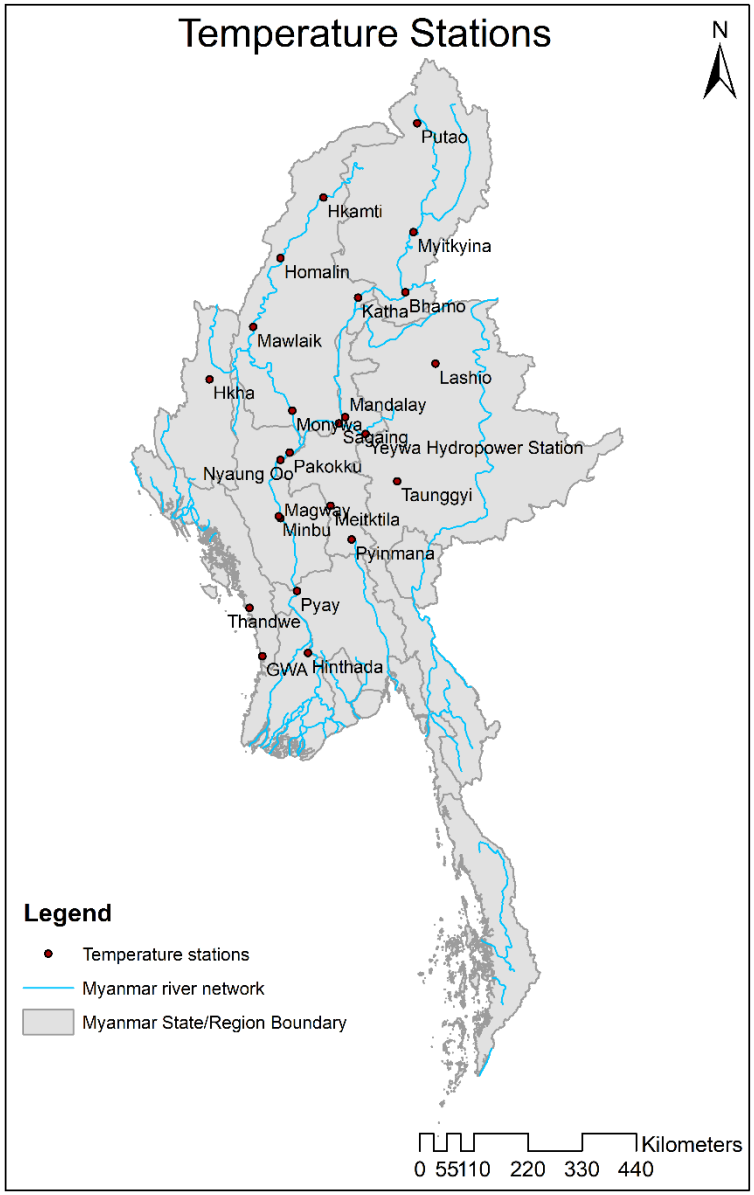
Ghimire U. et al (2017)

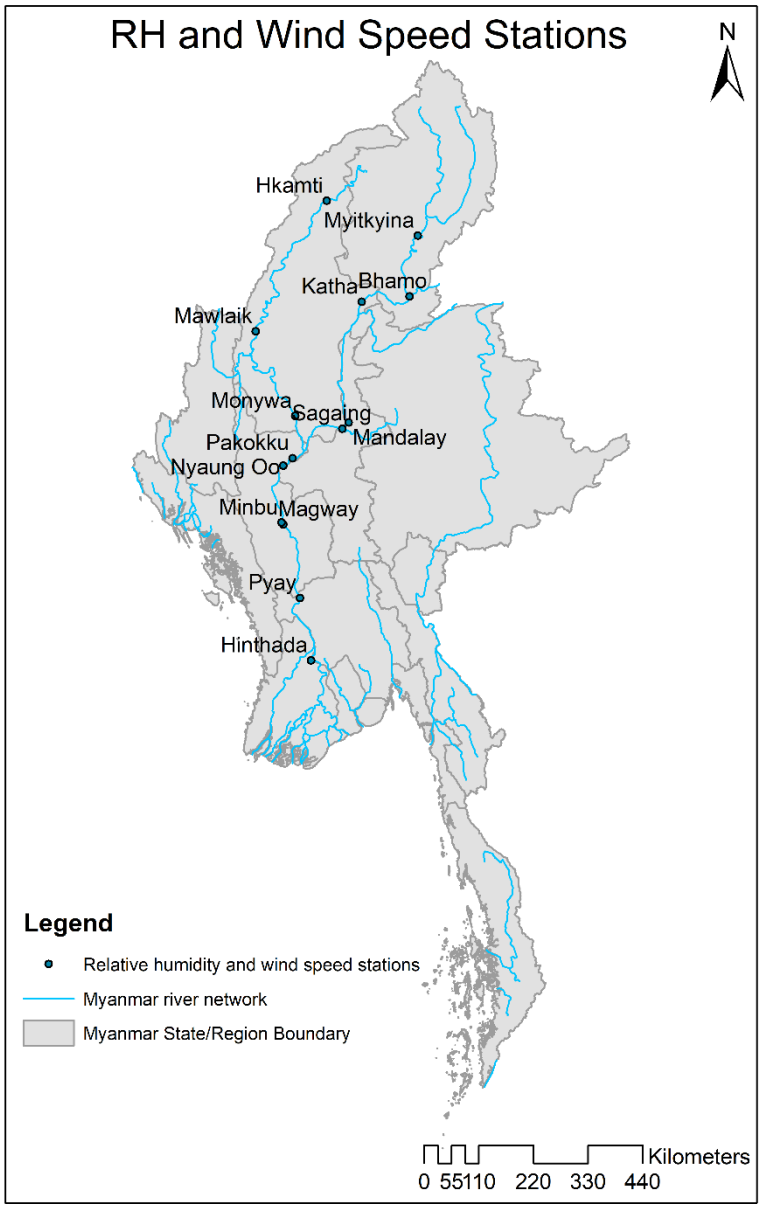
Sirisena T. A. J. G. et al (2018)

Annex 5 – Maps of stations

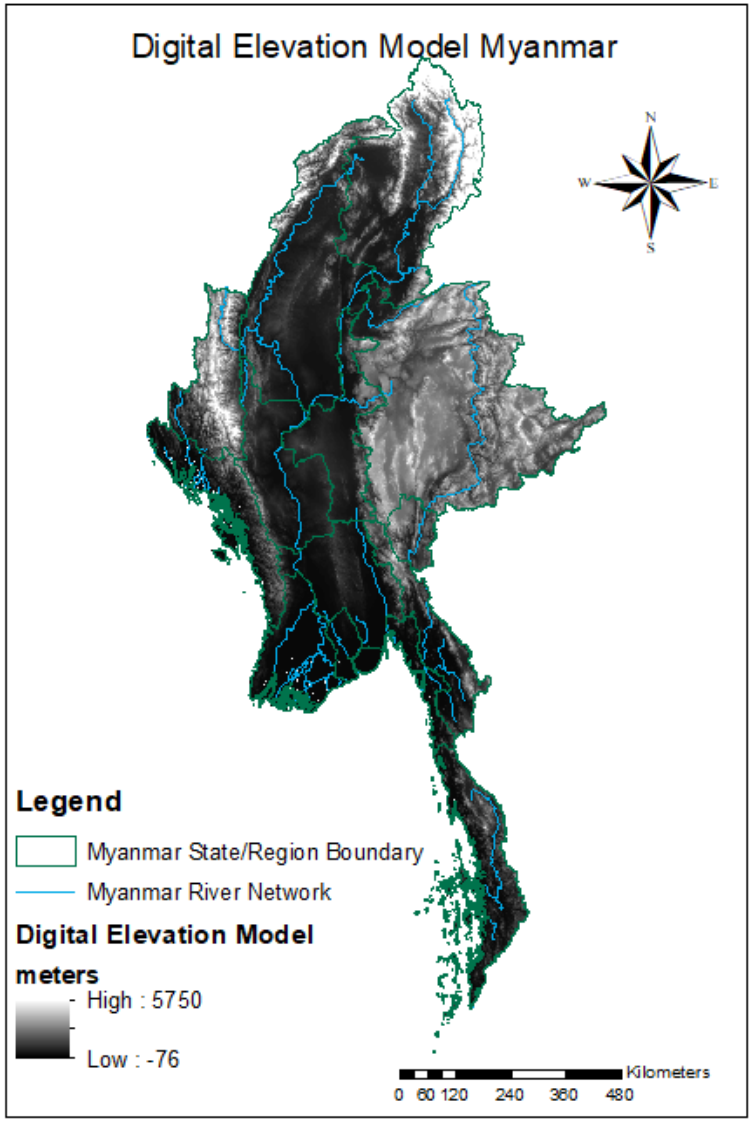


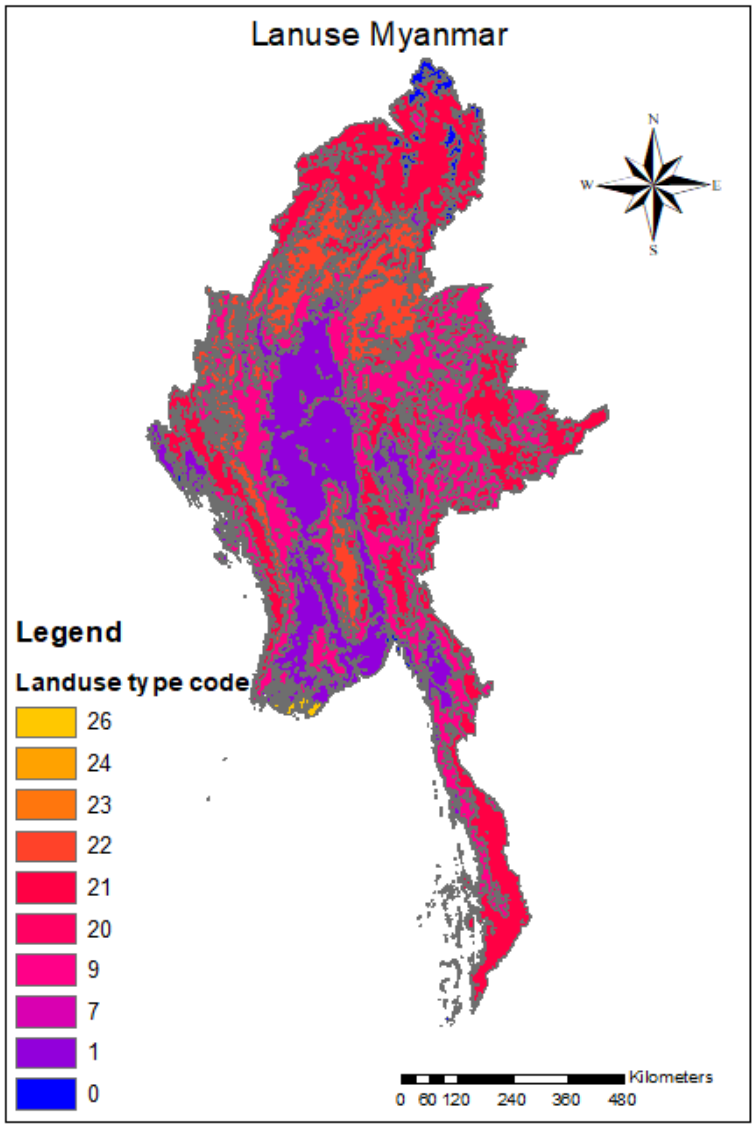



Temperature Stations
N
Putao
Hkamti
Myitkyina
Homalin
Katha
Bhamo
Mawlaik
Lashio
Hkha
Mandalay
Monywa
Sagaing
Yeywa Hydropower Station
Nyaung Oo
Pakokku
Taunggyi
Magway
Meitktila
Minbu
Pyinmana
Pyay
Thandwe
GWA
Hinthada
Legend
Temperature stations
Myanmar river network
Myanmar State/Region Boundary
Kilometers
0 55110 220 330 440

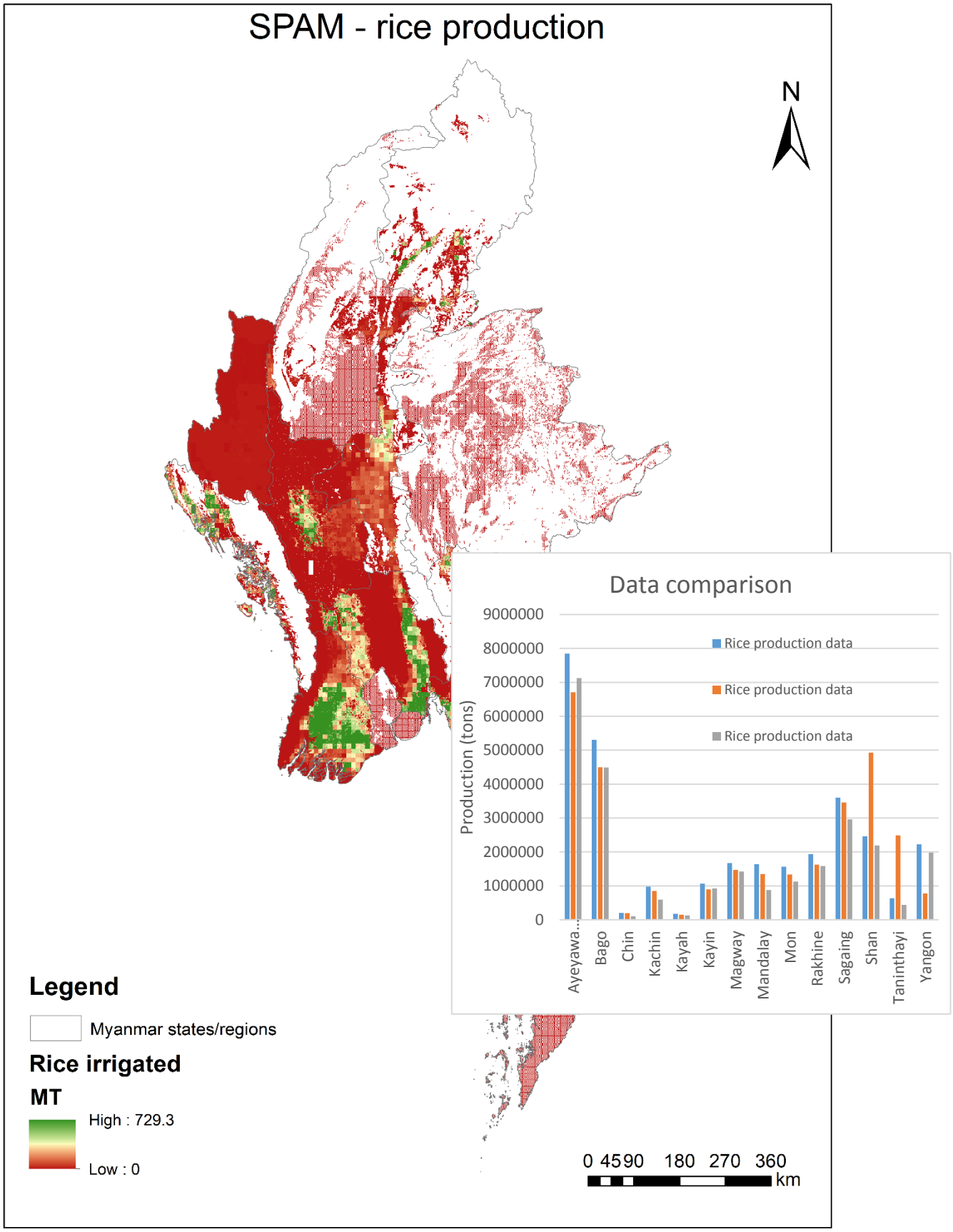

RH and Wind Speed Stations
N
Hkamti
Myitkyina
Katha
Bhamo
Mawlaik
Monywa
Sagaing
Mandalay
Pakokku
Nyaung Oo
Minbu
Magway
Pyay
Hinthada
Legend
Relative humidity and wind speed stations
Myanmar river network
Myanmar State/Region Boundary
Kilometers
0 55110 220 330 440

Annex 6 – Spatial data



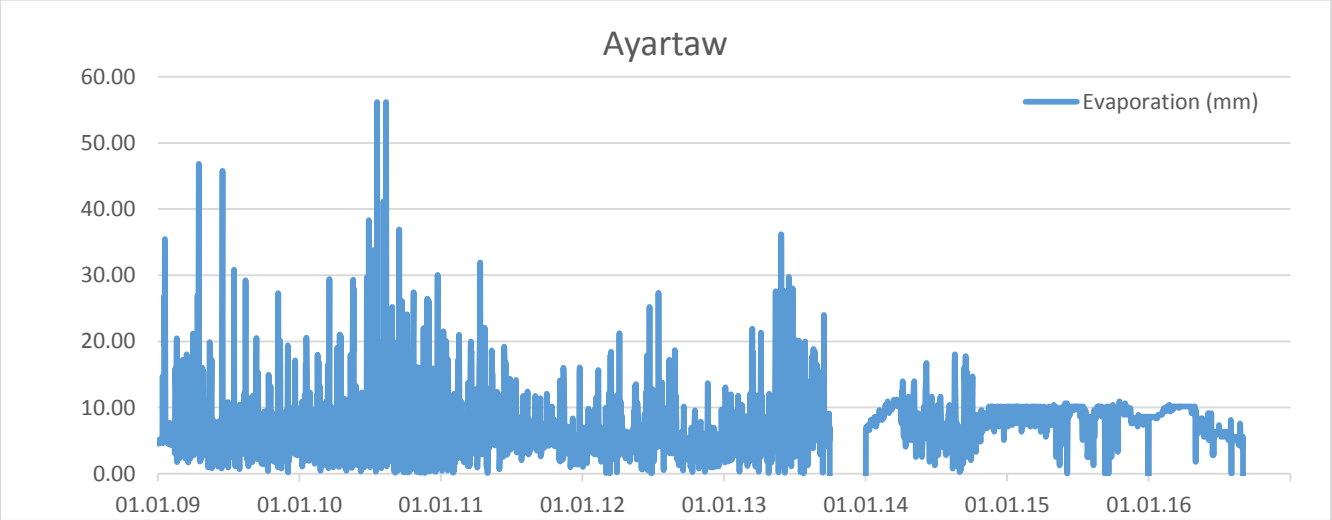


Annex 7 – Other data



Annex 8 – Observations made during data formatting and analysis

1. Evaporation
    a. The data from HIC suggests 2013 data to be in inches. It cannot possibly be in inches. Changed to mm.
    b. The values go as high as 55 mm which is unrealistic.
    c. The plot shows inconsistencies with distribution within the data set.



2. Discharge
    a. Hkamti
        i. Rampant 0 values in HIC data for Jan-May 2015. Given Hkamti station lies in the Chindwin river, one of the major tributaries of the Ayeyarwady, it is unlikely that the river will have 0 flow.
            1. 0 values changed to -99.

        ii. Comparing with data from Jeewa from IHE, the following can be discerned:

Date	HIC	Jeewa IHE
01-01-02	7.00	36.00
02-01-02	6.00	35.00
03-01-02	4.00	33.00
04-01-02	2.00	31.00
05-01-02	-99.00	30.00
06-01-02	-99.00	29.00
07-01-02	-99.00	29.00
08-01-02	-99.00	29.00
09-01-02	-99.00	28.00
10-01-02	4.00	33.00
11-01-02	1.00	30.00

    b. Monywa

        i. Many of the data from Mansoor is not consistent with data from HIC and Jeewa – IHE. The latter two data appear to be the same.
    c. Nyaung Oo
        i. Mansoor and Jeewa – IHE data appear to be the same. Some discrepancies between these data and HIC data.
    d. Pyay
        i. Missing data from HIC.
        ii. Discrepancies between Mansoor and Jeewa – IHE's data in some cases.
    e. Sagaing
        i. Major discrepancies between data from HIC compared to Jeewa – IHE and Mansoor. The latter two have similar data.
        ii. Similarities between Matthew dry zone study data and HIC data.
3. Rainfall
    a. Bhamo
        i. "Trace" values changed to 0 after consultation with Luna ma'am.
    b. Gangaw
        i. HIC accidently shared data for Hkamti instead of Gangaw, although the file is named as Gangaw.
        ii. Gangaw is from the first data sharing agreement between HIC and IWMI.
    c. Mandalay
        i. Some minor discrepancies between Jeewa – IHE data when compared to data from HIC and Uttam ji.
    d. Mawlaik
        i. No data for entirety of 2009
    e. Myitkyina
        i. Data from Uttam ji (Ghimire et al (2010)) is two days ahead.
        ii. HIC data consistent with data Yin Mon translated.
        iii. Inconsistencies between Jeewa – IHE data and HIC data.
    f. Ywatha
        i. No data for 1989, 1996-2000 inclusive, and 2003-2004 inclusive.
4. Temperature
    a. Gangaw
        i. HIC accidently shared data for Hkamti instead of Gangaw, although the file is named as Gangaw.
        ii. Gangaw is from the first data sharing agreement between HIC and IWMI.
    b. Pakokku
        i. Plethora of 10s as minimum temperature in 1993. Probably wrong.

Small-scale Aquaculture Investments for Livelihoods (SAIL) NM

Gender Strategy Building Blocks

Submitted: 25 January 2020

Julie Newton and Jessica Scott

Contents

1. Introduction

SAIL aims to provides a means of ensuring the improved availability of diverse, safe, affordable nutrient-rich foods, especially for women and young children from poor and vulnerable households. This will be achieved by ensuring that poor households have an increased ability to purchase accessible nutritious foods due to improved incomes from entrepreneurial activities including improved small-scale aquaculture in the intervention areas and the strengthening of aquaculture market systems with particular attention to expanding opportunities for women and youth. In addition, behavioural change work will prioritize nutritious-conscious household decisions by means of both home production and local markets. Specifically, it is expected that the adoption of fish culture technologies would contribute to improved food and nutrition security for poor households in several ways; i) generating income from fish culture which would be used to purchase nutritious food, ii) creating alternative employment generating activities and increasing labour productivity, and iii) increasing available food supply and fish consumption

This document serves as the building blocks for **SAIL NM Gender** Strategy. It follows a 'working' gender integration workshop in 15 and 16 January with core project staff (see workshop report).

It begins with brief overview of how gender is captured in the proposal, then presents core concepts that should guide the gender work. It identifies a number of areas for better gender integration in project design across different pathways. It also highlights a number of opportunities to better integrate gender into the MEL, particularly the baseline.

2. Gender Concerns in SAIL

This is cut and paste from project proposal

Within SAIL NM project proposal, there is mention of gender in several parts.

- Under the nutrition pathway: In close coordination with Output 1 nutrition-sensitive interventions will be delivered while incorporating an accurate understanding of gender dynamics. Women's empowerment as a pathway to improved nutrition, and is such this activity will promote a gender inclusive strategy in all intervention areas (see the Gender Section for more information).
- Dedicated gender paragraph p.15: "Gender dynamics profoundly influence the ability of women and men to effectively produce fish, equitably and effectively access inputs and engage in and benefit from markets in aquaculture production and in the emerging and rapidly changing fish value chains in Myanmar (Benchmarking outputs WorldFish 2017). Conversely, the development of the aquaculture sector in Myanmar, if catalyzed inclusively, has enormous potential to positively contribute to women's empowerment, including in terms of economic empowerment. An accurate understanding of gender dynamics and barriers in the selected project contexts and application of that understanding, via strategic technical and social/market innovations are required to effectively address gender barriers within each intervention area. Doing so will be critical to Project success. To ensure this success, the Project will mainstream gender throughout the project cycle from context

analysis, to refinement and implementation of each intervention area (as per the ToC, with special reference to land tenure, input and output markets, nutrition, and [capacity in] partnerships) through implementation, and throughout M&E, including rapid feedback and learning cycles"

The specific plan for gender mainstreaming will be developed in phase 1 of the project following and in conjunction with context scoping and refinement of each sub-component. This will include application of USAID's Gender Integration Framework (GIF). Overall, gender integration will have multiple dimensions and strategies and will be operationalized in accordance with the FISH gender strategy and in alignment with USAID's approach to gender mainstreaming. This includes several dimensions:
Project design; throughout the project as a whole and within the area of intervention - incorporation of women's and men's aspirations and mitigation of gender-related risks, such as avoiding increases in women's time and work burdens.

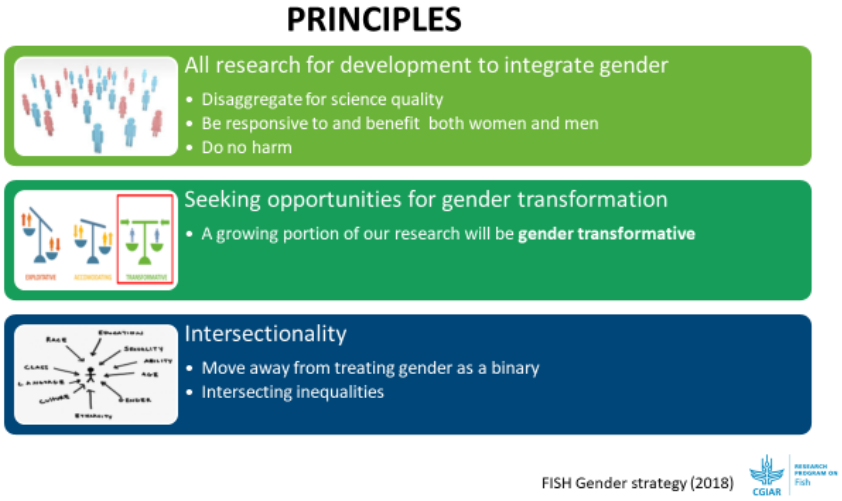
- Specific attention will be given to how current gender dynamics function. For example, the positioning of men in rural Myanmar households as household heads and migration patterns that increase the numbers of female-headed households. Both in connection with policy influence on equitable access to land and water, access to and control over inputs, and access to and benefits from markets, nutrition outcomes and influence women's empowerment and overall gender equality.
- All aspects of implementation will be '*gender accommodative'*, i.e. identifying and working around gender barriers to enable women's full inclusion in the project activities.
- Moreover, in response to analysis of in context gender dynamics, specific intervention areas will develop and pilot gender transformative approaches as needed to address normative barriers in a context-sensitive manner. For example, this may include testing innovations that address nutrition and gender barriers together through bespoke SBCC that engage women and men (in alignment with SPRING guidelines: Increased time and energy savings for women and increased income control by and equitable opportunities for women).
- Where possible, the project will apply an intersectional approach to gender, i.e. assessing and engaging with other dimensions of social difference as needed in the selected contexts, such as age, ethnicity, marital status or wealth.
- MEL in the project will reflect a bespoke approach to gender-integrated M&E, this will:
- ○ incorporate gender throughout the range of project M&E indicators and data (in particular ensuring effective gender disaggregation of data);
- ○ develop and apply gender-specific indicators as needed, in particular it will draw on an adaptation of the 'Women's empowerment in fisheries index' which is developed from the USAID (Feed the Future) interventions; and
- ○ apply strategies for gender-responsive M&E as outlined in the FISH Gender Strategy, including seeking opportunities for project M&E (as well the intervention processes themselves) to be empowering for women and men involved in the project.

Commencing from the scoping design, the project will explore the six domains of gender analysis (ADS 205) through mixed methods field survey and desk review. These domains cover the experiences of women and men from the individual to state level, including the policy and legal environment.
USAID six domains of gender analysis3:

- Access: a person's ability to use the necessary resources to be fully active and productive participant (socially, economically and politically) in society.
- Knowledge, beliefs and perception: refers to the types of knowledge that men and women are privy to (who knows what), the beliefs that shape gender identities and behavior, and perceptions that guide how people interpret aspects of their lives differently depending on their gender identity.
- Practices and participation: refers to peoples' behaviors and actions in life – what they actually do – and how this varies by gender. It encompasses not only current patterns of action, but also the way that people engage in development activities
- Time and space: includes recognizing gender differences in the availability and allocation of time as well as the space in which time is spent.
- Legal rights and status: involves assessing how people are regarded and treated by both the customary and formal legal codes and judicial systems.
- Power and decision making: this sphere of social life pertains to the ability of people to decide, to influence, to control, and to enforce. It refers to the capacity to make decisions freely and to exercise power over one's body and within an individual's household, community, municipality, and the state.

Further intersectional disaggregation will ensure the range of subcategories of women and men are represented in data collection and project design. This is particularly important for populations of displaced persons, ethnicity, levels of poverty and women in both male and female headed households; acknowledging changing intra-household dynamics resulting from outmigration of a spouse

For **WorldFish**, gender integration is one of three core principles. All research for development is to integrate gender, including disaggregating for science quality, being responsive to and benefit both for women and men and should do no harm.



For **USAID**, gender analysis should be built around the following 2 core questions:

1. How will the different roles and status of women and men within the community, political sphere, workplace and household affect the work to be undertaken?
2. How will the anticipated results of the work affect women and men differently?

3. Conceptual framework of SAIL

A core objective of the Gender Strategy is to provide a basis for a common understanding of what gender integration in the context of SAIL NM. This rests on having a common language of core gender concepts as detailed in the FISH gender integration guide (forthcoming).

3.1. Gender as relational

Gender is understood as a social relation. This perspective moves away from treating women and men as isolated categories in opposition of each other (i.e. binaries) to focusing on the social relationships through which they are continuously reproduced as unequal social categories (Kabeer & Subrahmanian 1996). A social relations perspective is sensitive to **intersectionality**, in that it recognizes that the social position of women and men is influenced by the **points of intersection** with other social markers that contribute to their unique experiences of privilege or oppression (AWID, 2004). This implies an acknowledgement that the social position of people is shaped through the **different points of intersection of social relations** of gender *and* class, age, ethnicity, religion, marital status location (rural/urban), etc. (Kabeer, 1994).

3.2. Four dimensions of gender relations

There are **four dimensions** of a gender relations which constitute the core building blocks for designing tools and carrying out gender analysis. These dimensions are related to each other and **understanding how they interact** is critical for understanding how research for development can to contribute towards gender equality and women's empowerment

Gender division of labour: The allocation of particular tasks to a particular gender within the household (productive and reproductive tasks) as well as within fisheries/aquaculture and livelihood activities related to fish value chains and beyond fish within the community. Because these allocations take place in the context of social relations, they are also shaped by the social expectations of what different women and men and can do both within the household and related to different fisheries and aquaculture tasks. They therefore become social rules of what women and men should do and fixes responsibilities, roles and division of skills for women and men. These lead to gender hierarchies of what roles are ascribed more value, and therefore become part of self-reinforcing gender identity. For example, women's reproductive work (household care for survival) is often not valued because it is not easily captured in measurement or monetized. As such, this form of labour (reproductive work) is undervalued, and less valued.

Access to and control over assets and resources: Access refers to the opportunity to use a resource whereas control refers to the ability to define and decide on its use (benefit). Women and men from different social groups have different levels of access to key productive assets and resources (e.g. knowledge, technologies, ponds, seeds and inputs, fishing areas, fishing gear, credit). Although they may have access to a resource, they may not be able to decide on how those resources are used as this is influenced by her positioning in gender and intersectional hierarchy. There are different types of resources:

- **Human resources** (labour, health, skills).
- **Tangible resources** (credit, ponds, land, fishing equipment, income, seeds, feed)
- **Intangible** resources include (social capital, political influence, extension services, information, feelings of confidence).

Decision making: This broadly captures the agency of different women and men to make decisions and be able to act on them. Decision making is often at the heart of most empowerment measures and captures the act of taking control over one's life and future. Decision making is a core expression of agency which is the ability to pursue goals, express voice and influence and make decisions free from violence and retribution (Eerdewijk et al, 2017). Key decisions of interest to FISH at the household and community level cover decisions around production, livelihood strategies, income, food distribution and choices about women's own time, mobility and labour.

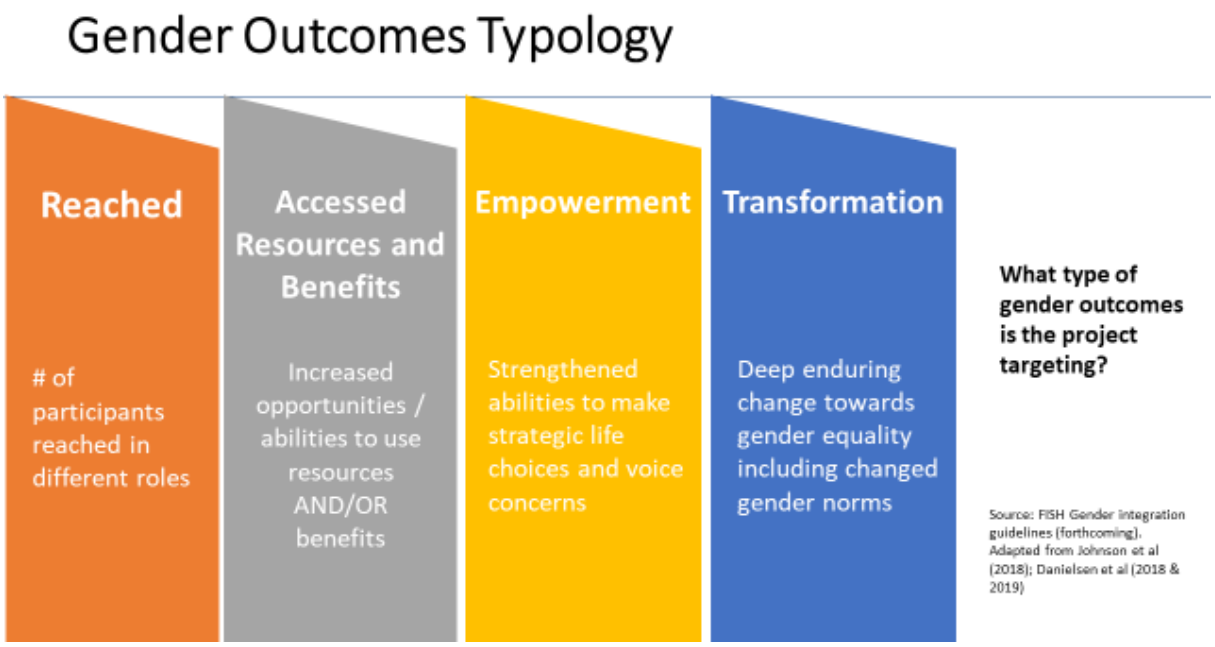
Norms: This refers to the set of social rules and assumptions about what men and women should do, how to behave and with what resources, and the status of individuals and their relative value in society. Gender norms are likely to affect women and men's roles, constraints and opportunities as well as perceived needs in aquaculture. They refer to the beliefs and expectations to which gender identity conforms (how women and men should act) in a specific setting at different stages of lifecycle (Eerdewijk et al, 2017; There are also broader social norms that may also affect the extent to which different technologies and extension information can be acted on related to taboos about what food can be eaten.

4.2. Different types of gender outcomes

What are gender outcomes: The gender results your research for development project aims to contribute towards. Includes results to be achieved for women and girls relative to men and boys and the results that contribute towards changing relations between different women and men. Can include positive achievements for women's wellbeing (equality, equity) and broader empowerment for women and gender transformative change for women and men at the community level brought about through a project interventions as well as your gender integrated research. They cover both FISH research outcomes and development outcomes (impact pathways). They can be attained at different levels: policy, institutions, communities, families, individuals

Gender outcomes cover a continuum of reach, benefit, empower and transform. In the workshop it was agreed at minimum the project should aim to track reach and benefit. Following baseline, the project will need to go into more detail around which gender outcomes it aims to reach (see Annex 1). These will have to be incorporated in the MEL.

Figure 1: Gender outcomes typology

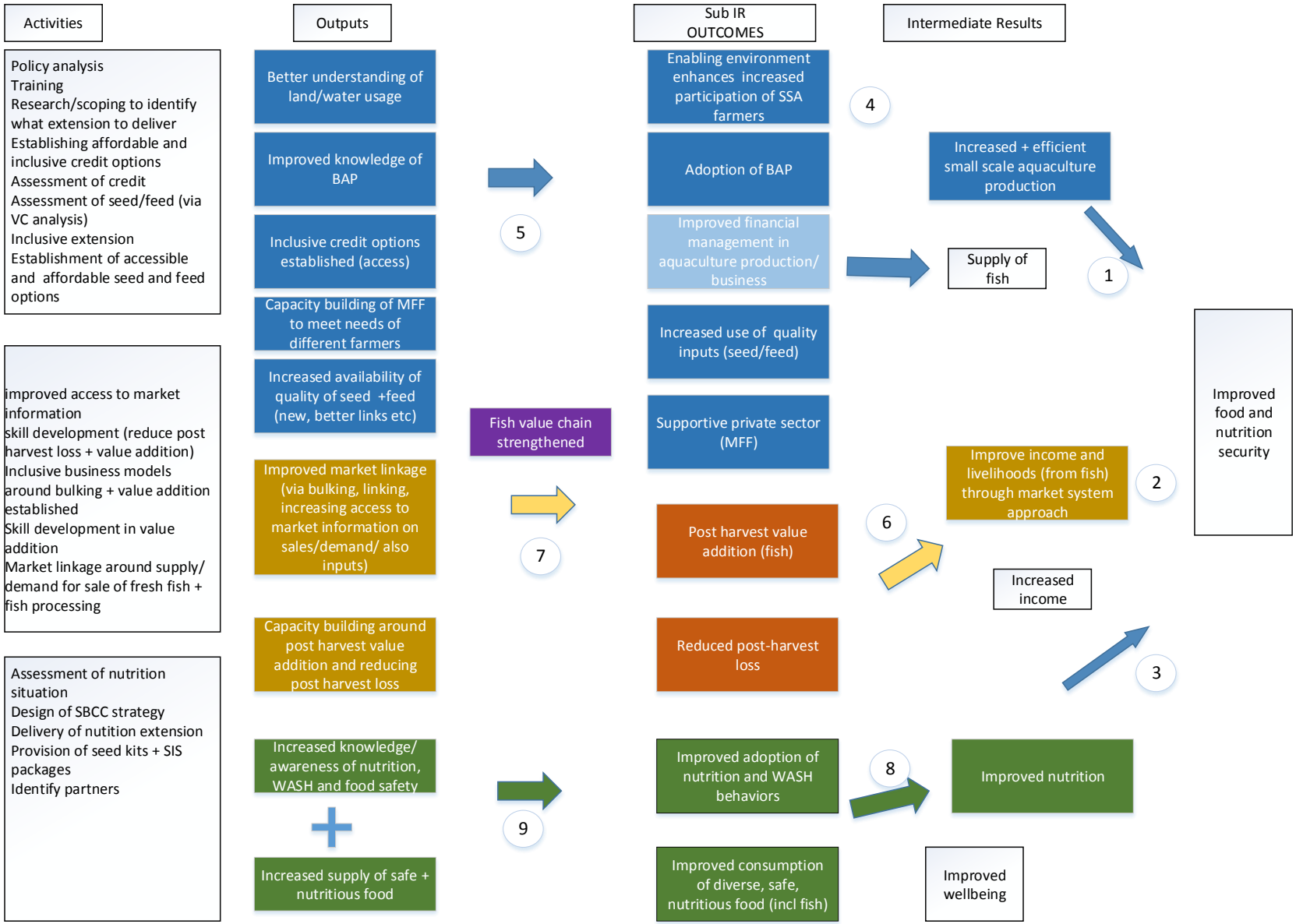


4. Gender responsive SAIL NM ToC

The current SAIL Theory of Change is still work in progress (Annex 2). During the workshop, participants went through each pathway to unpack the gender assumptions. This proved a useful exercise to make assumptions more explicit and their gendered dimensions.

Below is an attempt to simplify the existing ToC to highlight the gender assumptions (Figure 2) . This will need to revisited following the baseline findings. Then the MEL indicators will be mapped across the ToC. [note these assumptions are work in progress]

Figure 2: Simplified SAIL Theory of Change


Activities
Outputs
Sub IR OUTCOMES
Intermediate Results
Policy analysis
Training
Research/scoping to identify what extension to deliver
Establishing affordable and inclusive credit options
Assessment of credit
Assessment of seed/feed (via VC analysis)
Inclusive extension
Establishment of accessible and affordable seed and feed options
improved access to market information
skill development (reduce post harvest loss + value addition)
Inclusive business models around bulking + value addition established
Skill development in value addition
Market linkage around supply/ demand for sale of fresh fish + fish processing
Assessment of nutrition situation
Design of SBCC strategy
Delivery of nutition extension
Provision of seed kits + SIS packages
Identify partners
Better understanding of land/water usage
Improved knowledge of BAP
Inclusive credit options established (access)
Capacity building of MFF to meet needs of different farmers
Increased availability of quality of seed +feed (new, better links etc)
Improved market linkage (via bulking, linking, increasing access to market information on sales/demand/ also inputs)
Capacity building around post harvest value addition and reducing post harvest loss
Increased knowledge/ awareness of nutrition, WASH and food safety
Increased supply of safe + nutritious food
5
Fish value chain strengthened
7
9
Enabling environment enhances increased participation of SSA farmers
4
Adoption of BAP
Improved financial management in aquaculture production/ business
Increased use of quality inputs (seed/feed)
Supportive private sector (MFF)
Post harvest value addition (fish)
6
Reduced post-harvest loss
Improved adoption of nutrition and WASH behaviors
8
Improved consumption of diverse, safe, nutritious food (incl fish)
Increased + efficient small scale aquaculture production
Supply of fish
1
Improve income and livelihoods (from fish) through market system approach
2
Increased income
3
Improved nutrition
Improved wellbeing
Improved food and nutrition security

List of assumptions

	Assumptions
1	Increased supply of fish will lead to improved food and nutrition security
	Everyone will benefit from increased income generated from fish businesses
2	Income generated from sale of fish (fresh/dry) will be used to be invested in household nutrition
3	Nutritious food will be distributed equitably within the household so that everyone benefits
4	Enabling environment will support different types of SSA farmers equitably (will be supportive for all types of SSA farmer
	That different types of SSA farmers are able to practice/implement BAP/BMP to the same extent Different types of SSA farmers have access to all necessary resources to implement BAP/BMP
	Both women and men SSA farmers have same decision making power/autonomy over financial resources to invest in aquaculture business Credit will only be used for aquaculture (household decision making support this and there is no conflict in this decision)
	Both women and men have same ability to access the quality inputs (seed and feed). They have access to income to purchase inputs, have time to go to buy the input. Women and men decide jointly when/how to use quality inputs Women and men have same knowledge of how to use the quality inputs
	The MFF is willing to support all types of SSA farmers (women/men other intersectional groups , and is able to and provides different types of support for women and men SSA farmers
5	Everyone in household has sufficient 'time' to engage in BAP/BMP
	There is equal willingness between women and men household members to purchase/use the quality seed/feed Both men and women have same knowledge of the seed sector
	The hatchery and mill providers are responding to the needs of the different women and men clientele The hatchery and mill providers are 'accessible' to women and men in same way and other intersectional markers
	Capacity building of MFF supports the different types of MFF actors to better understand the different needs/constraints/opportunities of women and men SSA farmers and other aquaculture value chain actors
	Credit options are able to cater/tailored to the different needs of women and men SSA farmers and value chain actors.
6	SSA farmers (women/men, other intersectional groups) have same motivation to engage in post-harvest value addition (they may want to engage in other livelihood opportunities) Addressing post-harvest value addition is the most suitable income generating activity for target group

	There is sufficient market demand for fish products Different types of consumers have the ability to afford fish products in the market There is support from all household members to engage in fish livelihood generation activities (very important for women)
7	Women and men value chain actors have sufficient access to 'fish' to engage in trading, post-harvest processing Women and men have sufficient resources (income, other) to invest in business around post-harvest value addition Women/men have sufficient time to sell fish + fish products in market
8	Adoption of nutrition practices is the main pathway to improved nutrition
	Everyone in household has same ability and motivation to practice the knowledge around nutrition
9	Increased supply of fish and access to nutritious fish and homestead production will be used to benefit everyone in the household Joint decision making (woman and men) promotes that these 'nutritious foods' are kept for home consumption and not sold
	Women and men have same time to engage in training on nutrition Women and men have access to resources needs to invest in nutrition Women and men decide together what food to purchase for nutritious needs of household
	Home production of nutritious food is sufficient to meet nutritious needs of household

5. Gender integration entry points

Note: This document should be crosschecked with matrix which has more detail.

The details of the project interventions are still yet to be determined following the baseline analysis and scoping work. Meanwhile, the workshop revealed a number of core gender integration entry points across each pathway. See gender integration matrix for more detail.

Each section presents brief overview of pathway, observations on gender gaps, recommendations for gender integration, and concrete actions. These entry points could become the key action areas for SAIL NM that should be further fine-tuned following baseline and validated in next project kick off meeting.

Crosscutting issues:

- Integrate gender into baseline: Still don't have sufficient data to know 'what the problem' is for women and men / across other intersectional markers. Given the lack of gender data in scoping, need a solid baseline that integrates gender data=> inform project design . gender responsive data collection principles needed to identify (who is respondent, how are they recruited, who is involved and in what capacity).
- Value chain analysis needs to address gender dimensions
- Implementation plan for gender integration work may vary for different contexts. For example in IDP locations there may be more emphasis on market linkage and value addition for different profiles of women/men value chain actors.

Main entry points:

- Community Appraisal (during inception phase) to get info on what women and men want in terms of program and along fish VC. Use meeting to guide the design of project activities. Guidance also needed around how to arrange this meeting (ensure all represented, gender/intersectionality). Meeting is also critical to avoid backlash later on.
- Design of training packages across different pathways to address gender barriers/ constraints
- Delivery of extension to adopt gender integration principles throughout. (aquaculture, financial literacy, value chain strengthening, nutrition. **A checklist could be designed to support this.**
- ToT for partners at each stage needs to be crosschecked for gender integration using gender strategy forth coming. Several levels of training > to farmers – For example short messages when buying seed/feed > SSA on farm and demo farmers. Gender strategy to provide guidance/checklist on how to do this.
- MEL to capture reach and benefit for different target groups and gender learning around prioritized areas. Although these are yet to be determined, these could include testing around different business models targeting women or other intersectional groups, effectiveness of nutrition messaging, new aquaculture technologies for women and men SSA farmers.
- Exit and sustainability strategy: need to integrate gender into this which some key 'gender norms' project may wish to tackle in long term.

Pathway 1: Aquaculture production

Potential gender objective : Increasing recognition of women's contribution in aquaculture production

The aquaculture package comprises WorldFish standard interventions around aquaculture. These include creating enabling environment for SSA farmers, improving aquaculture production efficiency through delivery of best management aquaculture practices (BMP), improving access to quality inputs (seed and feed); access to finance/credit and enhancing the capacity of the MFF.

Observations: During the workshop, the following gaps were identified:

- Scoping thus far has not generated sufficient knowledge around what are the gendered nature of main barriers/constraints to aquaculture production. Given the diverse context SAIL works in, the gendered division of labour varies in location and women and men play different roles in pond preparation, managing ponds, harvesting fish. The assumption so far is that men are the SSA farmer and that women do not play a role.
- There are many assumptions around access to feed, seed and credit being barriers to more efficient production. We don't know the gendered dynamics (access/ decision making) on how these resources are being used.
- Project provides opportunity to revise current extension material and move towards more adult centred learning approaches to ensure reach to different profiles of SSA farmers.

Creating an enabling environment for farmers in aquaculture production (I.R. 1.1)

Observation: Currently we don't know the gender dynamics around access to land and water resources and decision making processes around conversion of land to pond. In some locations (particularly IDP locations) SAIL may not be able to get access to ponds. Implies, other interventions (market linkage/livelihood generation/nutrition may be more important for different locations and different individuals

Entry points for gender integration
Baseline: capture information on gender division of labour, access/control over pond, ownership and decision making around land/water ; and how this varies by location. Discuss with IWMI if they have this information already and other experts working in the field. **Policy analysis/mapping:** Need information on how existing policies on land/water rights affect women and men and other intersectional markers. Look at the different access/control dimensions (access, tenure, security) Explore how this varies at national and regional level. **Modelling of scenarios:** Ensure assessment/modelling validates scenarios for different types of households (MHH, FHH disaggregated across different intersectional groups). Ensure scenarios for IDP in relevant sites. **MEL:** capture changes in conversion of land to pond, how policies affecting different access/control

over land/water
Next steps: Follow up with IWMI + LAND CORE group (Phil Hersch), other land specialists to identify gender dynamics (what is already known)

Improved access to information on market and SSA technologies (BMP)

Currently access to information on market (prices/ demand etc.) and SSA technologies have been merged under the same output. Suggest delete SSA technologies as these are more relevant in the efficiency of aquaculture production pathway. The assumption is that this pathway concerns accessing information about prices of inputs (seed, feed). Implicitly it also suggested that it is about accessing information around prices for sale of fresh fish/fish products. Suggest to rename this as "access to market information" and be put under pathway two (market systems) and then it can include both access to information about prices for inputs and prices for selling fish (live + products).

Observation: Women and men will have different constraints and opportunities to access different types of information depending on the a) type of information b)modality of delivery c) the actor who provides the information. Women may not have time to access some of these sources of information due to their other roles within the household.

From a design perspective the merging of market prices with BAP is problematic as they concern two different types of resources which have different gender dynamics around their delivery. Moreover, different actors will be providing different types of resources depending on the 'service' and the customer (woman/man across intersectional actors). For example, market information prices might come more from private sector actors compared to information around BAP which may be provided by government, NGOs etc.

Entry points for gender integration

Baseline: For women and men separately within household, capture information on different sources from whom they access to information on market prices on (inputs + sale of fish products) Ensure that specifies from 'who' they access information (government extension staff, hatcheries, nurseries, etc.) and 'type' of information.

Extension around market information: First need to understand how women and men currently access such market information, assess what are their barriers to accessing this information. Ensure this closely monitors from which actor women and men access this information This can be used to design a) content b) modality of extension. Also check closely whether access to market information is the main problem. There may be other barriers (not enough time, resources to invest in production)

- Ensure VC analysis captures information on how women and men access market prices for different fish products (fresh/dry) and for various inputs (seed, feed/) and from whom. If not, then this has to be covered in baseline.
- Ensure design of extension to address gap in access to information responds to the gendered challenge for different types of women and men + other intersectional markers

- ToT for partners responsible for extension includes guidance on how to better 'reach' different target groups
- Gender strategy to provide checklist to guide partners in basis gender responsive principles for preparation, delivery and follow up of any 'training' directly to farmers
-

Note: may be more appropriate to move this under pathway 2

MEL: Following design of extension packages, MEL to capture whether target groups are accessing the information (reach) and using it (benefit) and whom in household is benefitting. Also capture unintended consequences (workload)

Next steps: ensure baseline covers relevant information. Rethink putting activity line related to assessing access to market information under pathway 2 (market systems) . allocate resources for revising BAP extension material throughout.

Efficiency of aquaculture production increased [Suggest that this is renamed to 'adoption of BMP/ BAP] (sub I.R. 1.2)

Observation: This package concerns the delivery of extension around BAP; thereby covering the design of extension (content) and its modality of delivery and targeting. Suggest that it is renamed to 'adoption of BMP/BAP

From current experience (MYAP, MYCULTURE, MY FISH) we know that more men have been reached than women for different reasons (not inviting women, timing , location of training etc.). This reinforces bias that only men are 'the aquaculture farmer'. This bias is also reinforced through current extension delivery modality (timing, location, targeting etc.) which has privileged more men to attend, overlooking the other care tasks of women that may prevent them from attending; moreover in many cases they have not been invited. Challenges around the 'format' of extension, material used and lack of literacy has also compromised the quality of learning around BAP which may also prevent learning from being shared within the household.

Entry points for gender integration

Baseline: we need to know who does what in HH around pond management to ensure most relevant individuals are targeted. Also need to know what is their current access/ use of BAP extension. For women and men separately within household, capture information on different access to information on BAP extension + market prices on (inputs + sale of fish products) and modality of delivery (training,) for women and men within the HH. Ensure that specifies from 'who' they access information (government extension staff, hatcheries, nurseries, etc.) and 'type' of information.

Extension around BAP: Design of 'content' of extension on BAP needs to be informed by analysis of gender division of labour (who does what in aquaculture) to ensure that it adequately targets relevant

individual engaged in different aquaculture tasks. Baseline should also identify what is main 'challenge/barrier' for engaging in aquaculture. Where needed, provide 'technologies (e.g. fingerling, nets, etc.) which address those gender barriers.

- Use baseline findings to inform design of extension messages, prioritize WHO needs training for what part of aquaculture management.
- Consider reviewing all extension material for promoting more adult learning focus
- All extension material needs to be checked for gender integration (i.e. are gender messages aligned across all work packages: production, nutrition, market linkages)
- Types of gender messages: agree on what are core messages project wants to promote around promoting joint decision making of use of fish products, use of income towards nutrition, , male engagement strategy. (can be done after baseline once we know what are main challenges)
- Extension delivery to include targets for women and men farmers
- Delivery of extension to be aligned to seasonal calendar taking in consideration gender division of labour at time.
- Gender strategy to provide checklist to guide partners in basic gender responsive principles for preparation, delivery and follow up of any 'training' directly to farmers
- Ensure community consultation (inception phase) gauges what women and men want around aquaculture production. Note that not all women may be interested in pond management.
- Selection of partners: explore experience of working with women farmers + other relevant intersectional groups
- ToT for partners responsible for extension includes guidance on how to better 'reach' different target groups
-

MEL: Following design of extension packages, MEL to capture whether target groups are accessing the information (reach) and whom in household is benefitting (women /men). Also capture unintended consequences (workload) . there may be options for gender learning around testing different extension modalities for women and men (see FISH gender strategy learning questions). See MYSAP extension research questions to help inform MEL.

Link to FISH gender strategy learning: What are poor women's and men's preferences and needs, as well as risks, constraints, opportunities and experiences, in relation to improved fish breeds (carp and tilapia strains), and do these differ or converge by gender or other social difference?

Next steps: ensure baseline covers relevant information. Rethink putting activity line related to assessing access to market information under pathway 2 (market systems) . allocate resources for revising BAP extension material throughout.

Increased access to credit and financial instruments (sub I.R. 1.3)

Observation: A key assumption noted in the workshop is that access to credit/finance may be a constraint to adopting BAP. Similarly the diversity of different types of sources of credit/finance were

overlooked. It was recognized that this was an area that requires more exploration to understand the different gendered dynamics in access to different forms of credit, and the decision making around use of credit for investment in aquaculture production, businesses around aquaculture inputs (seed/feed) and aquaculture processing. Participants noted that the Myanmar government has passed out a new law where NGOs cannot provide microfinance.

Entry points for gender integration

Baseline: Get information on access to different forms of credit for women and men, noting under whose name it is under and use of credit for (investment in aquaculture production, business, nutrition). Qualitative focus groups could be used to dive deeper into gender dynamics around decision making of use of credit.

Identify credit delivery system: ensure that scoping/deep dive covers the different channels that different types of women and men access different forms of formal/informal credit. Scoping should also cover the uses of credit and gender dynamics around decision making of their use. This information will be needed to identify the design of the credit support.

Financial literacy training: Participants acknowledged that most of the existing financial literacy packages focus more on setting up businesses . Whilst this is relevant to package 2 (market systems), there may also be opportunity to explore financial literacy at couple level to promote joint decision making promoting expenditure on nutrition (purchase of nutritious foods, keeping fish for home consumption). There is also scope to explore how financial literacy targeting couples could encourage more male support for women led businesses to ensure women can control the use of income (benefit). Used scooping/baseline to prioritize who is selected for training.

Piloting/testing different forms of credit: Participants noted that there may be an option to 'test' different forms of credit support/delivery with involvement of BRAC (In kind through inputs of seed/feed, revolving funds, usual business of BRAC). It is recommended that decisions around what is piloted/tested should be made after baseline and in view of USAID priority to make link to improvement in nutrition outcomes. Research design should integrated gender with respect to sampling, questions, research methods and ensuring that results can be linked to key gender outcomes (benefit). For example, could test inclusion of household approach on top of credit to promote more joint decision making around use of credit for nutrition/or investment in fish business led by women.

Explore men engagement strategy: will be needed throughout program to ensure income of women (via credit, business, other) is under her control and used for household benefit. Alternatively Income generated through 'family business' is also invested in benefiting all within the household.

MEL: assess how credit + income from sale of fish (fresh/products) is used to benefit different members in the HH, assess if financial literacy is making a difference to promoting 'benefit', assess how credit is being used to invest in aquaculture business (production/processing) and gendered dynamics around decision making.

Link to FISH gender strategy learning: *Wealth generation & livelihoods:* . What are the enabling and constraining factors and the most effective strategies and opportunities to enhance women's wealth generation, in particular poor women, through women-led entrepreneurship or other opportunities for enhanced or diversified livelihoods in fisheries dependent contexts?
c. What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be 'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries?

Next steps: ensure baseline covers relevant information. Rethink putting activity line related to assessing access to credit under pathway 2 (market systems) or closer to pathway 2 . Ensure ToR of consultant for assessment of credit delivery covers gender.

Increased access to fish SEED through engaging and strengthening linkages between private and public sector [sub IR. 1.4] and increasing availability and access to quality affordable FEED using agricultural co-products by farmers [sub IR. 1.5]

Observation: Currently there is insufficient information of where women and men are in the value chain and the constraints they face based on where they are. This analysis is important to inform the design of interventions around seed/feed to address these barriers. Note there is overlap around business opportunities around seed/feed that could also be covered in pathway 2 (market system)

Entry points for gender integration

Comments are applicable to both seed and feed.

Value chain: Explore where women and men are in different nodes of the value chain. Ensure covers how different types of women and men SSA access feed and seed and gendered barriers to access and use . *Ideally value chain analysis could cover this. if not, needs to be covered in baseline or a deep dive.* See Bangladesh IDEA/BANA gender value chain framework + tools as a guide.

Baseline: to assess gender division of labour (who does what regarding seed/feed) and if any gendered barriers to access to key inputs.

Identification of opportunities in SEED and FEED (social enterprises) : Use baseline and VC findings to identify what interventions best address the different gendered challenges. These may vary for women and men. project to explore if there are any specific opportunities to support women led or other profiles business in the value chain around seed or feed. Currently in Myanmar women are engaged in hatcheries/nurseries and could be supported to expand this. May vary in IDP locations where this is not an option. Note, that for some business models (extra support: training, inputs) may be required for different groups; implying budget required. Specific opportunities mentioned:

- Explore supporting % of women hatcheries/nurseries
- Exploring setting up women led business model around quality feed

Call for business models from private sector: ensure that the call includes criteria for partners with

experience of working with different profiles of SSA farmers/VC actors (i.e. different women, other intersectional groups) to ensure that project does not support only the 'usual suspects' (those who are more privileged, wealthier, well connected).

Establishment of 'model hatchery' or **'**model feed': explore if some of these models can include a mixture of women and men led businesses to showcase how both genders can be involved. Also explore 'other' groups who can be role models for others.

Training: Ensure target for women SSA value chain actors, selection criteria for training to ensure most relevant individuals invited, adoption of gender responsive principles for training (Gender strategy to include checklist) . ToT of partners to cover gender orientation

Explore men engagement strategy + community dialogue : will be needed throughout program to ensure income of women (via credit, business, other) is under her control and used for household benefit. Alternatively Income generated through 'family business' is also invested in benefiting all within the household. Also community dialogue to avoid backlash against successful businesses involving women.

MEL: Routine monitoring to capture how benefit is distributed from engagement in seed/ feed business.
Learning opportunity: to test which business models work best for different profiles of SSA value chain actors , particularly women. Cover unintended consequences (backlash, men taking over income from women led business)

Consider adding indicator:
models for gender inclusive and women led entrepreneurship and agribusiness

Link to FISH gender strategy learning: *Wealth generation & livelihoods:* .2. **What factors and strategies enable the equitable engagement of, and benefits for, poor women in wealth generation in aquaculture and fisheries, including women-led enterprises**?
a)What are the enabling and constraining factors and the most effective strategies and opportunities to enhance women's wealth generation, in particular poor women, through women-led entrepreneurship or other opportunities for enhanced or diversified livelihoods in fisheries dependent contexts?
b)What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be 'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries?

Next steps: ensure value chain/ baseline covers relevant information. If value chain does not cover this, may need deeper dive

Enhanced capacity of MFF to support SSA for improved management practices [SUB IR.1.6]

Observation: MFF is the private sector platform for businesses/private sector actors involved in aquaculture. They could play a critical role in providing enabling environment for more business around aquaculture. The literature/learning around innovation platforms and multi-stakeholder platforms could be useful here. There are many entry points for ensuring gender gets mainstreamed in content of discussions and for ensuring that the different concerns of women and men are represented in meetings. MFF could be an important ally to fund/finance women led business if they can see the incentives for doing so. SAIL could explore action learning with this stakeholder around this if there is appetite.

Entry points for gender integration
Assessment of MFF: Ensure consultant ToR covers gender integration. Ensure that it covers MFF incentives for working on mainstreaming gender in different aquaculture areas and also working with different profiles of farmers/ producers, service providers. Share baseline/VC findings with MFF to identify ways to engage them in achieving project objectives. explore if there are incentives for working with women entrepreneurs. **Review baseline findings:** Review baseline findings to present different integration strategies for women and men in different positions of the value chain that MFF could support. Use consultant report to identify opportunities to integrate gender and entry points for supporting their existing strategies. use meeting as opportunity to present pro-women business policies + MoF and highlight the policy benefits of engaging in women. **Next steps:** - review the presence/absence of gender in MFF proposal (Kachin) - Ensure ToR of consultant covers looking at the capacity around gender - Take findings of scoping to inform design of possible entry points for gender integration - Devise checklist to ensure more representation of women in meetings of MFF + mainstream gender into discussions **MEL:** documentation of meeting minutes to cover who is represented and content of discussions (how they address gender). Consider adding indicator: # models for gender inclusive and women led entrepreneurship and agribusiness **Link to FISH gender strategy learning:** *Wealth generation & livelihoods:* .2. **What factors and strategies enable the equitable engagement of, and benefits for, poor women in wealth generation in aquaculture and fisheries, including women-led enterprises**? a)What are the enabling and constraining factors and the most effective strategies and opportunities to enhance women's wealth generation, in particular poor women, through women-led entrepreneurship or other opportunities for enhanced or diversified livelihoods in fisheries dependent contexts? b)What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be

'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries?

Pathway 2: Market systems (Access of SSA to domestic markets increased and consistent supply of safe fish and fish products (IR 2))

POTENTIAL GENDER OBJECTIVE: Fairly support livelihood opportunities around aquaculture and benefits for women and men

The market systems pathway is currently the least well defined as scoping is on-going to define the interventions. Currently it comprises two core areas of work. One comprises clustered production using BAP to improve marketability of fish products through strengthening market linkages. The second comprises improved fish processing and trading with the goal to improve income and food safety through reduced post-harvest loss. It is recommended that this pathway could reframe the intermediate results as improved income/livelihoods around fresh and processed fish. This has been captured in simplified ToC.

Observation: The value chain analysis needs to provide good overview of where women and men are in the fish value chain and the barriers/opportunities at different nodes. This is crucial to inform the design of interventions to address the link between supply of fish (from pathway 1) and the demand (in the market). Currently no gender lens has been integrated into the value chain analysis. Yet, it is also the pathway where there is considerable scope to explore value addition and agribusiness opportunities for women given their prominent role in marketing fish products.

Clustered production using BAPS to improve marketability of product (sub IR 2.1.) (Reframe this as Fish value chain strengthened)

Entry points for gender integration
Value chain analysis: Should explore where women and men are in the value chain around selling fish (fresh) and other fish products. Should cover what are the current gendered barriers and opportunities to selling/buying fresh/processed fish. **Linkage with pathway 1:** pathway currently includes access to market information under results area. The same points for gender integration are applicable here. Given women's more prominent presence in marketing of fish (fresh/dry), important to know where the blockages/opportunities are in the value chain to enhance link between supply and demand of fresh and processed fish. **Stakeholder consultation with fish market actors:** ensure good cross section of different reps of value chain actors to ensure get perspectives of different constraints of women and men in value chain. **Design of interventions:** this package appears to concern the **market linkages** within the value chain

(linking supply with demand) . Hence there is link to pathway 1 (supply of fish) and getting the fish to the 'market' for sale. Value chain analysis and baseline should be used to prioritize what types of interventions to pilot to improve **sale** of different fish products. Set targeting criteria to support mix of different profile of women and men value chain actors. This is opportunity to explore 'empowerment' outcomes for supporting women in value chain + support of IDP groups who do not have access to ponds for production.

MEL: to be defined after value chain analysis. Opportunity for learning/assessment of women empowerment outcomes or empowerment for other intersectional groups (IDP) and linking this to improvement in nutrition outcomes.
Consider adding indicator:
models for gender inclusive and women led entrepreneurship and agribusiness

Next steps:

- Explore how current VC analysis integrates gender (see Bangladesh tools as way of supporting)

Link to FISH gender strategy learning: *Wealth generation & livelihoods:* .2. **What factors and strategies enable the equitable engagement of, and benefits for, poor women in wealth generation in aquaculture and fisheries, including women-led enterprises**?
a)What are the enabling and constraining factors and the most effective strategies and opportunities to enhance women's wealth generation, in particular poor women, through women-led entrepreneurship or other opportunities for enhanced or diversified livelihoods in fisheries dependent contexts?
b)What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be 'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries?
c)What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be 'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries?

Food safety practices adopted/integrated into fish processing and fish trading (sub IR2.2.(reframe as Post-harvest value addition)

Entry points for gender integration
Value chain analysis: Should explore where women and men are in the value chain around selling fish (fresh) and other fish products. Explore what are the current barriers/opportunities around fish processing and reducing post-harvest loss, focusing on implications to a) food safety (nutrient loss) b) profitability (sale). Could also explore current innovations/business opportunities in market for fish value addition.

Design of interventions: Value chain analysis and baseline should be used to prioritize what types of interventions to pilot with criteria for inclusive business models that benefit women and other intersectional groups. Business models could include interventions around value addition and reducing post-harvest loss or other models for bulking , improving prices gained for products. Set targeting criteria to support mix of different profile of women and men value chain actors. This is opportunity to explore 'empowerment' outcomes for supporting women in value chain + support of IDP groups who do not have access to ponds for production.

MEL: to be defined after value chain analysis. Opportunity for learning/assessment of women empowerment outcomes or empowerment for other intersectional groups (IDP) and linking this to improvement in nutrition outcomes.
Consider adding indicator:
models for gender inclusive and women led entrepreneurship and agribusiness

Next steps:

- Explore how current VC analysis integrates gender (see Bangladesh tools as way of supporting)

Link to FISH gender strategy learning: *Wealth generation & livelihoods:* .2. **What factors and strategies enable the equitable engagement of, and benefits for, poor women in wealth generation in aquaculture and fisheries, including women-led enterprises**?
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c)What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be 'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries?

Pathway 3: Nutrition (Improved nutrition diversity and safety and increased access, WASH, especially in childbearing age women and children under five)

POTENTIAL GENDER OBJECTIVE: Enable women and men to improve nutrition (dietary diversity) and improve access and use of safe nutritious and diverse food

The nutrition pathway supports SAIL to become nutrition sensitive and achieve its overall goal of improving dietary diversity. It is the pathway where there is scope to encourage intra-household

decision making to improve expenditure on more nutritious food and intra-household distribution of food. There is a vibrant nutrition community working in Myanmar which SAIL can leverage to improve nutrition in respective locations. Within the current activity plan there were many overlaps between activities which were re-organized. It is recommended to reframe this result as 'Improved nutrition'. Key areas of inquiry to track is the decision making dynamics around the use of fish (selling, consumption) and how it is used to improve nutrition status within household for different individuals.

Observation: During the workshop, it was noted that this pathway's ambition is to cover a number of interventions related to improving dietary diversity, WASH practices and food safety. The pathway was simplified during workshop to two sub IR : increased consumption of diverse safe nutritious food (including fish) and improved adoption of nutrition and wash practices. This complements pathway 1 and 2 by creating a demand for more /increased consumption of fish which is matched by enhanced supply of fresh and processed food coming from pathway 1 and 2.

Improved adoption of nutrition and WASH behaviours (newly articulated sub-IR 3.1.)

Entry points for gender integration

Baseline: Depending on what we know from existing nutrition surveys of target areas, may need extra nutrition data on target areas (dietary diversity, food taboos, consumer preferences for fish, etc).
=> Explore whether additional barrier analysis required which targets both women and men as respondents.

Key activities:

- Use baseline and secondary nutrition data to prioritize key nutrition behaviours and target group. ensuring that men are also targeted to avoid stereotypes that only women are custodians of good nutrition
- Develop a family centred nutrition behaviour change strategy that targets different individuals within household, community and region . explore opportunity to integrate gender messages within the strategy promoting joint decision making on use of fish for consumption/sale, use of income for purchasing nutritious food, sharing division of labour around care practices. Ensure messaging complies with existing SUN + Myanmar government nutrition extension.
- Identify suitable nutrition extension material which integrates gender messages + cater for literacy, language and culture. Look at 'content' and 'modality' of delivery. Ensure gender responsive extension principles (similar to aquaculture)
- Look for opportunities for including nutrition/gender aware messaging in aquaculture extension material.
- Identify strategic partners to deliver nutrition extension: depending on nutrition barriers identified, explore partnering with organizations with expertise with different intersectional groups (especially IDP locations).
- Explore opportunities for piloting (small scale) some gender transformative work depending on available resources.
- ToT of partners to cover gender and links to other pathways.

MEL: Ensure MEL covers how nutrition messaging is reaching different members of household and

contributing to benefit. USAID priority to track progress on nutrition outcomes. Need to explore how this can also be linked to more joint decision making around use of income from fish sales and use of fish for household consumption. Ensure routine monitoring captures changes in work burden and other intended consequences

Next steps:

- Explore what is already known around nutrition in target areas

Link to FISH gender strategy learning:

Crosscutting: What are the potential positive or negative implications of any (each potential) FISH innovations on poor women, including on their labor burdens? In particular, how can these innovations avoid risks and instead positively influence women's empowerment and gender dynamics?

Wealth generation & livelihoods: .2. **What factors and strategies enable the equitable engagement of, and benefits for, poor women in wealth generation in aquaculture and fisheries, including women-led enterprises**?
a)What are the enabling and constraining factors and the most effective strategies and opportunities to enhance women's wealth generation, in particular poor women, through women-led entrepreneurship or other opportunities for enhanced or diversified livelihoods in fisheries dependent contexts?
b)What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be 'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries?
c)What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be 'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries?

Improved consumption of safe diverse nutritious food including fish (IR 3.2)

Entry points for gender integration
Barrier analysis: Ensure barrier analysis captures gender dynamics around food preferences for women and men around consuming different food types and different types of fish products. May need extra study to look at food preferences in market and explore how fish is currently being prepared (fresh/dry) **Key activities:** - Note that there may be an overlap with Pathway 2 around assessing current practice around post-harvest fish preparation, linked to loss and waste - Nutrition SBCC may need campaign at community level to promote a) safe preparation of fish products b) more consumption of diverse food, including fish. - Same gender responsive principles to the training/delivery of extension around consumption of safe nutritious food as previous IR result (ir 3.1) - Provision of inputs to for nutritious food consumption (homestead garden kits, provision of small indigenous fish) - Training on management of SIS (indigenous fish/homestead production) needs to be targeted to relevant individual involved in this. ensure that BCC promotes messaging that these are for 'home consumption'. Involves working with couple in HH. - Explore link with financial literacy training (work package 1) for promoting household planning for purchasing nutritious food. **MEL:** Ensure MEL covers changes in food consumption preferences and practices at community and household level. **Next steps:** review activities/overlap with pathway 2. **Link to FISH gender strategy learning:** **Crosscutting:** What are the potential positive or negative implications of any (each potential) FISH innovations on poor women, including on their labor burdens? In particular, how can these innovations avoid risks and instead positively influence women's empowerment and gender dynamics? *Wealth generation & livelihoods:* .2. **What factors and strategies enable the equitable engagement of, and benefits for, poor women in wealth generation in aquaculture and fisheries, including women-led enterprises**? a)What are the enabling and constraining factors and the most effective strategies and opportunities to enhance women's wealth generation, in particular poor women, through women-led entrepreneurship or other opportunities for enhanced or diversified livelihoods in fisheries dependent contexts? b)What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be

'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries? c)What effects do these strategies and opportunities have on women's and household income, food security and women's empowerment? In small-scale fisheries, can any of these livelihood strategies be 'win-win' in terms of returns for women and sustaining ecological integrity in coastal and inland fisheries?

6. Enabling gender integration into MEL for SAIL

Prioritizing gender outcomes. At this stage it is difficult to make concrete suggestions around gender outcomes and corresponding indicators as we are awaiting baseline results to inform project design. Yet, a number of important entry points were noted based on existing USAID results frameworks and activities. See Excel Matrix , Tab 2 for preliminary ideas on gender indicators. At minimum and where possible all data should be sex disaggregated. Links to the FISH gender strategy outcome and outputs have also been included.

Adapting MEL tools to integrate gender

Baseline and value chain assessment needs to provide picture of gender dynamics around gender division of labour, access/control over resources, decision making and gender norms.

All MEL routine tools to track REACH and BENEFIT for both women and men SSA farmers. This includes tracking

- Equity in access to key resources given in the project (inputs, training, seed, feed, etc)
- Track unintended consequences (shifts in workload, backlash, men taking over when agribusiness targets women)

Where there is a decision to carry out women empowerment interventions, SAIL would need to track women empowerment (WEFI)

Areas of potential gender learning emerging from workshop. It is too soon to prioritize key areas of gender learning. However, USAID has expressed that the project should aim to generate evidence showing progress on improved food and nutrition security as the goal of impact of the project. If this is the overall goal , then it has to be captured within the MEL we need to be clear what is the goal of the project – if really in nutrition, we need to ensure we can capture that in MEL. During the workshop a number of learning areas already emerged summarized below:

1. **Learning around extension:** Testing different extension modalities to check if extension is being understood and used for benefit
    - Classic
    - Virtual /digital extension apps

- Update adult learning methods and for low literacy eg. Review the current ToT – very text heavy book. Using pictures, theatre, short videos and reinforce key messages for better understanding, memory, uptake and application.
- Could test in aquaculture, nutrition, financial literacy

2. **Learning around piloting different credit delivery modalities**
3. **Testing the effectiveness of different business models to empower women in fish value chain** (as seed providers, feed providers and fish processing value addition)

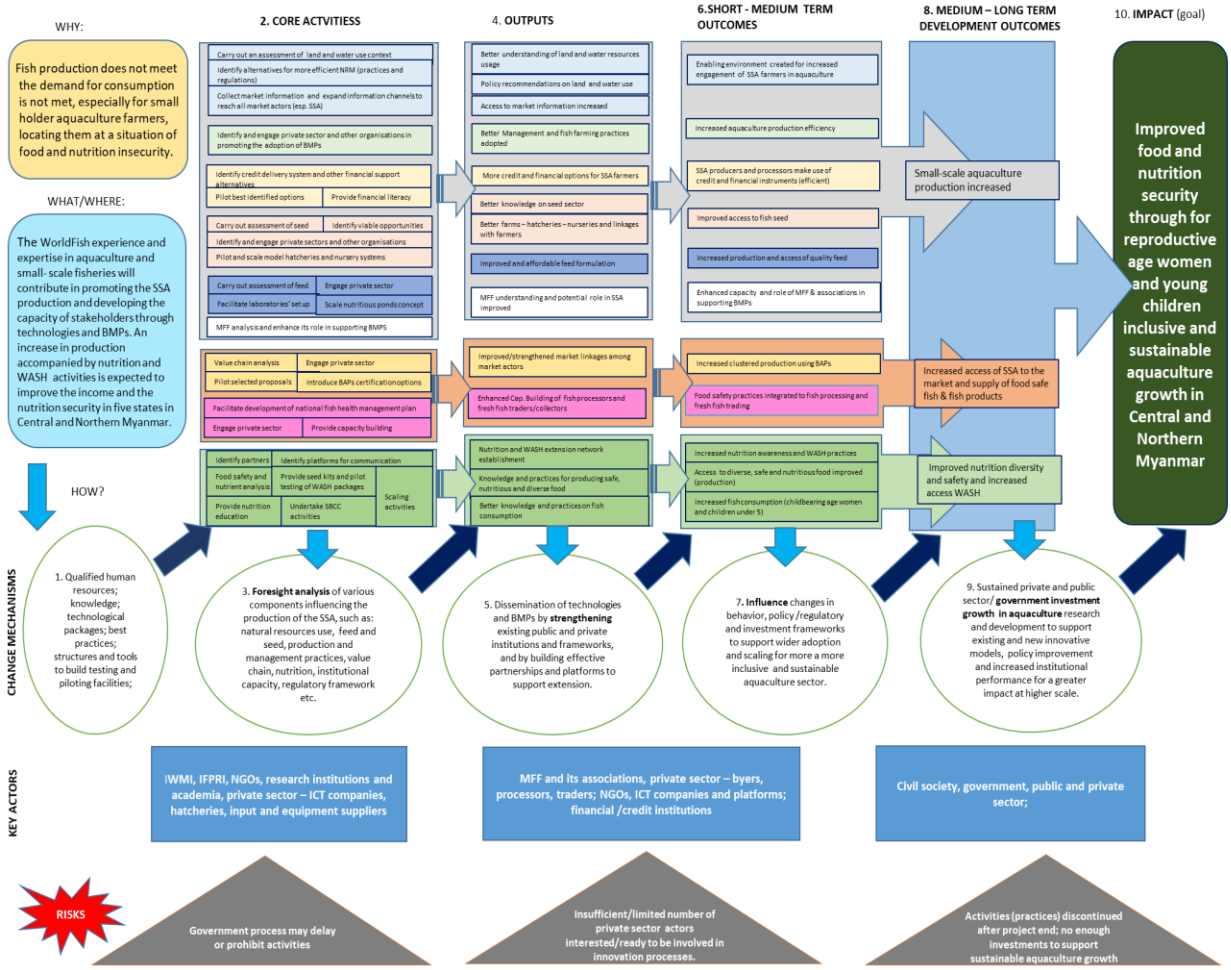
Next steps:

- After baseline, prioritize gender outcomes for SAIL and align with MEL framework
- Identify core gender learning areas SAIL would like to collect evidence on, demonstrating links/associations between gender outcomes and aquaculture, market linkage and nutrition outcomes.
- Once above sorted out, gender should be integrated within all MEL reporting formats.

Annex 1: Typology of Gender outcomes

1. "Reached" Shorter-term	2. "Accessing Resources and Benefits" – Intermediate-term	3. "Empowerment" Longer-term	4. "Transformation" Longer-term
Numbers of participants (women/men across intersectional markers in project activities: – Farmers – Pond managers – Food preparers – Parents – Self-employed or entrepreneurs – Employees (production, processing, retailing etc. in different positions) – Service providers, other value chain supporters – Women groups, men groups, mixed groups – Consumers (across look at intersecting social categories)	**ACCESSING RESOURCES:** **2.1 Increased access to knowledge and skills** – Aqua-culture practices – Market and business – Nutrition and health **2.2 Increased group membership** **2.3 Increased access to productive resources** – Inputs – Credit – Market **2.4 Increased adoption and use of new technology** – Equipment (nets, irrigation tools) – Management practices (pond, land, water) – Improved fish and fish based products **ACCESSING BENEFITS:** **2.5 Reduced drudgery** **2.6 Increased consumption of nutritious food** **2.7 Increased access to jobs and income of** – Farmers, entrepreneurs, employees	**3.1 Increased control over decisions** – Production – Income /credit – Nutrition **3.2 Increased voice & leadership** - water and land use governance - Income - Nutrition **3.3. Control over productive resources and benefits derived** - Fish - Inputs - Credit - Market **3.4 Enhanced status** – as ecological knowledge-holder – as (aqua-culture) farmer – As land/water manager – as entrepreneur – of care work provider **3.5 Increased confidence and self-efficacy**	**4.1 Change in gender norms and attitudes** - Types of activities women and men can do - Types of decisions that women and men can make 4.2. **Change in gender behavior** – Improved gender division of labour, i.e., sharing of reproductive work and childcare at household level; more equitable representation at community level and in VC/market roles) – Decreased restrictions to women's mobility (household, community, market) – More equitable gender relations in aquaculture value chains with both women and men attesting to greater freedoms for women **4.3.Increased male support to women's rights** – Secure property rights + water rights – women workers rights **4.4. Gender responsive policies and legislation with on women's rights (or other marginalized groups)**

Annex 2: SAIL Theory of change (15-16 January)



Stocking plan

No	Organization	Township	Village Tract	Village	Farmer Name	Pond type	Pond size		Acre	Total Stocking density (fish/ decimal)	Total stocking number	Species	Initial Avg body weight (g)	Tentative Stocking date
							Length (ft)	Width (ft)						
1	BRAC	Taungyi	Bant Kwe	Kone Nyunt	U Mg Mg Phyt	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
2	BRAC	Taungyi	Bant Kwe	Kone Nyunt	U Tin Ngwe	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
3	BRAC	Taungyi	Bant Kwe	Kone Nyunt	U Phoe Naung	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
4	BRAC	Taungyi	Bant Kwe	Kone Nyunt	U Mg Yit	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
5	BRAC	Taungyi	Bant Kwe	Kone Nyunt	U Aung Myat	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
6	BRAC	Taungyi	Bant Kwe	Kone Nyunt	U Hlawn	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
7	BRAC	Taungyi	Bant Kwe	Kone Nyunt	U Mg Kyaw	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
8	BRAC	Taungyi	Bant Kwe	Kone Nyunt	U Mg Lone	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
9	BRAC	Taungyi	Bant Kwe	Kone Nyunt	U Phoe Htaung	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
10	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Soe Thein	old pond	50	20	0.02	60	**138**	Common carp	20 g (3")	15-May
11	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Aung	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
12	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Ta Bote	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
13	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Than Lwin	old pond	50	20	0.02	60	**138**	Common carp	20 g (3")	15-May
14	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Kyaw Khan	old pond	40	40	0.04	60	**220**	Common carp	20 g (3")	15-May
15	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Har Yar Kay	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
16	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Aung Thu	old pond	50	20	0.02	60	**138**	Common carp	20 g (3")	15-May
17	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Chit Thein	old pond	40	40	0.04	60	**220**	Common carp	20 g (3")	15-May
18	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Saw Aung	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
19	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Myint Htoo	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
20	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Myat Thu	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
21	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Kyaw Htay	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
22	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Ta Chaung	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
23	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Tun Maung	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
24	BRAC	Taungyi	Myay Ni Kone	Myay Ni Kone	U Kyi Soe	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
25	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Lay Sein	old pond	40	25	0.02	60	**138**	Common carp	20 g (3")	15-May
26	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Aung Thein	old pond	40	40	0.04	60	**220**	Common carp	20 g (3")	15-May
27	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Hla Nay	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
28	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Saw Aung	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
29	BRAC	Taungyi	Nan Hu	Pa Lee Lin	Daw Mi Cho	old pond	40	50	0.05	60	**275**	Common carp	20 g (3")	15-May
30	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Khon Maung	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May

31	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Khon Saw	old pond	20	25	0.01	60	**69**	Common carp	20 g (3")	15-May
32	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Tun San	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
33	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Hei	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
34	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Kyaw Aye	old pond	30	15	0.01	60	**62**	Common carp	20 g (3")	15-May
35	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Khon Lain	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
36	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Thein Han	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
37	BRAC	Taungyi	Nan Hu	Pa Lee Lin	Daw Ohn Min	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
38	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Maung Myint	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
39	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Khon Mg Lone	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
40	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Paw Bode	old pond	30	15	0.01	60	**62**	Common carp	20 g (3")	15-May
41	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Kyaw Sein	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
42	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Hla Tin	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
43	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Kyaw Thu	old pond	40	15	0.01	60	**83**	Common carp	20 g (3")	15-May
44	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Kyaw Paing	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
45	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Sein	old pond	25	20	0.01	60	**69**	Common carp	20 g (3")	15-May
46	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Khon Tee	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
47	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Tun Lay	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
48	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Khon Mg	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
49	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Haw Khan	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
50	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Kan Nyunt	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
51	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Than Sein	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
52	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Pyin Nyar	old pond	40	15	0.01	60	**83**	Common carp	20 g (3")	15-May
53	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Aike Thein	old pond	30	15	0.01	60	**62**	Common carp	20 g (3")	15-May
54	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Kyi Aung	old pond	30	15	0.01	60	**62**	Common carp	20 g (3")	15-May
55	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Ohn Kyaw	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
56	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Chit Hlaing	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
57	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Win	old pond	50	50	0.06	60	**344**	Common carp	20 g (3")	15-May
58	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Mg Phit	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
59	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Khon Gyi	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
60	BRAC	Taungyi	Nan Hu	Pa Lee Lin	Daw Hnin may	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
61	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Mg Ko	old pond	80	60	0.11	60	**661**	Common carp	20 g (3")	15-May
62	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Kyaw	old pond	80	60	0.11	60	**661**	Common carp	20 g (3")	15-May
63	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Min Kyi	old pond	300	40	0.28	60	**1653**	Common carp	20 g (3")	15-May
64	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Ohn	old pond	80	50	0.09	60	**551**	Common carp	20 g (3")	15-May
65	BRAC	Taungyi	Nan Hu	Pa Lee Lin	U Ye Myint	old pond	60	30	0.04	60	**248**	Common carp	20 g (3")	15-May
66	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Mg Aye	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
67	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Ta Oo	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May

68	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Kyaw Zaw	old pond	100	40	0.09	60	**551**	Common carp	20 g (3")	15-May
69	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Aung Phyo	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
70	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Zaw Lin	old pond	50	20	0.02	60	**138**	Common carp	20 g (3")	15-May
71	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Khoon Swe Win	old pond	180	20	0.08	60	**496**	Common carp	20 g (3")	15-May
72	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Kan Zaw	old pond	100	100	0.23	60	**1377**	Common carp	20 g (3")	15-May
73	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Kan Tun	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
74	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Thaung	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
75	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	U Phoe Aung	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
76	BRAC	Taungyi	Nan Huu	Ma Gyi Pin	Daw Win Yee	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
77	BRAC	Taungyi	Nan Huu	Nan Huu	U Pi Hain	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
78	BRAC	Taungyi	Nan Huu	Nan Huu	U Pi Wut	old pond	25	20	0.01	60	**69**	Common carp	20 g (3")	15-May
79	BRAC	Taungyi	Nan Huu	Nan Huu	U Myo Naing	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
80	BRAC	Taungyi	Nan Huu	Nan Huu	U Tin Aye	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
81	BRAC	Taungyi	Nan Huu	Nan Huu	U Eaint Maw	old pond	25	20	0.01	60	**69**	Common carp	20 g (3")	15-May
82	BRAC	Taungyi	Nan Huu	Nan Huu	U Saw Palae Hti No	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
83	BRAC	Taungyi	Nan Huu	Nan Huu	U Naw Eal Say	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
84	BRAC	Taungyi	Nan Huu	Nan Huu	U Thein Aung	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
85	BRAC	Taungyi	Nan Huu	Nan Huu	U Ta Nge	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
86	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Kyawe	old pond	100	20	0.05	60	**275**	Common carp	20 g (3")	15-May
87	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Ngwe	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
88	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Yane	old pond	50	50	0.06	60	**344**	Common carp	20 g (3")	15-May
89	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Tun Aung	old pond	50	40	0.05	60	**275**	Common carp	20 g (3")	15-May
90	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Mg Kyaw	old pond	50	30	0.03	60	**207**	Common carp	20 g (3")	15-May
91	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Mg Nyunt	old pond	50	50	0.06	60	**344**	Common carp	20 g (3")	15-May
92	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Ba La	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
93	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Tun Phyu	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
94	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Mg Tu	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
95	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Kone	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
96	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Ta Lay	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
97	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Ta Shwee	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
98	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Saw Aung	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
99	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Ta Thaw	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
100	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Mg Kyu	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
101	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Kone Ta Yane	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
102	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Tin Naing	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
103	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Khonn Haw Khan	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
104	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Ta Moe	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May

105	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Ba	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
106	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Saung	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
107	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Ta Dee	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
108	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Thein Htoo	old pond	40	20	0.02	60	**110**	Common carp	20 g (3")	15-May
109	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Myint Htoo	old pond	80	50	0.09	60	**551**	Common carp	20 g (3")	15-May
110	BRAC	Taungyi	Myae Ni Kone	Thin Baw	U Sein Tun	old pond	40	30	0.03	60	**165**	Common carp	20 g (3")	15-May
111	BRAC	Taungyi	Sa Khae	Sa Khae	U Yooe	old pond	70	20	0.03	60	**193**	Common carp	20 g (3")	15-May
112	BRAC	Taungyi	Sa Khae	Sa Khae	U Kyaw Win	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
113	BRAC	Taungyi	Sa Khae	Sa Khae	U Tun Mg	old pond	50	40	0.05	60	**275**	Common carp	20 g (3")	15-May
114	BRAC	Taungyi	Sa Khae	Sa Khae	U Tin Mg	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
115	BRAC	Taungyi	Sa Khae	Sa Khae	U Tha Oo	old pond	25	20	0.01	60	**69**	Common carp	20 g (3")	15-May
116	BRAC	Taungyi	Sa Khae	Sa Khae	Ko Oo	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
117	BRAC	Taungyi	Sa Khae	Sa Khae	U Kan	old pond	50	40	0.05	60	**275**	Common carp	20 g (3")	15-May
118	BRAC	Taungyi	Sa Khae	Sa Khae	U Hla Baw	old pond	30	20	0.01	60	**83**	Common carp	20 g (3")	15-May
119	BRAC	Khin U	Yone Suu	Yone Suu	U Thein Zaw Win	old pond	190	120	0.52	30	**1570**	Rohu	100g (5")	2.6.2020
120	BRAC	Khin U	Yone Suu	Yone Suu	**U Aung Phyo Zaw***	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	2.6.2020
121	BRAC	Khin U	Yone Suu	Yone Suu	Daw Nyo San	old pond	170	100	0.39	30	**1171**	Rohu	100g (5")	2.6.2020
122	BRAC	Khin U	Yone Suu	Yone Suu	U Than Maung	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
123	BRAC	Khin U	Yone Suu	Yone Suu	Daw Cho Tint	old pond	190	100	0.44	30	**1309**	Rohu	100g (5")	2.6.2020
124	BRAC	Khin U	Yone Suu	Yone Suu	U Zaw Win	old pond	120	100	0.28	30	**826**	Rohu	100g (5")	2.6.2020
125	BRAC	Khin U	Yone Suu	Yone Suu	U Tike Thwe	old pond	100	80	0.18	30	**551**	Rohu	100g (5")	2.6.2020
126	BRAC	Khin U	Yone Suu	Yone Suu	U Phyoe	old pond	150	120	0.41	30	**1240**	Rohu	100g (5")	2.6.2020
127	BRAC	Khin U	Yone Suu	Yone Suu	U Chit Ko	old pond	120	100	0.28	30	**826**	Rohu	100g (5")	2.6.2020
128	BRAC	Khin U	Yone Suu	Yone Suu	U Aung Pyae Zaw	old pond	150	80	0.28	30	**826**	Rohu	100g (5")	2.6.2020
129	BRAC	Khin U	Yone Suu	Yone Suu	U Willian Aung	old pond	150	100	0.34	30	**1033**	Rohu	100g (5")	2.6.2020
130	BRAC	Khin U	Yone Suu	Yone Suu	Daw Khaing Wai Aung	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	2.6.2020
131	BRAC	Khin U	Yone Suu	Yone Suu	U Myint Zaw Win	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	2.6.2020
132	BRAC	Khin U	Yone Suu	Yone Suu	U Zaw Moe Myint	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
133	BRAC	Khin U	Yone Suu	Yone Suu	U Aung Myo Naing	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
134	BRAC	Khin U	Yone Suu	Yone Suu	U Kyaw Soe Tun	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	2.6.2020
135	BRAC	Khin U	Yone Suu	Yone Suu	U Zaw Myo Aung	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	2.6.2020
136	BRAC	Khin U	Yone Suu	Yone Suu	U Zaw Zaw Myo	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
137	BRAC	Khin U	Yone Suu	Yone Suu	U Naing Tun	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
138	BRAC	Khin U	Yone Suu	Yone Suu	U Htay Min	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	2.6.2020
139	BRAC	Khin U	Yone Suu	Yone Suu	U Phoe Phyu	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	2.6.2020
140	BRAC	Khin U	Yone Suu	Yone Suu	U Kyaw Nyunt	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
141	BRAC	Khin U	Yone Suu	Yone Suu	U Nay Myo Aung	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	2.6.2020

142	BRAC	Khin U	Yone Suu	Yone Suu	Daw Wai Mon Aung	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
143	BRAC	Khin U	Yone Suu	Yone Suu	U Chit Ko	old pond	210	100	0.48	30	**1446**	Rohu	100g (5")	2.6.2020
144	BRAC	Khin U	Yone Suu	Yone Suu	Daw Aye Mya Thu	old pond	180	100	0.41	30	**1240**	Rohu	100g (5")	2.6.2020
145	BRAC	Khin U	Yone Suu	Yone Suu	U Zaw Po	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
146	BRAC	Khin U	Yone Suu	Yone Suu	U Than Tun	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
147	BRAC	Khin U	Yone Suu	Byine Kyaing	U Tin Shaung	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
148	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Thoo	old pond	120	100	0.28	30	**826**	Rohu	100g (5")	2.6.2020
149	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Thin	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
150	BRAC	Khin U	Yone Suu	Byine Kyaing	U Htay Maung	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
151	BRAC	Khin U	Yone Suu	Byine Kyaing	U Than Hlaing	old pond	120	110	0.30	30	**909**	Rohu	100g (5")	2.6.2020
152	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Khin Mar Than	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
153	BRAC	Khin U	Yone Suu	Byine Kyaing	U Aung Naing	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	2.6.2020
154	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Khin Chu	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
155	BRAC	Khin U	Yone Suu	Byine Kyaing	U Soe	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	2.6.2020
156	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Thin Nwe	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
157	BRAC	Khin U	Yone Suu	Byine Kyaing	U Naing Win	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	2.6.2020
158	BRAC	Khin U	Yone Suu	Byine Kyaing	U Zin Min Soe	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	2.6.2020
159	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Nu Kyi	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
160	BRAC	Khin U	Yone Suu	Byine Kyaing	U Kyi Myint	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
161	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Mar Tin	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	2.6.2020
162	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Ei Zar	old pond	180	100	0.41	30	**1240**	Rohu	100g (5")	2.6.2020
163	BRAC	Khin U	Yone Suu	Byine Kyaing	U Win Myint	old pond	210	100	0.48	30	**1446**	Rohu	100g (5")	2.6.2020
164	BRAC	Khin U	Yone Suu	Byine Kyaing	U Hla Myint	old pond	180	100	0.41	30	**1240**	Rohu	100g (5")	2.6.2020
165	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Than Htay	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
166	BRAC	Khin U	Yone Suu	Byine Kyaing	**U Htun Aung***	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
167	BRAC	Khin U	Yone Suu	Byine Kyaing	Daw Day Si	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	2.6.2020
168	BRAC	Khin U	Yone Suu	Byine Kyaing	U Kyaw Swe	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	2.6.2020
169	BRAC	Khin U	Ma Yan Inn	Ma Yan Inn	U Kyaw Myint	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	3.6.2020
170	BRAC	Khin U	Ma Yan Inn	Ma Yan Inn	U Nay Linn	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
171	BRAC	Khin U	Ma Yan Inn	Ma Yan Inn	U Aung Maung	old pond	200	90	0.41	30	**1240**	Rohu	100g (5")	3.6.2020
172	BRAC	Khin U	Ma Yan Inn	Ma Yan Inn	U Phyoe	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
173	BRAC	Khin U	Ma Yan Inn	Ma Yan Inn	U Aung Shwin	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
174	BRAC	Khin U	Ma Yan Inn	Ma Yan Inn	U Saw Naung	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	3.6.2020
175	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Po	old pond	210	90	0.43	30	**1302**	Rohu	100g (5")	3.6.2020
176	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Zaw Lwim	old pond	220	90	0.45	30	**1364**	Rohu	100g (5")	3.6.2020
177	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Myo Htet	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	3.6.2020
178	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Aung Thu Lin	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	3.6.2020

179	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Mya Htun	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
180	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Thu Thu Tun	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	3.6.2020
181	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Than Win	old pond	210	100	0.48	30	**1446**	Rohu	100g (5")	3.6.2020
182	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Aung Ko Win	old pond	220	90	0.45	30	**1364**	Rohu	100g (5")	3.6.2020
183	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Hla Thaung	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
184	BRAC	Khin U	Ma Yan Inn	Kone Thar	**U San Htet Aung ***	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
185	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Myint Ngwe	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
186	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Naing Win Aung	old pond	220	90	0.45	30	**1364**	Rohu	100g (5")	3.6.2020
187	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Shwe Aye	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	3.6.2020
188	BRAC	Khin U	Ma Yan Inn	Kone Thar	U Tun Naing	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
189	BRAC	Khin U	Gyawe Kone	Gyawe Kone	U Htun Myint	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	3.6.2020
190	BRAC	Khin U	Gyawe Kone	Gyawe Kone	U Nyunt Win	old pond	150	140	0.48	30	**1446**	Rohu	100g (5")	3.6.2020
191	BRAC	Khin U	Inn Pat	Myin Daung	U Khin Maung Than	old pond	200	80	0.37	30	**1102**	Rohu	100g (5")	3.6.2020
192	BRAC	Khin U	Inn Pat	Myin Daung	U Aung Kyaw Thiha	old pond	120	80	0.22	30	**661**	Rohu	100g (5")	3.6.2020
193	BRAC	Khin U	Ma Gyee Oak	Kyun Taw Gyi	U Soe Myint	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	3.6.2020
194	BRAC	Khin U	Ma Gyee Oak	Kyun Taw Gyi	Daw Thidar Oo	old pond	180	110	0.45	30	**1364**	Rohu	100g (5")	3.6.2020
195	BRAC	Khin U	Ma Gyee Oak	Kyun Taw Gyi	Daw Thein Moet Moet Soe	old pond	120	80	0.22	30	**661**	Rohu	100g (5")	3.6.2020
196	BRAC	Khin U	Ma Gyee Oak	Kyun Taw Gyi	U Tin Soe Kyaw	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
197	BRAC	Khin U	Ma Gyee Oak	Kyun Taw Gyi	U Kyaw Moe Tun	old pond	220	150	0.76	30	**2273**	Rohu	100g (5")	3.6.2020
198	BRAC	Khin U	Ma Gyee Oak	Kyun Taw Gyi	U Win Aung	old pond	250	150	0.86	30	**2583**	Rohu	100g (5")	3.6.2020
199	BRAC	Khin U	Ma Gyee Oak	Kyun Taw Gyi	U Chan Nyein Thu	old pond	200	180	0.83	30	**2479**	Rohu	100g (5")	3.6.2020
200	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(S)	U Nyo Lay	old pond	100	80	0.18	30	**551**	Rohu	100g (5")	3.6.2020
201	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(S)	**U Thein Htike***	old pond	220	180	0.91	30	**2727**	Rohu	100g (5")	3.6.2020
202	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(S)	U Khin Maung Shwe	old pond	240	180	0.99	30	**2975**	Rohu	100g (5")	3.6.2020
203	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Chit Khaing	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	3.6.2020
204	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	Daw Yin Nway	old pond	150	80	0.28	30	**826**	Rohu	100g (5")	3.6.2020
205	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Tint	old pond	220	110	0.56	30	**1667**	Rohu	100g (5")	3.6.2020
206	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Maung Khaing	old pond	220	150	0.76	30	**2273**	Rohu	100g (5")	3.6.2020
207	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Thein Htay	old pond	230	150	0.79	30	**2376**	Rohu	100g (5")	3.6.2020
208	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Thar Aye	old pond	230	145	0.77	30	**2297**	Rohu	100g (5")	3.6.2020

209	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Thar Aung	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	3.6.2020
210	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Win Tun	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	3.6.2020
211	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Aung Naing Tun	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	3.6.2020
212	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Aung Sein	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
213	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Ye Win	old pond	190	120	0.52	30	**1570**	Rohu	100g (5")	3.6.2020
214	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Soe Maung	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	3.6.2020
215	BRAC	Khin U	Ta Pinn Kaung	Ta Pin Kaung(N)	U Kyaw Swar Win	old pond	240	180	0.99	30	**2975**	Rohu	100g (5")	3.6.2020
216	BRAC	Khin U	Ta Pinn Kaung	Ma Ni Kone	U Thein Saung	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	3.6.2020
217	BRAC	Khin U	Ta Pinn Kaung	Ma Ni Kone	U Katoe Win	old pond	100	80	0.18	30	**551**	Rohu	100g (5")	3.6.2020
218	BRAC	Khin U	Ta Pinn Kaung	Ma Ni Kone	U Aung Naing Tun	old pond	250	150	0.86	30	**2583**	Rohu	100g (5")	3.6.2020
219	BRAC	Khin U	Saw Gyi	Saw Gyi	U Tin Aung	old pond	210	110	0.53	30	**1591**	Rohu	100g (5")	4.6.2020
220	BRAC	Khin U	Saw Gyi	Saw Gyi	U Aung Min	old pond	230	80	0.42	30	**1267**	Rohu	100g (5")	4.6.2020
221	BRAC	Khin U	Saw Gyi	Saw Gyi	U Tin Myint	old pond	250	170	0.98	30	**2927**	Rohu	100g (5")	4.6.2020
222	BRAC	Khin U	Saw Gyi	Saw Gyi	U Sate	old pond	250	180	1.03	30	**3099**	Rohu	100g (5")	4.6.2020
223	BRAC	Khin U	Saw Gyi	Saw Gyi	U Maung Myo	old pond	240	180	0.99	30	**2975**	Rohu	100g (5")	4.6.2020
224	BRAC	Khin U	Saw Gyi	Pauk Taw	Daw Nyein Tin	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	4.6.2020
225	BRAC	Khin U	Saw Gyi	Pauk Taw	U Too	old pond	50	20	0.02	30	**69**	Rohu	100g (5")	4.6.2020
226	BRAC	Khin U	Saw Gyi	Ingyin Pin	Daw Nwe	old pond	140	80	0.26	30	**771**	Rohu	100g (5")	4.6.2020
227	BRAC	Khin U	Saw Gyi	Tha Nat Sein	Daw Shwe Mar	old pond	210	110	0.53	30	**1591**	Rohu	100g (5")	4.6.2020
228	BRAC	Khin U	Saw Gyi	Tha Nat Sein	U Win Naing	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	4.6.2020
229	BRAC	Khin U	Saw Gyi	Tha Nat Sein	Daw San Thida	old pond	180	125	0.52	30	**1550**	Rohu	100g (5")	4.6.2020
230	BRAC	Khin U	Saw Gyi	Tha Nat Sein	Daw Paing	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	4.6.2020
231	BRAC	Khin U	Saw Gyi	Tha Nat Sein	Daw Than Tin	old pond	170	130	0.51	30	**1522**	Rohu	100g (5")	4.6.2020
232	BRAC	Khin U	Saw Gyi	Tha Nat Sein	U Kyaw Thu	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	4.6.2020
233	BRAC	Khin U	Saw Gyi	Tha Nat Sein	U Soe Paing	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	4.6.2020
234	BRAC	Khin U	Saw Gyi	Tha Nat Sein	**U Ohn Lwin ***	old pond	100	110	0.25	30	**758**	Rohu	100g (5")	4.6.2020
235	BRAC	Khin U	Saw Gyi	Tha Nat Sein	U Aung Myo Win	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	4.6.2020
236	BRAC	Khin U	Saw Gyi	Tha Nat Sein	U Chit Paw	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	4.6.2020
237	BRAC	Khin U	Saw Gyi	Tha Nat Sein	U Maung Shwe	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	4.6.2020
238	BRAC	Khin U	Khin U	Aung Mingalar	U Aung Thu Lin	old pond	170	120	0.47	30	**1405**	Rohu	100g (5")	4.6.2020
239	BRAC	Khin U	Khin U	Aung Mingalar	U Aung Ko Min	old pond	170	120	0.47	30	**1405**	Rohu	100g (5")	4.6.2020

240	BRAC	Khin U	Khin U	Aung Mingalar	U Khin Maung Htay	old pond	150	80	0.28	30	**826**	Rohu	100g (5")	4.6.2020
241	BRAC	Khin U	Khin U	Aung Mingalar	Daw Thein	old pond	110	100	0.25	30	**758**	Rohu	100g (5")	4.6.2020
242	BRAC	Khin U	Khin U	Aung Mingalar	U Tin Aung Moe	old pond	210	110	0.53	30	**1591**	Rohu	100g (5")	4.6.2020
243	BRAC	Khin U	Khin U	Aung Mingalar	Daw Yee Mya	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	4.6.2020
244	BRAC	Khin U	Khin U	Aung Mingalar	U Saw Win	old pond	190	120	0.52	30	**1570**	Rohu	100g (5")	4.6.2020
245	BRAC	Khin U	Khin U	Aung Mingalar	U Phoe Si	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	4.6.2020
246	BRAC	Khin U	Khin U	Aung Mingalar	Daw Kyi Kyi Thein	old pond	210	110	0.53	30	**1591**	Rohu	100g (5")	4.6.2020
247	BRAC	Khin U	Khin U	Aung Mingalar	U Naing Myo Aung	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	4.6.2020
248	BRAC	Khin U	Khin U	Mya Kan Thar	**U Yan Moe Aung***	old pond	150	120	0.41	30	**1240**	Rohu	100g (5")	4.6.2020
249	BRAC	Khin U	Khin U	Mya Kan Thar	U Myint Thein	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	4.6.2020
250	BRAC	Khin U	Kyee Kan	Pauk Tone	U Tin San	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	4.6.2020
251	BRAC	Khin U	Kyee Kan	Pauk Tone	Daw Nyunt Wai	old pond	210	100	0.48	30	**1446**	Rohu	100g (5")	4.6.2020
252	BRAC	Khin U	Kyee Kan	Pauk Tone	U Kyaw Myint	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	4.6.2020
253	BRAC	Khin U	Kyee Kan	Pauk Tone	U Khaing Oo	old pond	120	100	0.28	30	**826**	Rohu	100g (5")	4.6.2020
254	BRAC	Khin U	Kyee Kan	YaeAye Kone	U Kyaw Htay	old pond	210	100	0.48	30	**1446**	Rohu	100g (5")	4.6.2020
255	BRAC	Khin U	Kyee Kan	YaeAye Kone	U Tin Win	old pond	220	110	0.56	30	**1667**	Rohu	100g (5")	4.6.2020
256	BRAC	Khin U	Kyee Kan	YaeAye Kone	U Myint Linn	old pond	230	100	0.53	30	**1584**	Rohu	100g (5")	4.6.2020
257	BRAC	Khin U	Kyee Kan	YaeAye Kone	U San Myint	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	4.6.2020
258	BRAC	Khin U	Kyee Kan	YaeAye Kone	U San Wai	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	4.6.2020
259	BRAC	Khin U	Kyee Kan	YaeAye Kone	U Bo Aye	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	4.6.2020
260	BRAC	Khin U	Kyee Kan	YaeAye Kone	U Zaw Htun	old pond	220	150	0.76	30	**2273**	Rohu	100g (5")	4.6.2020
261	BRAC	Khin U	Kyee Kan	YaeAye Kone	U Than Win	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	4.6.2020
262	BRAC	Khin U	Kyee Kan	YaeAye Kone	U Maung Than	old pond	220	180	0.91	30	**2727**	Rohu	100g (5")	4.6.2020
263	BRAC	Khin U	Kyee Kan	YaeAye Kone	U Pyawe	old pond	200	160	0.73	30	**2204**	Rohu	100g (5")	4.6.2020
264	BRAC	Khin U	Kyee Kan	YaeAye Kone	**U San Kont***	old pond	220	150	0.76	30	**2273**	Rohu	100g (5")	4.6.2020
265	BRAC	Khin U	Kyee Kan	YaeAye Kone	Daw Ohamar	old pond	200	160	0.73	30	**2204**	Rohu	100g (5")	4.6.2020
266	BRAC	Khin U	Kyee Kan	Wun Gyi	Daw Nu khaing	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	4.6.2020
267	BRAC	Khin U	Kyee Kan	Wun Gyi	U Moe Kyaw	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	4.6.2020
268	BRAC	Khin U	Kyee Kan	Wun Gyi	U Maung Khaing	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	4.6.2020
269	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Aung Kyaw Lin	old pond	250	150	0.86	30	**2583**	Rohu	100g (5")	5.6.2020
270	BRAC	Khin U	Tae Po Pin	Tae Po Pin	Daw Khin Tint	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	5.6.2020

271	BRAC	Khin U	Tae Po Pin	Tae Po Pin	**U Kyaw Zaya Lin***	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
272	BRAC	Khin U	Tae Po Pin	Tae Po Pin	**U Kyaw Thura Lin***	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
273	BRAC	Khin U	Tae Po Pin	Tae Po Pin	Daw Khin Thuzar Lin	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	5.6.2020
274	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Sein	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	5.6.2020
275	BRAC	Khin U	Tae Po Pin	Tae Po Pin	Daw Tin Yee	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
276	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Lwin	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
277	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kaw Sin	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
278	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Phoe Swar	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	5.6.2020
279	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Sein Hlaing	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
280	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Nay Myo Oo	old pond	220	90	0.45	30	**1364**	Rohu	100g (5")	5.6.2020
281	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Tun Naing	old pond	190	120	0.52	30	**1570**	Rohu	100g (5")	5.6.2020
282	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Nyo Win	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	5.6.2020
283	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Nyo Lin	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
284	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Khaing Min	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
285	BRAC	Khin U	Tae Po Pin	Tae Po Pin	Daw Moe Moe	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
286	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Tun Nwe	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
287	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Aung Naing Soe	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	5.6.2020
288	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Tun Maung	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
289	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Bo Than	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
290	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Tin Htay	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
291	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Shane Maung	old pond	220	110	0.56	30	**1667**	Rohu	100g (5")	5.6.2020
292	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U San Myint	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
293	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Myint Aye	old pond	170	130	0.51	30	**1522**	Rohu	100g (5")	5.6.2020
294	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Soe	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
295	BRAC	Khin U	Tae Po Pin	Tae Po Pin	Daw Khin Win	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	5.6.2020
296	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Thein	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	5.6.2020
297	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Sein Myint	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
298	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Soe Win	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
299	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Aye	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
300	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Min Soe	old pond	180	130	0.54	30	**1612**	Rohu	100g (5")	5.6.2020
301	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Htay Naing Win	old pond	170	130	0.51	30	**1522**	Rohu	100g (5")	5.6.2020
302	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Than Shain	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
303	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Nwe Win	old pond	210	110	0.53	30	**1591**	Rohu	100g (5")	5.6.2020
304	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Win Aung	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
305	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Soe Lwin	old pond	200	110	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
306	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Tin Min Khaing	old pond	210	100	0.48	30	**1446**	Rohu	100g (5")	5.6.2020
307	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Nyunt Win	old pond	190	120	0.52	30	**1570**	Rohu	100g (5")	5.6.2020

308	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
309	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Khaing Win	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	5.6.2020
310	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Than Shin	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
311	BRAC	Khin U	Tae Po Pin	Tae Po Pin	Daw Ami Nar	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	5.6.2020
312	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Maung Lwin	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
313	BRAC	Khin U	Tae Po Pin	Tae Po Pin	Daw Mar Mar San	old pond	220	100	0.51	30	**1515**	Rohu	100g (5")	5.6.2020
314	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Zaw Khaing	old pond	220	110	0.56	30	**1667**	Rohu	100g (5")	5.6.2020
315	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Than Aung	old pond	180	120	0.50	30	**1488**	Rohu	100g (5")	5.6.2020
316	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Kyaw Thu	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	5.6.2020
317	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Tun Soe	old pond	200	120	0.55	30	**1653**	Rohu	100g (5")	5.6.2020
318	BRAC	Khin U	Tae Po Pin	Tae Po Pin	U Tun Win	old pond	200	100	0.46	30	**1377**	Rohu	100g (5")	5.6.2020
319	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Soe Moe Naing	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
320	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Myint Maung	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
321	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	UThet Ko	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
322	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Aung Ko Oo	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
323	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Aung Naing Moe	old pond	150	115	0.40	30	**1188**	Rohu or Mrigal	100g (5")	20.5.2020
324	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Zar Ni Aung	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	20.5.2020
325	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Thar Aye	old pond	150	115	0.40	30	**1188**	Rohu or Mrigal	100g (5")	20.5.2020
326	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Nyo Chaw	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	20.5.2020
327	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Kyaw Moe Oo	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
328	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Chit Thae	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
329	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Aung Kyaw Myint	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
330	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Ko Ko Phyo	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	20.5.2020
331	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Kyaw Lin	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
332	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Nay Ye Lin	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
333	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Zayar Soe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020

334	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Min Thet Aung	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
335	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Kyaw Aye	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
336	BRAC	Madaya	Let Kaung Kyi	Let Kaung Lay	U Win Oo	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	20.5.2020
337	BRAC	Madaya	Let Kaung Kyi	Myoet Kone	U Win Myaing	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
338	BRAC	Madaya	Let Kaung Kyi	Myoet Kone	Daw Than Aye	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
339	BRAC	Madaya	Let Kaung Kyi	Let Kaung Kyi	U Tin Maung	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
340	BRAC	Madaya	Let Kaung Kyi	Let Kaung Kyi	U Aye Naing	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
341	BRAC	Madaya	Let Kaung Kyi	Let Kaung Kyi	Daw Zin Mar Moe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
342	BRAC	Madaya	Let Kaung Kyi	Let Kaung Kyi	U Aung Myint	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
343	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Soe Min Thant	old pond	220	150	0.76	30	**2273**	Rohu or Mrigal	100g (5")	20.5.2020
344	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Moe Moe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
345	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Sein Win	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
346	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Tun Aung	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	20.5.2020
347	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Ahar Chan	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	20.5.2020
348	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Tun Oo	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
349	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Zaw Win Tun	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
350	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Kyaw Thet	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	20.5.2020
351	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Thein Htay	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
352	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Myint Aung	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
353	BRAC	Madaya	Kang Ta Phet	Kang Ta Phet	U Yan Aung	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
354	BRAC	Madaya	Shan Taw	Shan Taw	Daw Khin Mar Cho	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
355	BRAC	Madaya	Shan Taw	Shan Taw	U Nay Soe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020

356	BRAC	Madaya	Shan Taw	Shan Taw	U Nyein Zaw Hein	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
357	BRAC	Madaya	Shan Taw	Shan Taw	U Aung Soe Lwin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
358	BRAC	Madaya	Shan Taw	Shan Taw	Daw Wine	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	20.5.2020
359	BRAC	Madaya	Shan Taw	Shan Taw	U Phyo Thu Maung	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
360	BRAC	Madaya	Shan Taw	Shan Taw	U Zaw Naing	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
361	BRAC	Madaya	Shan Taw	Shan Taw	U Lwan	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
362	BRAC	Madaya	Shan Taw	Shan Taw	Mar Mar Sein	old pond			0.80	30	**2400**	Rohu or Mrigal	100g (5")	20.5.2020
363	BRAC	Madaya	Shan Taw	Shan Taw	U Myo Aung	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
364	BRAC	Madaya	Shan Taw	Shan Taw	Daw Mar Sein	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
365	BRAC	Madaya	Shan Taw	Shan Taw	U Phyo Thu Aung	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	20.5.2020
366	BRAC	Madaya	Shan Taw	Thila Kone	U Chit Shwin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
367	BRAC	Madaya	Shan Taw	Thila Kone	U Win Naing	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
368	BRAC	Madaya	Kang Ta Phet	Pha Yar Hpyu	U Kyaw Khaing	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
369	BRAC	Madaya	Kang Ta Phet	Pha Yar Hpyu	Daw Moe Moe Win	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	20.5.2020
370	BRAC	Madaya	Lwin Taung	Kyone Ywar	Ko Kyaw Win Tun	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
371	BRAC	Madaya	Lwin Taung	Kyone Ywar	U Kyaw Than	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
372	BRAC	Madaya	Lwin Taung	Kyone Ywar	Ko Tun	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	21.5.2020
373	BRAC	Madaya	Lwin Taung	Kyone Ywar	U Maung Khaing	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
374	BRAC	Madaya	Lwin Taung	Kyone Ywar	Daw Nay Zar	old pond			0.50	30	**1500**	Rohu or Mrigal	100g (5")	21.5.2020
375	BRAC	Madaya	Lwin Taung	Kyone Ywar	U Maung Hlaing	old pond			0.60	30	**1800**	Rohu or Mrigal	100g (5")	21.5.2020
376	BRAC	Madaya	Lwin Taung	Kyone Ywar	U Aung Kyee	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	21.5.2020
377	BRAC	Madaya	Kan Bae	Pauk Taw	Daw Myint Myint Aye	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020

378	BRAC	Madaya	Kan Bae	Pauk Taw	U Sai Wai Tun	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
379	BRAC	Madaya	Kan Bae	Pauk Taw	U Lin Lin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
380	BRAC	Madaya	Kan Bae	Pauk Taw	Daw Yu Nandar Tun	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
381	BRAC	Madaya	Let Kaung Kyi	Nyaung Aing Kone	U Nyi Nyi Lwin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
382	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Thein Win	old pond	200	110	0.51	30	**1515**	Rohu or Mrigal	100g (5")	21.5.2020
383	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Tun Win	old pond	200	180	0.83	30	**2479**	Rohu or Mrigal	100g (5")	21.5.2020
384	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Win Min Paing	old pond	190	110	0.48	30	**1439**	Rohu or Mrigal	100g (5")	21.5.2020
385	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Kyaw Myint Oo	old pond	200	130	0.60	30	**1791**	Rohu or Mrigal	100g (5")	21.5.2020
386	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Naing Tuu	old pond	150	100	0.34	30	**1033**	Rohu or Mrigal	100g (5")	21.5.2020
387	BRAC	Madaya	ywe Su	Inn Kone Ywar	Daw Win Mar	old pond	170	100	0.39	30	**1171**	Rohu or Mrigal	100g (5")	21.5.2020
388	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Kyi Khaing	old pond	180	50	0.21	30	**620**	Rohu or Mrigal	100g (5")	21.5.2020
389	BRAC	Madaya	ywe Su	Inn Kone Ywar	Daw Pwae	old pond	190	70	0.31	30	**916**	Rohu or Mrigal	100g (5")	21.5.2020
390	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Maung Oo	old pond	50	20	0.02	30	**69**	Rohu or Mrigal	100g (5")	21.5.2020
391	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Kyee Tan	old pond	120	50	0.14	30	**413**	Rohu or Mrigal	100g (5")	21.5.2020
392	BRAC	Madaya	ywe Su	Inn Kone Ywar	U San Wai	old pond	50	50	0.06	30	**172**	Rohu or Mrigal	100g (5")	21.5.2020
393	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Aung Lwin Oo	old pond	50	50	0.06	30	**172**	Rohu or Mrigal	100g (5")	21.5.2020
394	BRAC	Madaya	ywe Su	Inn Kone Ywar	U kount	old pond	60	60	0.08	30	**248**	Rohu or Mrigal	100g (5")	21.5.2020
395	BRAC	Madaya	ywe Su	Inn Kone Ywar	Daw Cho Zin Myint	old pond	60	60	0.08	30	**248**	Rohu or Mrigal	100g (5")	21.5.2020
396	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Aung Aung	old pond	70	70	0.11	30	**337**	Rohu or Mrigal	100g (5")	21.5.2020
397	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Zaw Zaw	old pond	150	100	0.34	30	**1033**	Rohu or Mrigal	100g (5")	21.5.2020
398	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Tin Tun Win	old pond	170	150	0.59	30	**1756**	Rohu or Mrigal	100g (5")	21.5.2020
399	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Thaung Naing	old pond	150	40	0.14	30	**413**	Rohu or Mrigal	100g (5")	21.5.2020

400	BRAC	Madaya	ywe Su	Inn Kone Ywar	U Kyaung Ni	old pond	150	50	0.17	30	**517**	Rohu or Mrigal	100g (5")	21.5.2020
401	BRAC	Madaya	Madaya	Quarter-2	U Ngwe Paw	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
402	BRAC	Madaya	Madaya	Quarter-2	U Htet Wai	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	21.5.2020
403	BRAC	Madaya	Madaya	Quarter-2	U Maung Shein	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
404	BRAC	Madaya	Madaya	Quarter-2	U Mg Oo	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	21.5.2020
405	BRAC	Madaya	Madaya	Quarter-2	U Aung Win	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	21.5.2020
406	BRAC	Madaya	Madaya	Quarter-2	U Maung San	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	21.5.2020
407	BRAC	Madaya	Madaya	Quarter-4	U Soe Min Oo	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	21.5.2020
408	BRAC	Madaya	ywe Su	ywe Su	U Tun Min Naing	old pond	150	100	0.34	30	**1033**	Rohu or Mrigal	100g (5")	21.5.2020
409	BRAC	Madaya	ywe Su	ywe Su	U Phyo Thu Win	old pond	150	100	0.34	30	**1033**	Rohu or Mrigal	100g (5")	21.5.2020
410	BRAC	Madaya	ywe Su	ywe Su	U Thein Win	old pond	190	110	0.48	30	**1439**	Rohu or Mrigal	100g (5")	21.5.2020
411	BRAC	Madaya	ywe Su	ywe Su	U Zaw Min	old pond	200	120	0.55	30	**1653**	Rohu or Mrigal	100g (5")	21.5.2020
412	BRAC	Madaya	ywe Su	ywe Su	U Min Lwin	old pond	250	100	0.57	30	**1722**	Rohu or Mrigal	100g (5")	21.5.2020
413	BRAC	Madaya	ywe Su	ywe Su	U Aung Phyo Hlaing	old pond	100	100	0.23	30	**689**	Rohu or Mrigal	100g (5")	21.5.2020
414	BRAC	Madaya	ywe Su	ywe Su	U Kyaw Win	old pond	200	100	0.46	30	**1377**	Rohu or Mrigal	100g (5")	21.5.2020
415	BRAC	Madaya	ywe Su	ywe Su	Daw Tin Myint	old pond	200	150	0.69	30	**2066**	Rohu or Mrigal	100g (5")	21.5.2020
416	BRAC	Madaya	ywe Su	ywe Su	U Thein Tan	old pond	210	160	0.77	30	**2314**	Rohu or Mrigal	100g (5")	21.5.2020
417	BRAC	Madaya	ywe Su	ywe Su	U Myat Ko Ko	old pond	210	140	0.67	30	**2025**	Rohu or Mrigal	100g (5")	21.5.2020
418	BRAC	Madaya	ywe Su	Ywar Thit	U Aung Swe Win	old pond	70	40	0.06	30	**193**	Rohu or Mrigal	100g (5")	21.5.2020
419	BRAC	Madaya	ywe Su	Ywar Thit	Daw San	old pond	100	90	0.21	30	**620**	Rohu or Mrigal	100g (5")	21.5.2020
420	BRAC	Madaya	ywe Su	Ywar Thit	U Kyaw Min Tun	old pond	60	60	0.08	30	**248**	Rohu or Mrigal	100g (5")	21.5.2020
421	BRAC	Madaya	ywe Su	Ywar Thit	Daw Bi	old pond	190	180	0.79	30	**2355**	Rohu or Mrigal	100g (5")	21.5.2020

422	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	Daw Myae	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
423	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	Daw Myint Myint Htwe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
424	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Shott	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
425	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Soe Min	old pond	80	100	0.18	30	**551**	Rohu or Mrigal	100g (5")	22.5.2020
426	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Kyaw Myint	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
427	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Aung Tun	old pond	200	150	0.69	30	**2066**	Rohu or Mrigal	100g (5")	22.5.2020
428	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Zaw Tun	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	22.5.2020
429	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Kyaw Sint	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	22.5.2020
430	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Taw	old pond	85	100	0.20	30	**585**	Rohu or Mrigal	100g (5")	22.5.2020
431	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Nyan Htay	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	22.5.2020
432	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	Daw Hlaing Ya Min	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	22.5.2020
433	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	Daw Bo Ma	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	22.5.2020
434	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Tin Lone	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	22.5.2020
435	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Thaung Nyunt	old pond	200	170	0.78	30	**2342**	Rohu or Mrigal	100g (5")	22.5.2020
436	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Moutt Tar	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
437	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Thein Shwe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
438	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	U Ohn Shwe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
439	BRAC	Madaya	Se Taing Kan	Kan Lel Khone	Daw Nwet Nwet Yi	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	22.5.2020
440	BRAC	Madaya	Kang Ta Phet	AhLaeBone	U Myo Myint	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	22.5.2020
441	BRAC	Madaya	Kang Ta Phet	AhLaeBone	U Khin Win	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
442	BRAC	Madaya	Kang Ta Phet	AhLaeBone	U Mite Kae	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
443	BRAC	Madaya	Kang Ta Phet	AhLaeBone	U Phone Kyaw	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	22.5.2020

444	BRAC	Madaya	Kang Ta Phet	AhLaeBone	U Aung Than	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
445	BRAC	Madaya	Kang Ta Phet	AhLaeBone	U Thein Tun	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
446	BRAC	Madaya	Kang Ta Phet	AhLaeBone	Daw Kyar Shin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
447	BRAC	Madaya	Kang Ta Phet	AhLaeBone	U Tin Win	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
448	BRAC	Madaya	Kang Ta Phet	AhLaeBone	U Hlaing Soe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
449	BRAC	Madaya	Kang Ta Phet	AhLaeBone	U Tint Swe	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	22.5.2020
450	BRAC	Madaya	Kang Ta Phet	Kyet Kone	U San Win Oo	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
451	BRAC	Madaya	Kang Ta Phet	Kyet Kone	U Sein Tun Aung	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
452	BRAC	Madaya	Kang Ta Phet	Kyet Kone	U Twan Kyar hlyo	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
453	BRAC	Madaya	Kang Ta Phet	Kyet Kone	U Myo	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
454	BRAC	Madaya	Kang Ta Phet	Kyet Kone	U Chan	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	22.5.2020
455	BRAC	Madaya	Kang Ta Phet	Mon Ywe	U Aung Min	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
456	BRAC	Madaya	Kang Ta Phet	Mon Ywe	U Thet Naung	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
457	BRAC	Madaya	Set Htate	Mon Ywe (Set Htate)	U Than Lwin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
458	BRAC	Madaya	Set Htate	Mon Ywe (Set Htate)	U Aung Naing Oo	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
459	BRAC	Madaya	Tae Kone	Taung Pyone Lay	U Si Thu Aung	old pond			0.80	30	**2400**	Rohu or Mrigal	100g (5")	22.5.2020
460	BRAC	Madaya	Tae Kone	Tae Kone	U Aung Thin	old pond			0.50	30	**1500**	Rohu or Mrigal	100g (5")	22.5.2020
461	BRAC	Madaya	Tae Kone	Tae Kone	U Myint Khing	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
462	BRAC	Madaya	Bae Mae	Bae Mae	U Mg Soe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
463	BRAC	Madaya	Bae Mae	Bae Mae	U Aung Thiha Shwe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
464	BRAC	Madaya	Bae Mae	Bae Mae	U Nay Thura Shwe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020
465	BRAC	Madaya	Bae Mae	Bae Mae	U Shwe Boe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	22.5.2020

466	BRAC	Madaya	ThaMInTwin	ThaMInTwin	U Khin Mg Win	old pond			0.00	30	**0**	Rohu or Mrigal	100g (5")	22.5.2020
467	BRAC	Madaya	ThaMInTwin	ThaMInTwin	U Mg Ko Gyi	old pond			0.00	30	**0**	Rohu or Mrigal	100g (5")	22.5.2020
468	BRAC	Madaya	ThaMInTwin	ThaMInTwin	U Lin Naing	old pond			0.75	30	**2250**	Rohu or Mrigal	100g (5")	22.5.2020
469	BRAC	Madaya	ThaMInTwin	ThaMInTwin	U Zaw Nyein	old pond			0.50	30	**1500**	Rohu or Mrigal	100g (5")	22.5.2020
470	BRAC	Madaya	ThaMInTwin	ThaMInTwin	U Pyi Soe Aung	old pond			0.75	30	**2250**	Rohu or Mrigal	100g (5")	22.5.2020
471	BRAC	Madaya	ThaMInTwin	ThaMInTwin	Daw Kyi Hlaing	old pond			0.00	30	**0**	Rohu or Mrigal	100g (5")	22.5.2020
472	BRAC	Madaya	No-5	Paung Hlae Tite	U San Lin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
473	BRAC	Madaya	No-5	Paung Hlae Tite	Daw Nwe Ni Lin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
474	BRAC	Madaya	No-5	Paung Hlae Tite	U Yae Naing Oo	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
475	BRAC	Madaya	No-5	Paung Hlae Tite	U Mya Tun	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
476	BRAC	Madaya	No-5	Paung Hlae Tite	Daw Sein Tin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
477	BRAC	Madaya	No-5	Paung Hlae Tite	U Than Tun	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
478	BRAC	Madaya	No-5	Paung Hlae Tite	U Aung Kyaw	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
479	BRAC	Madaya	No-5	Paung Hlae Tite	U San Naing Oo	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
480	BRAC	Madaya	No-5	Paung Hlae Tite	Daw Naw Li Tun	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
481	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U San Win	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
482	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Tun Tun Oo	old pond			0.00	30	**0**	Rohu or Mrigal	100g (5")	23.5.2020
483	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Tin Win	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
484	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Zar Ni	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
485	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Thar Din	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
486	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Kyaw Zin Win	old pond	200	150	0.69	30	**2066**	Rohu or Mrigal	100g (5")	23.5.2020
487	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U San Lwin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020

488	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Tin Lin	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
489	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Yae Khae	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
490	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Kyaw Win	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
491	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Zaw Moe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
492	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Htut Htut	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	23.5.2020
493	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Kyaw Soe	old pond	130	125	0.37	30	**1119**	Rohu or Mrigal	100g (5")	23.5.2020
494	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	Daw San Yi	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
495	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Min Naing	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
496	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Soe Naing Tun	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
497	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Min Thu Htwe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
498	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Kyaw Min Aung	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
499	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Htwe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
500	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U San Wai Aung	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	23.5.2020
501	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	Daw Theint	old pond	130	100	0.30	30	**895**	Rohu or Mrigal	100g (5")	23.5.2020
502	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Tin Htay	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
503	BRAC	Madaya	Let Kaung Kyi	PiThuKarSu	U Tin Win	old pond	200	150	0.69	30	**2066**	Rohu or Mrigal	100g (5")	23.5.2020
504	BRAC	Madaya	Kyauk Sa Yit (S)	Zee Hpyu Pin Kone	U Thar Htay	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
505	BRAC	Madaya	Kyauk Sa Yit (S)	Zee Hpyu Pin Kone	U Ye Myint Oo	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
506	BRAC	Madaya	Shwe Kyaung	Shwe Kyaung	U Sein Myint	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
507	BRAC	Madaya	Shwe Kyaung	Shwe Kyaung	U Soe Thu Moe	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
508	BRAC	Madaya	Shwe Kyaung	Shwe Kyaung	U J Nyi	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020
509	BRAC	Madaya	Shwe Kyaung	Shwe Kyaung	U Bo Lay	old pond	180	120	0.50	30	**1488**	Rohu or Mrigal	100g (5")	23.5.2020

510	BRAC	Madaya	Sate Thar	Sate Thar	U Mg Hein	old pond	40	30	0.03	30	**83**	Rohu or Mrigal	100g (5")	23.5.2020
511	BRAC	Madaya	Sate Thar	Sate Thar	U Kyaw Nyein	old pond	30	20	0.01	30	**41**	Rohu or Mrigal	100g (5")	23.5.2020
512	BRAC	Madaya	Sate Thar	Sate Thar	U Thein Tun Oo	old pond	30	30	0.02	30	**62**	Rohu or Mrigal	100g (5")	23.5.2020
513	BRAC	Madaya	Sate Thar	Sate Thar	U Than Htike	old pond	40	30	0.03	30	**83**	Rohu or Mrigal	100g (5")	23.5.2020
514	BRAC	Madaya	Sate Thar	Sate Thar	U Soe Win	old pond	40	30	0.03	30	**83**	Rohu or Mrigal	100g (5")	23.5.2020
515	BRAC	Madaya	ywe Su	Sate Thar	U Aung Aung	old pond	70	70	0.11	30	**337**	Rohu or Mrigal	100g (5")	23.5.2020
516	BRAC	Madaya	Sate Thar	ThaPyaeHla	U Than Maung	old pond	50	50	0.06	30	**172**	Rohu or Mrigal	100g (5")	23.5.2020
517	BRAC	Madaya	Sate Thar	ThaPyaeHla	U Kyaw Myint	old pond	50	30	0.03	30	**103**	Rohu or Mrigal	100g (5")	23.5.2020
518	BRAC	Madaya	Sate Thar	ThaPyaeHla	U Soe Tint	old pond	50	40	0.05	30	**138**	Rohu or Mrigal	100g (5")	23.5.2020
519	BRAC	Madaya	Sate Thar	ThaPyaeHla	U Min Lwin	old pond	70	60	0.10	30	**289**	Rohu or Mrigal	100g (5")	23.5.2020
520	BRAC	Madaya	Sate Thar	Shar Sae Chet	U Tin Aung	old pond	70	70	0.11	30	**337**	Rohu or Mrigal	100g (5")	23.5.2020
521	BRAC	Madaya	Sate Thar	Shar Sae Chet	U Hla Thaung	old pond	70	30	0.05	30	**145**	Rohu or Mrigal	100g (5")	23.5.2020
522	KMSS	Pekhon	Mobye	Nyaung Pin Thar	U Lawrence	Old pond	70	70	0.11	60	**675**	Common Carp	2.5	25-May
523	KMSS	Pekhon	Mobye	Daw Paw Ku	U Teri	Old pond	600	500	6.89	60	**41322**	Common Carp	2.5	25-May
524	KMSS	Pekhon	Mobye	Lel Htun	U Marko	Old pond			0.5	60	**3000**	Common Carp	2.5	25-May
525	KMSS	Pekhon	Mobye	Lel Htun	V Noe	Old pond	209	209	1.00	60	**6017**	Common Carp	2.5	25-May
526	KMSS	Pekhon	Mobye	Lel Htun	U Paulu	Old pond	108	108	0.27	60	**1607**	Common Carp	2.5	25-May
527	KMSS	Pekhon	Mobye	Lel Htun	U Peter	Old pond			0.5	60	**3000**	Common Carp	2.5	25-May
528	KMSS	Pekhon	Mobye	Lel Htun	U Mg Nio	Old pond			0.5	60	**3000**	Common Carp	2.5	25-May
529	KMSS	Pekhon	Mobye	Lel Htun	U Mg Zet	Old pond			0.7	60	**4200**	Common Carp	2.5	25-May
530	KMSS	Pekhon	Mobye	Lel Htun	U Htay	Old pond			0.5	60	**3000**	Common Carp	2.5	25-May
531	KMSS	Pekhon	Mobye	Lel Htun	U Mg Thein	Old pond			1	60	**6000**	Common Carp	2.5	25-May
532	KMSS	Pekhon	Mobye	Lel Htun	U La	Old pond			1	60	**6000**	Common Carp	2.5	25-May
533	KMSS	Pekhon	Mobye	Le Htun	Mg Pai	Old pond	210	210	1.01	60	**6074**	Common Carp	2.5	25-May
534	KMSS	Pekhon	Mobye	Hpar Lai Taungche	Mg Khun	Old pond	440	80	0.81	60	**4848**	Common Carp	2.5	25-May
535	KMSS	Pekhon	Mobye	Loi Yin Taung Che	U Htike	Paddy fish p	500	30	0.34	60	**2066**	Common Carp	2.5	25-May

536	KMSS	Pekhon	Mobye	Loi Yin Taung Che	U Ngwe	Old pond	150	100	0.34	60	**2066**	Common Carp	2.5	25-May
537	KMSS	Pekhon	Mobye	Loi Yin Min Ga Lar	U Saw Shwe	Old pond	200	70	0.32	60	**1928**	Common Carp	2.5	25-May
538	KMSS	Pekhon	Mobye	Thit Yar Htin Shue Kone	U Nyo	Old pond	150	150	0.52	60	**3099**	Common Carp	2.5	25-May
539	KMSS	Pekhon	Mobye	Thar Yar Kone	U Thine Paulu	Old pond	300	50	0.34	60	**2066**	Common Carp	2.5	25-May
540	KMSS	Pekhon	Mobye	Thit Yar kone	U Thay Luka	Old pond	140	40	0.13	60	**771**	Common Carp	2.5	25-May
541	KMSS	Pekhon	Mobye	Pwe Kone (2)	U Thomaso	Old pond	50	50	0.06	60	**344**	Common Carp	2.5	25-May
542	KMSS	Pekhon	Nar Hee	Pon Law	U Mg Soe	Old pond	300	60	0.41	60	**2479**	Common Carp	2.5	25-May
543	KMSS	Pekhon	Nar Hee	Ban Hku	U Kham Mu	Old pond	378	20	0.17	60	**1041**	Common Carp	2.5	25-May
544	KMSS	Pekhon	Nar Hee	Ban Hku	U Sai Lwan Moe	Old pond	108	25	0.06	60	**372**	Common Carp	2.5	25-May
545	KMSS	Pekhon	Nar Hee	Ban Hku	U Sein	Old pond	75	25	0.04	60	**258**	Common Carp	2.5	25-May
546	KMSS	Pekhon	Pekhon	Zay Shayk	U Than Mg	Old pond	452	81	0.84	60	**5043**	Common Carp	2.5	25-May
547	KMSS	Pekhon	Pekhon	Quiet thit	Mg Sue	Old pond	15	15	0.01	60	**31**	Common Carp	2.5	25-May
548	KMSS	Pekhon	Pekhon	Heindama	U Ambrose	Old pond	20	10	0.005	60	**28**	Common Carp	2.5	25-May
549	KMSS	Pekhon	Pekhon	Lonkar	U Ag Thein	Paddy fish p	650	20	0.30	60	**1791**	Common Carp	2.5	25-May
550	KMSS	Pekhon	Pekhon	Lonkar	Daw Irene	Earthen pon	85	20	0.04	60	**234**	Common Carp	2.5	25-May
551	KMSS	Pekhon	Nang Toke	Saung Lan	U Tun Kyi	Earthen pon	120	50	0.14	60	**826**	Common Carp	2.5	25-May
552	KMSS	Pekhon	Mobye	Moe Bye Yae Kar Tar	U Myat Moe	Earthen pon	95	60	0.13	60	**785**	Common Carp	2.5	25-May
553	KMSS	Pekhon	Nar Hee	Ban Hku	U Sai Lu	Earthen pon	108	25	0.06	60	**372**	Common Carp	2.5	25-May
554	KMSS	Pin Laung	Nang Toke	Yae Oo	U Tun Hlaing	Old pond	180	90	0.37	60	**2231**	Common Carp	2.5	25-May
555	KMSS	Pin Laung	Nang Toke	Yae Oo	U la Moe	Old pond	48	30	0.03	60	**198**	Common Carp	2.5	25-May
556	KMSS	Pin Laung	Nang Toke	Yae Oo	U Tee Lon	Old pond	66	36	0.05	60	**327**	Common Carp	2.5	25-May
557	KMSS	Pin Laung	Nang Toke	Saung Lan	U kureh	Old pond	65	55	0.08	60	**492**	Common Carp	2.5	25-May
558	KMSS	Pin Laung	Nang Toke	Saung Lan	U Law Reh	Old pond	2200	20	1.01	60	**6061**	Common Carp	2.5	25-May
559	KMSS	Pin Laung	Nang Toke	Saung Lan	U Soe Reh	Old pond	60	30	0.04	60	**248**	Common Carp	2.5	25-May
560	KMSS	Pin Laung	Nang Toke	Saung Lan	U Chel	Old pond	105	30	0.07	60	**434**	Common Carp	2.5	25-May
561	KMSS	Pin Laung	Nang Toke	Saung Lan	U Soe	Old pond	30	30	0.02	60	**124**	Common Carp	2.5	25-May
562	KMSS	Pin Laung	Nang Toke	Dau Por Klel	U lay Wi	Old pond	75	27	0.05	60	**279**	Common Carp	2.5	25-May
563	KMSS	Pin Laung	Nang Toke	Dau Por Klel	U Tireh	Old pond	30	18	0.01	60	**74**	Common Carp	2.5	25-May
564	KMSS	Pin Laung	Nang Toke	Dau Por Klel	U Soereh	Old pond	30	28	0.02	60	**116**	Common Carp	2.5	25-May
565	KMSS	Pin Laung	Nang Toke	Dau Por Klel	U Mereh	Old pond	60	21	0.03	60	**174**	Common Carp	2.5	25-May
566	KMSS	Pin Laung	Nang Toke	Saung Lan	U Mg Shareh	Old pond	60	40	0.06	60	**331**	Common Carp	2.5	25-May
567	KMSS	Pin Laung	Nang Toke	Dau Por Klel	U Mg Win	Earthen pon	50	30	0.03	60	**207**	Common Carp	2.5	25-May

	Description (elaborate further the meaning of the result) red remarks come from gender integration workshop	detailed activities	Gender integration activities (content) REVISE OR ADD NEW ACTIVITIES	gender integration (MEL). (baseline, routine, other)	Responsible person (to ensure gender integration happens)	Gender expertise/ resources support required	Why is it necessary / what problem it will tackle or solve	Responsible/ stakeholders involved	Sub-activities / Key steps at ground level -	Results / products (achieved at each level, e.g. deliverables, signed agreement, etc.)	Objectively Verifiable Indicators (indicators identified at IR, SUB- IR and Output level) IN CURRENT RESULTS FRAMEWORK	COMMENTS ABOUT INDICATORS
Purpose - IR 1 Small-scale aquaculture production increased by improved and land and water use, and increased access to info											EG. 3-10,-11,-12: Yield (i.e. production/ unit area) of targeted agricultural commodities among program participants with USG assistance Custom 1: Yield increase (in percentage change) for target beneficiaries Custom 1.2: Total Factor Productivity (TFP)	Assume this is HH level. If possible specify type of household by different wealth groups, and sex of fish farmer or BOTH. Risk is that man is listed as fish farmer but women may be doing the actual farming. Need to ensure its clear in baseline.

GENERAL: ANY TIME WE MENTION FARMERS IT HAS TO BE SEX DISAGGREGATED . For HH types, ensure specify if MHH or FHH.

Outcome /Sub- IR 1.1. An enabling environment is created to increase the engagement of farmers in commercial aquaculture production (water and land use and market knowledge)				note: the enabling environment in locations with IDP may not be conducive for engaging farmers in commercial aquaculture production. Other pathways may need to be emphasized (e.g. related to market system or nutrition).							Custom 1.1 - a: Number of farmers shifted from subsistence to commercial aquaculture practices Custom 1.1 - b: Number of registered farmers engaged in aquaculture as a result of the intervention (regulation/policy framework change)	1.1.A. problematic. Focus of project is about food and nutrition security for **smallholders. Shifting to commercial may be detrimental to small scale nutrition. Is this indicator about shifting from traditional farming practices to BMP or entering commercial production. .**
Output 1.1.1 Increased understanding on land and water resources and policy recommendations provided	Scope: understand the context; identify possible/best alternatives for better usage of water resources; provide recommendations to policy/regulations.		Overall: understanding gender dynamics around women and men different access/ability to decide on use of land /water for aquaculture. Discuss with IWMI whether they will integrate gender into this package	baseline: do we know different gender dynamics around women/men/ intersectional groups access to land + water			Access to land and water : limitations in terms of both regulations and resources use, availability and ownership, which is limiting the productivity and quality of aquaculture.	IWMI; MoALI, DoF,		1 MoA signed with IWMI; Scoping and baseline study on water (integrated to the main scoping report); Policy report on water an land use; (Report) Modeling of climate variability, and water seasonality; Design of monitoring network on		
Activities													

1.1.1.1 Assessment of existing policies related to land and water rights/security through organizing policy diagnosis			**gendered policy impact assessment (what are the policies and what are the impacts currently on women and men intersectionality as a result of policies)** Ensure assessment existing policies on land water rights assesses how these affect women and men across intersectional markers (secondary data review, if doesn't exist	**scoping:** speak to land rights specialists before baseline to get overview of situation **Baseline:** capture gender dynamics of access to land + water bodies + decision making on use of resource. (ownership , activity). Decide if this is HH level or individual. (access + tenure, security) disaggregate by gender. **Routine:** ensure captures changes in **conversion of land** for aquaculture or crops and who decides (gender). two types: converting Riceland to narrow canal + entire land for aquaculture	MARK to follow up. check in with Tariq (BRAC) who knows key organizations working on land policy issues for women and indigenous issues + land Core GROUP.	find FTE for Mark who can provide support on scanning policy on gender/intersectional issues					
1.1.1.2 Investigate current water resources management practices within and outside current aquaculture systems (including with surveys carried out) in selected townships			Assess gender dynamics around water resource management (access/ ownership, tenure) and gendered dynamics around decision making on conversion of land to water use for aquaculture. May be intersectional issues in different	baseline: capture gender dynamics around who is involved in water resource management practices (FGD) and/or discussion with potential Ips	MANJU to follow up with Sonali that gender is integrated to assessment.						

1.1.1.3 Assess opportunities to enhance water productivity (e.g.. best location for new ponds, feasibility of using existing irrigation infrastructure for aquaculture)				MEL templates captures impacts (benefit) of different aquaculture models on women and men + intersectional				IWMI				
1.1.1.4 Design monitoring network for water quality and flows, upstream, within and downstream of aquaculture ponds of selected townships				baseline: ensure that disaggregates results across different types of HH across relevant intersectional markers (wealth, ethnicity, location).				IWMI				
1.1.1.5 Evaluation of possible water implications of water resource development up and downstream of aquaculture			N/A (modelling)									
1.1.1.6 Ascertain the potential consequences of different aquaculture development scenarios and the potential water risks through utilizing water resource modeling			Ensure assessment/modelling validates scenarios for different types of households (MHH, FHH disaggregated across different intersectional groups). Ensure scenarios for IDP in relevant		MANJU to check with IWMI on gender integration			IWMI				

Output 1.1.2 Improved access to information on market and SSA technologies (BMPs)	NEED info on forward and backward market info (feed and seed, where I can find seed/feed and price and where I can sell my fish)		REMARK: access to MARKET information may be more relevant under pathway 2. would keep access to BAP related to aquaculture extension here.				Limited knowledge on market drivers/environment across the value chains (rohu, tilapia, prawn, feed)	Partner in collaboration with WF;		1 Ascended with market partner; Monitoring reports - quarterly on information access and usage (provided by the company) - app developed, information collected through partners (CBOs, NGOs)uploaded and monitored result reported ; Training	Survey to market actors on the usage/utility of the information (as part of MEL activities0	
ADD: alignment of training .	fish seed provided at same time. After one cycle the culture period will be different depending on stock. Some species are shorter time. So production period will be change. Farmers need to know fish price so know when to know fish raising so can get higher price											

1.1.2.1 Market relevant information collected from hatcheries, nurseries, feed mills and traders, and distributed to the relevant (virtual) extension partners	CHECK: just market info or also regular BAP extension?	1.Ensure baseline includes questions around access to extension on BMP for women and men 2. Ensure VC captures how women and men access information on market prices 3. Use baseline + VC findings to	VC analysis to assess what are different market information needs of different types of women and men in value chain by location. Also assess what channels/mediums they access market information (what type of information).	baseline (FGD): capture how different women and men currently access market information (what channels + from whom). + INFO on BAP baseline (FGD): capture how different women and men currently access regular BAP extension (what channels + from whom) (see mysap tools) Routine: monitor if there are changes in how different women and men access market information from different channels to assess if different reach strategies are needed + how information is	MANJU , Amman and Jess and Sebastian to figure out what can be covered in VC. Mark to have check?	Ask Jess about FGD tools developed to support MSAP to assess extension needs of women and men . worldfish Bangladesh has tools and concepts.		Virtual Partner				

1.1.2.2 Engage with partners (private, NGOs, and private companies) to expand information channels to all market actors and to monitor outreach (actors accessing/making use of the information)	Identify more partners through competitive process	Assume this is about actual delivery of extension from different actors. See comments below about delivery of extension.	use baseline findings to identify gender responsive information channels. identify what information is provided by which actor. Ensure for all actors that gender responsive information channels are used. Develop criteria (based on baseline) to identify 'who' needs extension for which parts of BAP practices depending on gender division of labor (GDL)	ensure baseline covers questions on what extension they receive and for what channels. Also cover barriers to accessing extension (REACH). Ensure baseline covers GDL around pond management practices + fish processing.	Amman to follow up.	need to ensure questionnaire is gender responsive. Check the final tool with Jess. When will share ToR has gender expertise.						

1.1.2.3 Training (PRIVATE SECTORS & CBOs) on market (prices, inputs suppliers and availability, access, etc.)	**training to partners to support their customers: xxxxx (build capacity of our partners to better need customers)** 2 trainings: 1 for information collectors - the App company will give training to enumerators to collect market info; 1 training given to the farmers by the App company on how to access information on the virtual platforms	Training needs to be informed by baseline findings around barriers t to provide concrete suggestions of how to reach different profiles of women and men customers. Currently we don't know what are the main barriers. MEL to track	review baseline findings for gender analysis of who has access to different inputs . Prioritization of possible supports to different profiles of farmers. Gender orientation of partners to understand the different needs of different customs and jointly assess strategies to reach. Ensure training covers gender responsive	ensure baseline findings are used to identify what are the major barriers to market. covers questions on what extension different women and men receive and for what channels. Also cover barriers to accessing extension (REACH). Ensure baseline covers GDL around pond management practices + fish processing.	Amman to follow up.	same as above.						
Delivery extension on BMP to relevant target groups	Delivered mainly by NGO partners and maybe private sectors. Possibly 2 types of training directly by farmers on BMP (more intense by NGOS). Two types of ToT (intensive partners like NGOs and other actors private sector).	ToT to intensive partners to cover basic gender responsive training principles (G.Strategy will include a guide/checklist)	gender responsive facilitation principles apply. Tot to incorporate gender responsive approaches (see gender integration guide). Develop check list. Gender expert to review the curriculum for gender	Routine: Include questions to assess what the 'extension' + market information is used for + whom it is benefitting . Baseline/end line: could explore which extension delivery modalities for different types of information are leading to more benefit for different target groups (women/men across different intersectional								

training of indirect beneficiaries (hatcheries, nurseries, feed mills, feed traders, MFF)	will give knowledge to customers on aquaculture in different way (distribute leaflet)	first priority is to train 'intensive' partners on gender responsive extension modalities. Later on we can	**THIS MIGHT NOT BE PRACTICAL IN EARLY STAGES, PRIORITIZE INTENSIVE PARTNERS FIRST:** gender orientation of stakeholders to	baseline same above: ROUTINE: check who are the secondary adopters who are getting information from (extension).	Amman for baseline. Manju to decide on VC.							
training of direct beneficiaries by NGOS		see comments above. Basic gender responsive facilitation to apply (g.strategy will include guide). MEL to track reach and benefit. BASELINE must prioritize 'who' is most appropriate target group.	CURRENT EXPERIENCE SUGGESTS THAT FARMERS HAVE DIFFICULTY REMEMBERING EXTENSION MATERIAL. use this project as opportunity to REVISE BAP training manual to be more adult learning centered and literate sensitive + pictorial + more interactive. Allocate resources to review BAP	SEE COMMENTS ABOVE		Use baseline findings to identify who should be targeted for each module. Ask gender expert to review existing English version and identify gender integration points and alignment with other extension channels (nutrition, financial literacy). [*after discussion with Jess, advised against this: recommend full update of existing training package]*						

Learning option: Developing an APP to be used by project beneficiaries (direct, secondary) to get info on BMP + market info etc.	3 apps will be used: 1 (grannoveter). 2. app to help calculate how much fish feed in pond; 3. hatchery owners to upload info on type of seed, size. Nursery can access this . Would include info of all apps in areas. (very innovative).	This needs good MEL to track how the app will reach/benefit different profiles of farmers (women, men other etc.). Need learning questions around how the app helps	understand how women and men use digital apps to access information, ensure MEL follows up how this extension modalities is enhancing benefit.	baseline to check if people have access to phone, power for phone, internet, credit to pay for it.	Manju							
Outcome /Sub- IR 1.2 Efficiency of aquaculture production increased	This SUB- IR will focus on improving the productivity and the ability of aquaculture to generate/improve income through BMPs.										EG.3.2-28: Number of hectares under improved management practices or technologies that	indicators ok, as long as long as EG 3.2..24 Is sex disaggregated and where possible intersectional (age,

Output 1.2.1 Farmers adopted improved fish farming practices in a range of production systems (e.g.. ponds, rice-fish systems)	Diversified production; improved usage of feed; density, fish size, seed, water quality, etc.		design .SIMPLE MEL TOOLS to pick up gender dynamic adoption . Ensure reporting templates include reporting on gender; gender orientation of implementing partners on gender MEL. Ensure field coordinators understand what to collect (role to support with implementing). MEL reporting template should be gender	routine monitor have capture adoption and who (type of households).	WF mel team (Amman) + field coordinators team.	support to review tool and incorporate gender lens.					Number of practice adopted; Number of farmers adopting the practices (beneficiaries - direct and indirect) .	
Activities													
1.2.1.1 Issue calls for business models/concepts from private sector businesses and organizations (NGOs/CBOs/CSOs) on increased adoption of improved best management practices (BMP) for SSA including rice-fish systems	Sub- grantees to deliver the BMPs call for partners to submit min proposal 12 areas of intervention (everything to do with project, training, access to info, forward market linkages, seed, feed, input supply, linking to farmer) . Also relevant to work package 2.		Selection criteria of partners to include their capacity for gender and nutrition Following baseline , identify if any new partners/consultants required to support further gender integration (based on	N/A	Manju and cross check with Jess, queenie.	Ensure partners understand gender assumptions of ToC and expectations of gender integration in the program. Recommend to do this during the inception workshop and regular annual reflections. Use existing training manuals + develop new ones as needed (e.g. on		WF & selected partners	Train selected sub-grantees on BMPS; extension methodologies, nutrition, gender, etc.		1. Agreements with selected partners; training reports; Training manual- if new;	

1.2.1.2 Review and evaluate the business models/concepts, co-design business plans with selected applicants and sign grant agreements or contracts		copy	Establish criteria for gender responsive business models that support different types women and men farmers Identify relevant partner with expertise for business models targeting specific vulnerable groups Train partners on gender responsive 'reach'. prior to signing contract with partners to ensure when	KII with relevant NGO/private sectors involved in inclusive business models to assess which partners could work for different profiles of farmers (based on poverty, ethnicity, type of HH, which are more appropriate). Establish target criteria for business models for most vulnerable groups which may also include women empowerment objectives.	who ever is leading business models.	check in with Jess around women empowerment options for business models. Note overlap with pathway 2 (market system).						
1.2.1. 3 Stakeholder consultation workshop with aqua-pharmaceutical and aqua equipment/machinery companies and identify priority intervention areas	Understanding current (negative) practices and equipment used in order to intervene by promoting more sustainable practices. ; Include BMPs in the packages that the companies sell.									Report on current practices and priority areas		
1.2.1.4 Facilitate implementation of agreed business plans, grant management and reporting	2 type of contracts: NGOs & companies (aqua - pharmaceutical)											
1.2.1.5												
Outcome/Sub-IR 1.3: Increased access to credit and financial instruments											EG.4.2.a: Percent of households participating in group-based savings, micro-finance or lending programs [ZOI-	this will not tell you about control over finance and how finance (intra household). Need to be able to associate control

Output 1.3.1 Credit and financial instruments targeting smallholder aquaculture producers and processors introduced and further developed	More doable micro-credit generated by farmers themselves. The activities will focus mainly on the assessment and exploration		REMARK: THIS OUTPUT might be more suitable under pathway 2	BASELINE: needs picture on who has access credit (diff forms of credit), DM on how credit used. Mapping of stakeholders of different providers on credit.								
Activities							Difficult for farmers to access credit	Consultant		Report highlighting possible options		
1.3.1.1 Identify credit delivery systems (i.e. formal loans via INGOs, local CBOs, and or in-kind assistance from input suppliers) in the project intervention areas to help sustain aquaculture initiatives (Consultant)	CREDIT (FORMAL/INFORMAL)		Ensure consultant ToR includes include gender review of how formal/informal credit 'accessed' and used by different types of women and men as different approaches may be needed in different contexts. *(what credit do they currently have access to, what would you do if you had access to - money OR inputs, who is who is responsible*	baseline: include questions on access to credit (disaggregated), whose names under and who decides how different forms of credit used (questions already exist in WEFI) Routine: ensure MEL monitors decision making around how credit used for aquaculture and how benefiting within HH. Include checks for unintended cosequences baseline: cover access to different forms of credit (in whose name) and purpose	Manju	support in choosing which credit packages could be used for women entrepreneur. What business choices can be suitable for women. Myculture we know women involved in feed trading..						

1.3.1.2 Explore opportunities on how the private sector and MFF are able to provide credit support in the form of inputs to SSA households (Consultant)	INPUTS		SAME AS ABOVE. SUGGEST THIS ACTIVITY MOVE TO PATHWAY 2. Include partners with expertise on providing credit for different intersectional groups based									
1.3.1.3 Pilot new identified opportunities with selected stakeholders	need market system specialist.		opportunity: to explore inclusive finance options for different profiles of SSA farmers based on their current constraints (suggest consult with financial inclusion experts) . Explore if this could be support for empowerment for women entrepreneurs around fish input (feed), fish trading, feed, entrepreneur.), fish processing. use baseline	Baseline: FGD to identify positive deviators of business models around women. Routine monitoring: unintended consequences (backlash men)	Deputy chief of party.	check in Jess						

1.3.14 Provide financial/credit literacy to SSA as a support to access available systems		ensure financial literacy addresses management of household resources to promote expenditure on nutritious food (joint decisions) . Ensure partners financial literacy package covers household financial management or create	Use baseline findings to prioritize what financial literacy is needed and for whom. around expenditure of family resources, need to target both husband and wife to promote joint decision making. different financial literacy training to set up business . need to make sure you get support of men if it's women focused. ensure literacy	baseline: FGD to assess basic assess to informal/formal credit to invest in aquaculture production Routine: assess how credit + income from sale of fish (fresh) + fish products are used to 'benefit' different individuals in HH; assess if financial literacy targeting both wife/husband support more benefit		Tariq can support						
LEARNING: pilot effectiveness of different credit delivery system (3 groups): in kind subsidy (inputs, seed), revolving funds , usual business of BRAC. (regular microfinance credit)	different modalities for delivering credit improve productivity, income of aquaculture production.	recommend any piloting to be prioritized based on what are key learning areas of project and to show link to nutrition outcomes (USAID	gender integration into the design of experiment.	routine monitoring, and the MEL establish how it is leading to different access/ control over credit. Use baseline findings to support design of experiment. What type of resource is important for economic empowerment.								

Outcome/Sub-IR 1.4: Increased access to fish seed through engaging and strengthening linkages between private and public sector	Necessity to increase the production and supply of seed for SS aquaculture growth. Strategically engage private and public sector.						Availability is one of the biggest issues Myanmar;			Overall report on seed inclusive of all component .	Track beneficiaries (all direct and not). Custom 1.4 - a: Number of HHs used improved seed Custom 1.4- b: Number of improved quality fingerlings	Ensure HH type is specified (MHH/FHH/ other intersectional markers if possible, i.e. MHH/FHH over wealth categories)
Output 1.4.1 Improved knowledge and understanding of the existing seed sector								Consultant		Report ; dataset on seed; journal article		
Activities												
1.4.1.1 Assessment of existing seed (carp, prawn, tilapia, catfish) demand, availability, production (including SIS), nursery and supply networks, and bio security audits at national			Ensure value chain analysis assesses how different VC SSA farmers (women/men other	baseline: data on how HH accesses SEED. FGD explore 'who' is responsible for this (need to understand the demand and supply) and if any	Manju: discuss with Sebastian. See Bangladesh VC tool	Jess .						
1.4.1.2 Opportunities in the seed sector identified	note there are main known issues and challenges here.		assess if there are any gendered barriers around access to different seed. Whether there are employment options to involve women in seed production (hatcheries/nurseries) . Establish criteria for prioritizing what type of seed support needed. If barrier emerge for women ,	same as above. Routine monitoring continues assumes.								

Establish SEED NURSERIES for women?			RESEARCH/learning opportunity: What business models needed to support women nurseries (and or other positions in value chain beyond production) THINK ABOUT TARGET FOR WOMEN NURSERIES FOR empowerment OUTCOMES. men engagement strategy to ensure joint decision making around	VC: cover GDL in value chain.								
Output 1.4.2 Linkages strengthened and new ones established between fish farms, nurseries and hatcheries	Increase access and quality of seed. Upgrading of hatcheries (5 private + 5 public by 2020); introducing new tools for better quality							WF in collaboration with partners/sub-grantees				
1.4.2.1 Issue call for business models/concepts from private sector businesses and organizations on increased availability of improved seed in the ZOI	mainly for private sector entities.		Ensure call also considers location to ensure 'access' to SSA from poorer wealth groups, more remote locations. REFER TO EARLIER POINT OF BUSINESS CALL									

1.4.2.2 Explore sources of good quality brood and distribute to hatcheries	15 tones (1000 brood for 20 hatcheries)		explore if way to involve more women farmers in hatcheries. Use baseline findings to make decision									
1.4.2.3 Facilitate implementation of a model hatchery (carp or tilapia) and nursery systems by the selected private and public sector using BMPs together with distribution networks which could be further tested	Establish new nurseries and link them with hatcheries and farmers (100- 200 nurseries) . Each of them will be selling to at least 25 -50 farmers. Building capacity of hatcheries to build some testing - action research - and compare with existing hatcheries.		Value chain analysis to unpack where women/men are in hatcheries. Selection criteria to ensure that support mixture of both women and men managed hatcheries to promote women in other nodes of VC	vc analysis to explore where women and men are in VC chain (hatcheries, nursery etc.)						Record books given to the hatcheries.	Track of how many farmers they are selling to; number of seed; size, before/after ; with /without (comprehensive comparative analysis of the seed intervention)	
1.4.2.4 Facilitate scaling of model hatchery (carp or tilapia) and nursery systems by the selected private and public sector using BMPs together with distribution networks during following years (cost sharing with private sector)	Demonstrate model hatcheries to others so the same model can be implemented elsewhere (extension) - To 20 + hatcheries. Nurseries will be established - 200 - using improved seed		Ensure scaling promotes models that are run by both women and men and other intersectional groups. I.e. do not just scale 'wealthy' businesses. Targeting criteria for models is gender aware				Limited/no availability of nurseries in the project areas			100 % of the existing hatcheries will be introduced to model hatcheries concept.		
Outcome/Sub-IR 1.5: Increased availability and access to quality affordable feed using agricultural co-products by farmers	Develop low cost, moderate quality accessible to the SS farmers; Create strategies and partnerships to increase accessibility.	same as above.					Limited, expensive, not efficient				Custom 1.5 - b: Number of feed traders linked with supported quality feed mills Custom 1.5 - c: Number of households accessing quality feed through feed traders and feed mills established	1.5b: ensure sex disaggregated. Add another indicator to capture the # of quality feed produced by women feed millers (If project decides to do this) 1.5.c. ensure HH specifies if MHH, FHH and across other categories.

Output 1.5.1 Improved feed formulation adopted by small and commercial feed mills	Foresight analysis of fish feed demand (how likely will be the farmers purchasing the improved feed). To include in the baseline questionnaire . Plan to work with national level feed mill. At community level mini feed mill could be operated by women. . If USAID. Could set up social enterprise around feed production.		If baseline/VC analysis identifies opportunities for social enterprises involving women and other intersectional groups, ensure interventions to avoid backlash in HH + community (i.e. male engagement). Establish targeting criteria for supporting different profiles of feed producers, include target for women if there are	include in VC analysis (GDL)	Manju			Facilitated by WF (Consultant doing the assessment)				1
Activities			SAME as feed									
1.5.1.1 Assessment of existing feed (carp, prawn, tilapia, catfish) quality, demand, availability of ingredients and feeds, production capacity, and supply networks at national and ZOI level (Consultant)			SAME as feed							Report on assessment		
1.5.2.3 Issue call for business models/concepts from private sector businesses and organizations on increased availability of improved			SAME as feed									
1.5.2.4 Review and evaluate the business models/concepts, co-design business plans with selected applicants and sign grant agreements or contracts (cost sharing)			SAME as feed									
1.5.2.5 Facilitate implementation of agreed business plans, grant management and reporting			SAME as feed									

1.5.1.5 Facilitate the process of setting up of private sector laboratories to provide triple function of testing for 1) feed ingredients, 2) finished feed products and 3) the fish and shellfish produced in terms of nutrient and	Set up laboratories to test the 3 dimensions; Project to subsidize some of the money needed for the labs & provide technical support.		check that labs accessible to everyone to test feed. (fish feed entrepreneur) . .					WF to lead; selected private companies		Report on the testing results		
1.5.1.6 Use of feed calculator (mobile) app for small and medium scale feed producers for optimizing their feed formulation and ingredient	App to calculate the feed - apps(offline) shared with farmers		same comments in app section further up.									
ESTABLISH INNOVATIONS FOR FEED INVOLVING WOMEN.			depending on baseline, entry point for women empowerment.		for seed and feed need to track where the seed and feed go and who is buying, the supply price and across season. Ensure disaggregated	Tariq.						
set up social enterprise about feed.			same as above									
Output 1.5.2 Nutritious pond concept adopted and scaled	Share concept with project beneficiaries (direct & indirect); Monitor the adoption effects/impact.		modelling has to ensure affordability for different intersectional groups.							Journal article nutritious pond; report on the performance ; dataset on		
1.5.2.1 Estimation of nutrient budget and nutrient flow in an integrated rice-aquaculture systems for efficient inputs of nutrients and quantifying areas of enhancing ecosystem service as a part of	Understand the nutrient budget (e.g. nitrogen) to quantify and optimize the use of feed.										FCR (feed conversion ratio)	
1.5.2.2 Scaling of nutritious pond concept by engaging private sector												
1.5.2.3 Performance monitoring (e.g. growth, feed efficiency, GHG emission, carrying capacity, robustness against disease resilience, water use												

Outcome/Sub-IR 1.6: 1.6. Enhanced capacity and role of MFF and its associations in supporting SSA for improved management practices	MFF are crucial for sustainability and exit strategy. Need to get them on board .	Ask Julie about gender integration points for national innovation platforms		ensure that documentation captures who attends these MFF events + how gender is integrated into meetings.							CBLD-9: Percent of USG-assisted organizations with improved performance [IM-level] (main reference to MFF but also to other private, public and NGOs	to be decided after consultants scan.
Output 1.6.1 Institutional analysis of MFF performed and alternatives to enhance their capacity identified										Sign MOU with MFF		
Activities												
1.6.1.1 Facilitate participatory institutional analysis of the MFF and its associations to see their existing roles and capacity around production and market systems (with particular focus on supporting functions) and managing natural resources	will engage consultant to review capacity overall to support aquaculture.		Ensure consultant ToR covers gender integration. ensure that it covers MFF incentives for working on mainstreaming gender in different aquaculture areas and also working with different profiles of farmers/ producers, service providers.. Share baseline/VC findings with MFF to	to be decided after the plans for MFF are clearer.	TBC	KIT has some guidelines on how to integrate gender into national innovation platforms which could be useful.				Key findings presented (report + presentation)		

1.6.1.2 Proposals submitted by MFF in relation to developing inclusive market system and sustainable management practices which benefit the project beneficiaries	Based on the findings, MFF will submit proposals to fill in the identified gaps.		Assess if MMF understands what is an inclusive market system. Fine tuned after consultants selection. Two entry points: use assessment findings to identify gender integrating points + develop a plan afterwards on how they can be supported . Two: five year strategic plan for machine. Could support upgrading some of hatcheries as quick wins and	same as above								
1.6.1.3 Review the proposal to be submitted by MFF and facilitate drafting plan on implementation of the market systems identified	Sign agreements on best proposals.		review how much it addresses gender and/or women specifically to identify if any entry points.	same as above						Agreements signed (MoAs under the main MoU); Deliverables to be identified after		
1.6.1.4 Coordinate implementation of the systems identified above around SSA business (Consultant-KMS)	The consultant . explore MFP broader platform. WF is key player		after consultants report, identify how this implementation plan could integrate	same as above						Meetings, workshops.		

Purpose- IR 2: Access of SSA to domestic markets increased and consistent supply of food safe fish and fish products ensured [suggest to reframe as improved income and livelihoods through market	**forward linkages.**										**EG.3.2-26: Value of annual sales of producers and firms receiving USG assistance [IM-level]**	
Outcome/Sub-IR 2.1: Clustered production using BAPs to improve direct marketability of product increased	2 consultants to develop market-based approach for SAIL including backward and forward market (inputs and output - fish & fish product supply)		GAP: not clear how gender will be integrated into the assessment + value chain interventions.				Collectives seen as a strategy to increase the power of the farmers in the market.				Custom 2.1 - a: Number of clusters selling fresh fish following BAPs Custom 2.1- b: number of processors selling fish product BAPs	
Output 2.1.1 Improved market linkages among aquaculture market actors										Market strategy document;	Qualitative assessment	
Activities												
2.2.1.1 Value chain analysis of fish feed (partly covered din 1.5.1.1) and seed (covered in 1.4.1.1) and market system strategy development (2 consultants)	to define strategies in better engaging the actors		Ensure gender/inclusion lens included in assessment. Note framework and tools already exist for WorldFish used in	baseline: routine:								

2.2.1.2 Stakeholders consultation workshop with fish market actors (wholesale, transport, retail, processing), and associations at national and ZOI level and identify priority intervention areas	Strategies validated Sharing the strategy with stakeholders and identify priority areas for piloting. For each of the identified areas have at least one proposal for piloting.		invitation of stakeholders: ensure good cross section of reps of value chain actors (both women and men) who are able to reflect the different gender barriers/constraints and opportunities for different profiles of actors Ensure workshop also integrates gender into the agenda to ensure selection of intervention areas includes	baseline: xxx						Workshop		
2.2.1.3 Issue call for piloting fish marketing collectively engaging small-scale aquaculture farming households and explore possible fields of cooperation with buyers like Blue Circle Foods in USA among others	Collective marketing piloting proposals		opportunity to explore empowerment options for different profiles of SSA farmers based on their need (women entrepreneurs, IDP (women and men) linked up to aquaculture farmers	baseline: include questions around who is involved in fish processing and marketing baseline (FGD); explore what fish marketing IDP currently involved with								

2.2.1.4 Issue call for strategies of intervention /action plans on the identified priority areas	Proposals on priority areas		Ensure that the selection of strategies/action plans includes options that meet expressed need of different profiles of VC actors + locations are accessible for	baseline: xxx routine: xxx								
2.2.1.5 Review proposals submitted on priority areas of intervention and on piloting fish marketing collectively and engaging small-scale aquaculture farming households and explore possible fields of cooperation with buyers like Blue Circle Foods in USA	Monitoring of piloted activities through partners and WF									Contract signed with partners from winning proposals. Action plans, reports, data on performance monitoring of piloted activities (Partners). WF to monitor the activities directly as well and produce reports		
2.2.1.6 Facilitate piloting of priority areas and fish marketing collectively engaging small-scale aquaculture farming households and explore possible fields of cooperation with buyers like Blue Circle Foods in USA	WF to support the implementation of the piloting activities.		assume that VC analysis will identify range of options that are profitable/ more inclusive and will be suitable for different profiles of VC actors explore range of pilots									

2.2.1.7 Assessment and possible introduction of clustered BAPs certifications for local (hotels, schools, hospitals and supermarkets) and regional marketability of			assume that VC analysis will identify feasibility of different					Consultant to be hired		Report; intervention strategy on introducing certifications;	number of certifications released	
Outcome/Sub-IR 2.2: Food safety practices adopted											Custom 2.2 : Food producers and traders working	
Output 2.2.1 Enhanced capacity of fish processing and fresh fish trading actors to adopt food safety practices	The training will be provided by WF and by the 6 advanced processors from 2.1											
Activities												
2.2.2.1 Related to 3.2.1.4 plus assessment of fish processing and marketing mechanisms	Assessment of the existing conditions.									Report		
Facilitate development of national fish health management plan through a consultative process led by Dept. of Fisheries & MFF	Developed based on the findings on 2.2.2.1									Health management plan (Mohan)		
Issue call for business models/concepts from private sector businesses entities and organizations on improved post-harvest (fish and fish products) market linkages	Proposals on how to pilot post-harvest processing practices											
Review the proposals submitted on business models/concepts from private sector businesses and organizations on improved post-harvest												
Facilitate implementation of agreed business models/concepts on improved post-harvest (fish and fish products)market linkages for food safe practices	Exploring strategy and potential implementation of safe post-harvest processes									Reports from key findings on pilots;		
2.2.2.2. Provide capacity building and information to fish product processors and fresh fish collectors/traders	Based on the identified gaps, provide the necessary support to ensure that food safety practices are adopted.									Training, manuals		
Purpose/IR 3: Improved nutrition diversity and safety and increased access WASH , especially in childbearing age women and c											MISSING	

SUB IR RESULT 3.1. IMPROVED ADOPTION OF NUTRITION AND WASH BEHAVIORS												
new output 3.1.1: increased AWARENESS on nutrition, WASH and food safety practices												
[REFRAME AS ACTIVITY]Output 3.1.1: Established network for increasing extension of key nutrition and WASH messages through engaging local nutrition platforms (e.g.. SUN CSA) make it activity not output , replace with increased knowledge	these networks already exist and are well established. MAIN priority would be to consult with them to get support with identifying partners, accessing material, identifying partners, and ensure learning from project is featuring in discussions)		assumption is that there is already secondary lit on what are main nutrition challenges in the targeted locations that can be used to inform prioritization of nutrition messages								HL.8.2-a :Percent of households with access to a basic sanitation service [ZOI-level] HL.8.2-b: Percent of households with soap and water at a handwashing station on premises [ZOI-level] Custom 3.1: People that have accessed information on nutrition and WASH: digital and social media platform analytics	8.2-2 per Aung (number of HH. Denominator is total number of HH observed) Measure yearly/
Activities												
[add Review baseline findings to prioritize key nutrition behaviors to prioritize and for whom				baseline: to exclude relevant nutrition questions to understand key nutrition behaviors including intra household								

3.1.1.1 Consultation workshop to identify complementarities and potential partnership with local and International NGO's working in health, nutrition and WASH in selected township	identify strategic partners to support the awareness activities :: S/W broader group - agree implementers, any working in market systems, fish processing and in the market. :: How are they engaging men and women and in range of messaging. :: Ethnic organization Cover - information collection and sharing and 2nd identify partners for potential partners. QR - will follow msgs from ministry of health and sports. MS-NPAN? (?? actual plan)	review secondary literature on main nutrition challenges for different profiles of people based on intersectional markers to prioritize what nutrition's messages and for whom. use workshop to validate baseline findings in workshop in order to prioritize identifying which partners have expertise on nutrition for these profiles	baseline: include key nutrition messages. n/a. consultation workshop preferably should happen after baseline								
3.1.1.2 Development and printing of communication materials on nutrition and WASH based on the Essential Nutrition Actions and Essential Health Actions messages; includes the importance on consumption of micronutrient-rich small fish (SIS), farming SIS, etc.	Most material on nutrition exists already. Need to elaborate the ones on WASH -collected by SUN CSA * Literacy, language, cultural sensitivity. * Gender neutral images, or not reinforcing in the messaging *Gender of the CFs and intersectionality of the CF ?does this impact uptake of the messaging. This may be different in diff. * men training on PLW Training gender - ToT, CFs	Prioritize relevant nutrition messages MEL - access the knowledge retention following training. Are their social barriers to msg being accepted. Assessing the quality of the training.									

3.1.1.3 Engage social media platforms such as Facebook, local software application, etc. in providing digitized nutrition, WASH practices, and food safety messages	Assess reach to different people. ? General page or gender responsive page? Consider - overlap of materials WASH , UN already on TV and Facebook. Smaller download function of apps - can poorer users still access these msgs. Radio for some areas? (eg existing) : Responsive interviewing - people saying yes and neong agreeable. SO - be aware they may be responsive. Have KII and unpack /vs general FGD. Community engagement in designing the activates at the beginning to ensure			Routine: capture how the different SBCC modalities are reaching different household members (women, men, children) and how it impacts distribution of fish for consumption, more diverse food, and decisions about how income used for nutrition)	Part of Quennie and Aman responsibilities .							
added: Develop SBCC nutrition strategy targeting different household members +community	* Barrier analysis toc Sept/Oct 2020 (Queenie) Need to ensure different M/W and groups are engaged. ? Include men's perception on barrier, the target group eg is PLW > add intersectional lens to this. SBCC design - after barrier analysis. >Family centered approaches to improving nutrition > IDPs > Men who fish involved, aware of which fish nutritional to take home and feed for the HH. Understanding nutritional values for what they keep and sell. Baseline In consultation workshop - understand the trade offs for vulnerable HH if resources stretched, what		REVIEW BASELINE FINDINGS to prioritize nutrition messages Ensure Strategy includes separate strategy for engaging with men: (within HH, and also men in community (influential leaders, religious, head men, teachers etc.)	Baseline Consultation	Queenie	Review barrier analysis - does it need an extra layer , KII or FGD with men also.					

added: Develop specific men engagement strategy as part of SBCC (social behavior change communication) strategy	Yes - all agree important		Need to understand the division of labor, preparing meals. ?Understand the burden to women they often, Activity to show workloads of men and women. > ensure the facilitator is capturing the msg and summing up why we are doing. We need to ensure we support the capacity of the training.			JS to ensure roles and division of labor activity goes into the ToT. 24 hour time.						
3.3.1.2 Conduct of Training of Trainers focusing on Nutrition especially on the consumption of fish and Small Indigenous fish and vegetables resulting in dietary diversity, and improved WASH practices to implementing partners (Consultant)	ToT on consumption		See other box _ yes men to attend the nutrition training and it is important for them to be involved. Ensure the nutrition									
3.3.1.3 Social Behavior Change communication activities on nutrition and improved WASH practices such as cooking demonstration, formation of Mothers support group, nutrition month campaigns, etc. at different venue (markets, health center, etc.)	SBCC: Practical demonstrations Involve elder women of the community - MIL, grandmothers to these events Youth - schools.		Champion family centered nutrition improving. HH participation. Not prompting women as the only preparer of food. Youth - men and women to support the cooking?									

3.2.1.3 Pilot testing of WASH package materials (e.g. soap, tippy taps, etc.) to increase adoption of improved WASH practices among beneficiary households MOVED FROM 3.2.	identify partner experienced in WASH and sign agreement . Baseline need to understand current practice. ?different pple with ? Different practices. WASH promotion to be included in the ToT. Not WASH beyond hand washing. In future - they may build toilets. ID gender aware partners for scale out strategy											
[NEW] explore potential for GTA in nutrition curriculum in selected sites			explore feasibility of piloting gender transformative curriculum in selected locations (small scale). Approach HKI + Bangladesh worldfish team for discussion on suitability of adapting nurturing connections									
3.2.1.5 Scaling through different dissemination strategies	Messages to increase awareness among non beneficiary stakeholders on healthier practices (diverse diet and safe food & health practices)		Apply gender lens in the reach > what groups and platforms would it reach and ?benefit.	Has it been assessed before scaling it out? How is information understood in the community. How is information shared - what is eg short movie to be shown by a community focal, or in the church so can reach pple there who may not have a phone etc.								

3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (MOVED FROM 3.3. as refers to increasing awareness)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level. WHO? CFs during ToT, in addition to the LEARN.		3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT HERE: move to 3.3.1)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.	3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT HERE: move to 3.3.1)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.	3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES	3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.	3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT HERE: move to 3.3.1)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.
Outcome/Sub-IR 3.2: ~~Improved access to diverse, safe and nutritious food~~ [RENAME: improved consumption of diverse, safe and nutritious food]	Increase the availability of safe and nutritious food for the consumer through an intervention in the production stage										Custom 3.2 - a: Food safety and nutrient score (related to market) Custom 3.2 - b: Households with Food Consumption Score threshold >35	
[NEW output 3.2.1: Improved access to diverse, save and nutritious food [rename to improved knowledge on how to achieve food safety] *changed it from su-IR to output level*							Background information to analyze the context					

Output 3.2.1: Improved knowledge and ~~practices based on EHA, ENA~~, Food safety, vegetable and mola-carp polyculture production			suggesting to delete here as it is more relevant to output 3.1 about increase knowledge and				Background information to analyze the context					
Activities	Collect fish product samples form different market in a different times (nutritional and safety aspects). Connected with IR 2 - piloting of nutrient rich and safe products (Identifying alternatives).											
3.2.1.4 Food safety (and Nutrient) analysis on local fish based processed products;							Baseline: to include assessment on the awareness of farmers on the safety of the products they are consuming and if this has some impact in their consuming patterns. Would they consume more fish if they new is					
3.2.1.1 Provision of seed kits depending on the types of seed identified that are grown in the area for vegetable dyke production among beneficiary households; after development of vegetable seasonal calendar per area	Pond entry point ? IDP if homestead vege garden.		establish criteria for selecting 'who' should get the seed based on need + suitability of resources Training of target group on how to use seed. If women, orientation of									

3.2.1.2 Provision of Small indigenous fish species (SIS) seed among beneficiary households	Who: Those who are interested and those who have ponds and thinking of the type of fish that they have. ? Target smallest ponds. ? Targeting - HH with women of repro age as priority for targeting with this nutrition sensitive > targeting to areas that have a fish deficit		Adding targeting and focus on populations									
~~3.2.1.3 Pilot testing of WASH package materials (e.g. soap, tippy taps, etc.) to increase adoption of improved WASH practices among beneficiary households [DOESN'T FIT, move to 3.1]~~	identify partner experienced in WASH and sign agreement .		NOW COVERED IN 3.1.									
Outcome/Sub-IR 3.3 Fish consumption for young children and women of reproductive-age increased through SBCCs and nutrition education by infants [SUGGEST DELETE THIS OUTCOME ALTOGETHER AS IT IS COVERED UNDER reframed 3.2]											HL.9-4 : Number of individuals receiving nutrition-related (professional) training through USG-supported programs [IM-level] HL.9.1-d: Percent of women of reproductive age consuming a diet of minimum diversity [ZOI-level] HL.9-I; Prevalence of healthy weight (WHZ ≤ 2 and ≥-2) among children under five (0-59	
Output 3.3.1: Improved knowledge and consumptions behaviors on fish												
Activities												
ADD: Includes nutrition messages in SBCC strategy promoting consumption of nutrition fish												

~~3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships~~ ~~(DOES NOT FIT HERE: move to 2.3.1)~~	~~Partners (XXX) plus others to be identified. ToT to deliver training at ground level.~~							~~WF; partners to engage at ground level~~				
~~3.3.1.2 Conduct of Training of Trainers focusing on Nutrition especially on the consumption of fish and Small Indigenous fish and vegetables resulting in dietary diversity, and improved WASH practices to implementing partners (Consultant)~~	~~ToT on consumption~~		moved this					~~Consultant: partners to engage at ground level~~				
~~3.3.1.3 Social Behavior Change communication activities on nutrition and improved WASH practices such as cooking demonstration, formation of Mothers support group, nutrition month campaigns, etc. at different venue (markets, health center, etc.)~~	~~SBCC: Practical demonstrations~~											

CROSS CUTTING

participatory community appraisal

During this meeting consult with women and men what they want with project to feed into project design. Tips on arranging meeting to ensure representative profile of different individuals are there in first place. So they can express

partners (whoever implementing at ground level) oriented on gender before meeting ENSURE communities invited are representative

IP have community engagement

community need assessment (facilitated by NGO IPS)
Tot for implementing partner
all extension material to be reviewed for gender integration

MEL
ensure gender integrated in annual review and planning
year 2 planning cycle: ensure gender integration for planning for next year.
What are the main gender re: USAID priority to learn about nutrition outcomes. Means that any research /experimental design needs to show link to changes on nutrition

SSA training - if we want have women in the exit strategy, need to engage as farming in the beginning.

Training- follow up that it is effective across all the streams. Monitoring of the quality of the training.

When arranging community	* Social awareness and gender training to the CFs to so they gather all community members are represented and included. Gather eg - Friday and Sunday for Muslim and catholic Recruitment process - don't relied on one contact person to gather the group. ToT - enough sessions for staff turn over. More refresher training and ensuring for new staff when the ATOs are training new staff, that gender etc. is still being covered. Lack of confidence in delivering gender training	Initial set up of the project - from inception needs to consider which farmers are engaged from the beginning. Monitoring needs to also cover monitoring US as quality of project CF - under pressure? To deliver all packs Team leader - to	Review training and the disaggregated numbers if the checklist is being used. Follow up - "spot check" is the training effective in a more active way	Checklist - for community engagement. If reporting back is required, and a practical use of the checklist	Gender 2. ADD on women reach. And same HL9.1-t.
Disability inclusion - GAP					

	Description (elaborate further the meaning of the result) red remarks come from gender integration workshop	Gender integration activities (content) REVISE OR ADD NEW ACTIVITIES	gender integration (MEL). (baseline, routine, other)	Relevant gender outcomes in FISH Gender strategy impact pathways)	Responsible person (to ensure gender integration happens)	Gender expertise/resources support required	Why is it necessary/ what problem it will tackle or solve	Responsible/stakeholders involved	Results/products (achieved at each level, e.g. deliverables, signed agreement, etc.)	Objectively Verifiable Indicators (indicators identified at IR, SUB- IR and Output level) IN CURRENT RESULTS FRAMEWORK	REFRAMING FOR GENDER INTEGRATION (FOR FRIDAY)
Goal Inclusive and sustainable aquaculture growth to improve nutrition and food security especially for reproductive-age women and children under five in central and northern Burma.											
Purpose - IR 1 Small-scale aquaculture production increased by improved and land and water use, and increased access to information, high q										EG. 3-10,-11,-12: Yield (i.e. production/unit area) of targeted agricultural commodities among program participants with USG assistance Custom 1: Yield increase (in percentage change) for target beneficiaries Custom 1.2: Total Factor Productivity (TFP)	
Outcome /Sub-IR 1.1. An enabling environment is created to increase the engagement of farmers in commercial aquaculture production (water and land use and market knowledge)			note: the enabling enviornment in locations with IDP may not be conducive for engaging farmers in commercial aquaculture production. Other pathways may need to be emphasised (e.g. related to market system or nutrition).	REACH & BENEFIT OVERALL=> where possible more gender responsive and women targetted fish technologies packages and strategies for reaching farmers Increasing # of women farmers/fishers using technologies well suited to						Custom 1.1 - a: Number of farmers shifted from subsistence to commercial aquaculture practices Custom 1.1 - b: Number of registered farmers engaged in aquaculture as a result of the intervention (regulation/policy framework change)	

Output 1.1.1 Increased understanding on land and water resources and policy recommendations provided	Scope: understand the context; identify possible/best alternatives for better usage of water resources; provide recommendations to policy/regulations.	Overall: understanding gender dynamics around women and men different access/ability to decide on use of land /water for aquaculture. Discuss with IWMI whether they will integrate gender into this package	baseline: do we we know different gender dynamics around women/men/ intersectional groups access to land + water				Access to land and water : limitations in terms of both regulations and resources use, availability and ownership, which is limiting the productivity and quality of aquaculture.	IWMI; MoALI, DoF,	1 MoA signed with IWMI; Scoping and baseline study on water (integrated to the main scoping report); Policy report on water an land use; (Report) Modeling of climate variability, and water seasonality; Design of monitoring network on water quality, flows etc. (report);		
Activities											
1.1.1.1 Assessment of existing policies related to land and water rights/security through organizing policy diagnosis		**gendered policy impact assessment (what are the policies and what are the impacts currently on women and men intersectionality as a reuslt of policies)** Ensure assessment existing policies on land water rights asseses how these affect women and men across intersectional markers (secondary data review, if doesn't exist, consult with key NGOs working in the area) . Differnent approach required in IDP location. need policy impact assessment that takes gender into account. may need a national policy assessment and how it looks at regional level. **check in with other organsiations**	**scoping:** speak to land rights specialists before baseline to get overview of situation **Baseline:** capture gender dynamics of access to land + water bodies + decision making on use of resource. (ownership , activity). Decide if this is HH level or individual. (access + tenure, security) disaggregate by gender. **Routine:** ensure captures changes in **converssion of land** for aquaclture or crops and who decides (gender). two types: converting riceland		MARK to follow up. check in with Tariq (BRAC) who knows key organisations working on land policiy issues for women and indigneous issues + land Core GROUP.	find FTE for Mark who can provide support on scanning policy on gender/intersectional issues					

1.1.1.2 Investigate current water resources management practices within and outside current aquaculture systems (including with surveys carried out) in selected townships		Asssess gender dyanmics around water resource management (access/ ownership, tenure) and gendered dynamics around decicion making on conversion of land to water use for aquaculture. May be intersectional issues in differnet locations.	baseline: capture gender dynamics around who is involved in water resource management practices (FGD) and/or discussion with potential Ips		MANJU to follow up with Sonali that gender is integrfated to assessment.						
1.1.1.3 Assess opportunities to enhance water productivity (e.g.. best location for new ponds, feasibility of using existing irrigation infrastructure for aquaculture)			**MEL templates captures impacts (benefit) of different aquaculture models on women and men +**					IWMI			
1.1.1.4 Design monitoring network for water quality and flows, upstream, within and downstream of aquaculture ponds of selected townships			baseline: ensure that disaggregates results across different types of HH across relevant intersectional markers (wealth, enthnicity, location).					IWMI			
1.1.1.5 Evaluation of possible water implications of water resource development up and downstream of aquaculture areas		N/A (modelling)									
1.1.1.6 Ascertain the potential consequences of different aquaculture development scenarios and the potential water risks through utilizing water resource modeling		Ensure assessment/modelling validates scenarios for differnet types of households (MHH, FHH dissagregated across different intersectional groups). Ensure scenarios for IDP in			MANJU to check with IWMI on gender integration			IWMI			

Output 1.1.2 Improved access to information on market and SSA technologies (BMPs)	NEED info on forward and backward market info (feed and seed, where I can find seed/feed and price and where I can sell my fish)	REMARK: access to MARKET information may be more relvant under pathway 2. would keep access to BAP related to aquaculture extension here.					Limited knowledge on market drivers/environment across the value chains (rohu, tilapia, prawn, feed)	Partner in collaboration with WF;	1 Ag.signed with market partner; Monitoring reports - quarterly on information access and usage (provided by the company) - app developed, information collected through partners (CBOs, Ngos)uploaded and monitored result reported ; Training reports;	Survey to market actors on the usage/utility of the information (as part of MEL activities0	
ADD: alignment of training .	fish seed provided at same time. After one cycle the culture period will be different depending on stock. Some species are shorter time. So produciton period will be change. Farmers need to know fish price so know when to know fish raising so can get higher price.										

1.1.2.1 Market relevant information collected from hatcheries, nurseries, feed mills and traders, and distributed to the relevant (virtual) extension partners	CHECK: just market info or also regular BAP extension?	VC analysis to assess what are different market information needs of different types of women and men in value chain by location. Also assess what channels/mediums they access market information (what type of information).	baseline (FGD): capture how different women and men currently access market information (what channels + from whom). + INFO on BAP baseline (FGD): capture how differnet women and men currenty access regular BAP extension (what channels + from whom) (see mysap tools) Routine: monitor if there are changes in how different women and men access market information from different channels to assess if different reach		MANJU , Amman and Jess and Sebastian to figure out what can be covered in VC. Mark to have check?	Ask Jess at FGD tools developed to support MSAP to assess extension needs of women and men . wORLDfISH Bangladesh has tools and concepts.		Virtual Partner			
1.1.2.2 Engage with partners (private, NGOs, and private companies) to expand information channels to all market actors and to monitor outreach (actors accessing/making use of the information)	Identify more partners through competitive process	use baseline findings to identify gender responsive information channels. identify what information is provided by which actor. Ensure for all actors that gender responsive information channels are used.develop criteria (based on baseline) to identify 'who' needs extension for which parts of BAP practices depending on gender division of labour (GDL) Train partners on gender responsive extension to support reach develop checklist to support gender responsive extension	ensure baseline covers questions on what extension they receive and for what channels. Also cover barreis to accessing extension (REACH). Ensure baseine covers GDL around pond management practices + fish procesing.		Amman to follow up.	need to ensrue questtionare is gender responssie. Check the final tool with Jess. When will share ToR has gender expertise. Ask Afrina.					

1.1.2.3 Training (PRIVATE SECTORS & CBOs) on market (prices, inputs suppliers and availability, access, etc.)	**training to partners to support their customers: xxxxx (build capacity of our partners to better need cusstomres)** 2 trainings: 1 for information collectors - the App company will give training to enumerators to collect market info; 1 training given to the farmers by the App company on how to access information on the virtual platforms	review baseline findings for gender analysis of who has access to differnet inputs . Priortization of possible supports to different profiles of farmers. Gender orietnation of parntesr to understand the different needs of different customs and jointly assess Ensure training covers gender responsive appraoches to REACH	ensure baseline findings are used to identify what are the major barreisr to market. covers questions on what extension they receive and for what channels. Also cover barreis to accessing extension (REACH). Ensure baseine covers GDL around pond management practices + fish processing		Amman to follow up.	same as above.					
Delivery extension on BMP to relevant target groups	Delivered mainly by NGO partners and maybe private sectors.possibly 2 types of training directly by farmers on BMP (more intense by NGOS). Two types of ToT (intesnive partners like NGOs and other actors private sector).	gender responsive facilitation principles apply. Tot to incorporate gender responsive appraoches (see gender integration guide). Develop check list. Gender expert to review the curriculum for gender integration.	Routine: Include questions to assess what the 'extension' + market information is used for + whom it is benefitting . Baseline/endline: could explore which extension deliverity modalities for different types of information are leading to more benefit for different target groups (women/men across different intersectional								
training of indirect beneficiaries (hatcheries, nurseries, feed mills, feed traders, MFF)	will give knowledge to custmors on aquaculture in differnet way (distribute leaflet)	gender orientation of stakeholders to better respond to different women and men customers . Ensure DIP to cover this. (detailed implementation plan). Checklist for indirect beneficiaries to help them to interact with more farmers (women/	baseline same above: ROUTINE:check who are the secondary adopters who are getting infromation from (extension).		Amman for baseline. Manju to decide on VC.						

training of direct beneficiaries by NGOS		review BAP module ToT for gender integration entry points.integrate gender into the sessions (Lemlem revised) not nseparate session				get gender expert to review english version and identify gender integration points and alignmetn with other extension channels (nutrition, financial literacy). Use baseline findings to idetnify who should be targetted for					
Developing an APP to be used by project beneficiaries (dircct, secondary) to get info on BMP + market info etc.	3 apps will be used: 1 (grannoveter). 2. app to help calculate how much fish feed in pond; 3. hatchery owenrs to upload info on type of seed, size. Nursery can access this . Would include info of all apps in areas. (very innovative).	understand how women and men use digital apps to access information, ensure MEL follows up how this extension modalities is enchancing benefit. ESTABLISHING NURSERIES. (COULD EMPOWER SMALL TARGET OF WOMEN AS NUSERIES OR FEED/)	baseline to check if people have access to phone, power for phone, internet, credit to pay for it.								

Outcome /Sub-IR 1.2 Efficiency of aquaculture production increased	This SUB- IR will focus on improving the productivity and the ability of aquaculture to generate/improve income through BMPs.									EG.3.2-28: Number of hectares under improved management practices or technologies that promote imrpoved climate risk reduction and/or natural resources management with USG assistance [IM-level] E.G. 3.2-24: Number of individuals in the agriculture system who have applied improved management practices or technologies with USG assistance	
Output 1.2.1 Farmers adopted improved fish farming practices in a range of production systems (e.g.. ponds, rice-fish systems)	Diversified production; improved usage of feed; density, fish size, seed, water quality, etc.	design .SIMPLE MEL TOOSL to pick up gender dyanmic adotions . Ensure reporting templates include reporting on gender; gender orietnation of implemetning partners on gender MEL. Ensure field coordinators understand what tocollect (role to support with implemneting). MEL reporting template should be gender responsive. ensure field ccordinator +parnters are at inception workshkop where Gender diemnsion of toC are refreshed., + casecade to layers and bi-monthly meetings. every year tehre is review and planning meeting with	routine monitor have capture adoption and who (type of households).		WF mel team (amman) + field coordinators team.	support to review tool and incorporate gender lens.				Number of practice adopted; Number of farmers adopting the practices (beneficiaries - direct and indirect) .	
Activities											

1.2.1.1 Issue calls for business models/concepts from private sector businesses and organizations (NGOs/CBOs/CSOs) on increased adoption of improved best management practices (BMP) for SSA including rice-fish systems	Sub- grantees to deliver the BMPs call for partners to submit min propsosal 12 areas of intervention (everthing to do with project, training, access to info, forward marekt linkages, sseed, feed, input supply, linking to farmer) . Also relevant to work package 2	Include criteria on gender expertise + nutrition for assessment. Be used for selection process. Following baseline , idetnify if any new partners/consultants required for gender integration	N/A		Manju and cross check with Jess, queenie.	Train selected sub-grantees on BMPS; extension methodologies, nutrition, gender, etc. Use existing training manuals + develop new ones as needed (e.g. on		WF & selected partners		1. Agreements with selected partners; training reports; Training manual- if new;	
1.2.1.2 Review and evaluate the business models/concepts, co-design business plans with selected applicants and sign grant agreements or contracts		Establish criteria for gender responsive business models that support differnet types women and men farmers Identify relevant partner with expertise for business models targetting specific vulnerable groups Train partners on gender resposnive 'reach'. prior to signing contract with parners to ensure when there are moments to integrate gender. allocate budet line for supporting partners for farmers (vulnerable groups).	KII with relevant NGO/private sectors invovled in inclusive business models to assess which parnters could work for differnet profiles of farmers (based on poveryty, ethnicity, type of HH, which are more appropriate). Establish target criteria for business models for most vulnerable groups								
1.2.1. 3 Stakeholder consultation workshop with aqua-pharmaceutical and aqua equipment/machinery companies and identify priority intervention areas	Understanding current (negative) practices and equipment used in order to intervene by promoting more sustainable practices. ; Include BMPs in the packages that the companies sell.								Report on current practices and priority areas		
1.2.1.4 Facilitate implementation of agreed business plans, grant management and reporting	2 type of contracts: NGOs & companies (aqua -pharmaceutical)										
1.2.1.5											

Outcome/Sub-IR 1.3: Increased access to credit and financial instruments										EG.4.2.a: Percent of households participating in group-based savings, micro-finance or lending programs [ZOI-	
Output 1.3.1 Credit and financial instruments targeting smallholder aquaculture producers and processors introduced and further developed	More doable micro-credit generated by farmers themselves. The activities will focus mainly on the assessment and exploration	REMARK: THIS OUTPUT might be more suitable under pathway 2	BASELINE: needs picture on who has access credit (diff forms of credit), DM on how credit used. Mapping of stakeholders of different providers on credit.								
Activities							Difficult for farmers to access credit	Consultant	Report highlighting possible options		
1.3.1.1 Identify credit delivery systems (i.e. formal loans via INGOs, local CBOs, and or in-kind assistance from input suppliers) in the project intervention areas to help sustain aquaculture initiatives (Consultant)	CREDIT (FORMAL/INFORMAL)	Ensure consultant ToR includes include genderreview of how formal/informal credit 'accessed' and used by different types of women and men as different approaches may be needed in different contexts. NOTE THAT government changing law that NGO can't do any microfinance business. translate baseline findings + consultant report into tailored options. note very expensive and consuming. NOTE THAT MOST MICROFINANCE DONT' PROVIDE LOAN FOR AQUACULTURE	baseline: include questions on access to credit (disaggregated), whose names under and who decides how different forms of credit used (questions already exist in WEFI) ROUTine: ensure MEL monitors decision making around how credit used for aquaculture and how bneefiting within HH. Include checks for unintend conseq baseline: cover access to different forms of credit (in whose name) and		Manju	support in choosing which credit packages could be used for women entrepenenur. What business choices can be suitable for women. Myculture we know women involved in feed trading..				

1.3.1.2 Explore opportunities on how the private sector and MFF are able to provide credit support in the form of inputs to SSA households (Consultant)	INPUTS	SAME AS ABOVE. SUGGEST THIS ACTIVITY MOVE TO PATHWAY 2. Include partners with expertise on providing credit for different intersectional groups based on need.									
1.3.1.3 Pilot new identified opportunities with selected stakeholders	need market system specialist.	opportuntiy: to explore inclusive finance options for different profiles of SSA farmers based on their current constraints (suggest consult with financial inclusion experts) . Explroe if this could be support for empowerment for women entreprenneurs around fish input (feed), fish trading, feed, entrepreneur.) use baseline findings + consultants report. Ensure resources are adquate to support set up a business. community dialogue to avoid backlash at home (with successful) Tot session with parnters: include general message to avoid backlash mass meeting at	BASELINE:fgd to identify positive deviators of business models around women. Routine monitoring: unintended cosnequences (backlash men)		Deputy chief of party.	check in Jess					

1.3.14 Provide financial/credit literacy to SSA as a support to access available systems		Use baseline findings to priortize what financial literacy is needed and for whom. around expenditure of family resources, need to target both husband and wife to promote joint decision making. differnet financial literacy training to set up business . need to make sure you get support of men if it's women focused. ensure literacy training how the family budget is developed. Ensure men engagement strategies to support joint decision making around use of credit (for aquaculture + benefit (around use of fish for consumption/sale). Establish men engagement stragegy	baseline: FGD to assess basic asscess to informal/formal credit to invest in aquaculture production Routine: assess how credit + income from sale of fish (fresh) + fish products are used to 'benefit' different individuals in HH; assess if financial literacy targeting both wife/husband support more benefit			tariq can support					
to be tested: pilot effectiveness of different credit delivery system (3 groups): in kind subsidy (inputs, seed), revolving funds , usual business of BRAC. (regular microfinance credit)	different modalities for delivering credit improve productivity, income of aquaculture production.	gender integration into the design of experment.	reoutine monitoring, and the MEL establish how it is leading to differen access/ control over credit. Use baseline findings to support design of experiment. What								
Outcome/Sub-IR 1.4: Increased access to fish seed through engaging and strengthening linkages between private and public sector	Necessity to increase the production and supply of seed for SS aquaculture growth. Strategically engage private and public sector.						Availability is one of the biggest issues Myanmar;		Overall report on seed inclusive of all component .	Track beneficiaries (all direct and not). Custom 1.4 - a: Number of HHs used improved seed Custom 1.4- b: Number of improved quality fingerlings produced by the	

Output 1.4.1 Improved knowledge and understanding of the existing seed								Consultant	Report ; dataset on seed; journal article		
Activities											
1.4.1.1 Assessment of existing seed (carp, prawn, tilapia, catfish) demand, availability, production (including SIS), nursery and supply networks, and bio security audits at national and ZOI level (Consultant)		Ensure value chain analysis assesses how different VC SSA farmers (women/men other intersectional groups) currently access seed	baseline: data on how HH accesses SEED. FGD explore 'who' is responsible for this (need to understand the deamand and supply)). GDL in value chains .		Manju: discuss with Sebastian. Integrate BANGALDESH too.	Jess .					
1.4.1.2 Opportunities in the seed sector identified	note there are main known issues and report.	assess if there are any gendered barriers around access to different seed. Whether there are employment options to involve women in seed production (hatcheries/nurseries) . Establish criteria for prioritizing what type of seed support needed. If barrier emerge for women , ensure interventions address these	same as above. Routine monitoring contineus assues.								
Establish SEED NURSERIES for women?		research: What business models needed tosupport women nursuries. THINK ABOUT TARGET FOR WOMEN NURSERIES FOR empowerment OUTCOMES. men engagement strategy to ensure joint decision making around aquaculture income to support nutrition. Ensure benefit reaches all women and other members around nutrition Need to ensure there are 'resources' for women to invest in nursery. (e.g. bank account)									

Output 1.4.2 Linkages strengthened and new ones established between fish farms, nurseries and hatcheries	Increase access and quality of seed. Upgrading of hatcheries (5 private + 5 public by 2020); introducing new tools for better quality production.							WF in collaboration with partners/sub-grantees			
1.4.2.1 Issue call for business models/concepts from private sector businesses and organizations on increased availability of improved seed in the ZOI	mainly for private sector entities.	Ensure call also considers location to ensure 'access' to SSA from poorer wealth groups, more remote locations. REFER TO EARLIER POINT OF BUSINESS CALL……									
1.4.2.2 Explore sources of good quality brood and distribute to hatcheries	15 tones (1000 brood for 20 hatcheries)	explore if way to involve more women farmers in hatcheries. Use baseline findings to make decision									
1.4.2.3 Facilitate implementation of a model hatchery (carp or tilapia) and nursery systems by the selected private and public sector using BMPs together with distribution networks which could be further tested	Establish new nurseries and link them with hatcheries and farmers (100- 200 nurseries) . Each of them will be selling to at least 25 -50 farmers. Building capacity of hatcheries to build some testing - action research - and compare with existing hatcheries.	Value chain analysi sto unpack where women are in hatcheries. explroe whether small % of hatcheries could be women to challenge norms only hatcheries are run by men. MYANMAR: HATCHERIES RUN has some women running them.							Record books given to the hatcheries.	Track of how many farmers they are selling to; number of seed; size, before/after ; with /without (comprehensive comparative analysis of the seed intervention)	
1.4.2.4 Facilitate scaling of model hatchery (carp or tilapia) and nursery systems by the selected private and public sector using BMPs together with distribution networks during following years (cost sharing with private sector)	Demonstrate model hatcheries to others so the same model can be implemented elsewhere (extension) - To 20 + hatcheries. Nurseries will be established - 200 - using improved seed	if we demonstrate 'model' hatcheries. And rest of hatcheries can learn. Intetersectional. Targeting criteria for models integrated.					Limited/no availability of nurseries in the project areas		100 % of the existing hatcheries will be introduced to model hatcheries concept.		

Outcome/Sub-IR 1.5: Increased availability and access to quality affordable feed using	Develop low cost, moderate quality accessible to the SS farmers; Create strategies and partnerships to increase accessibility.						Limited, expensive, not efficient			Custom 1.5 - b: Number of feed traders linked with supported quality feed mills Custom 1.5 - c: Number of households	
Output 1.5.1 Improved feed formulation adopted by small and commercial feed mills	Foresight analysis of fish feed demand (how likely will be the farmers purchasing the improved feed). To include in the baseline questionnaire .	plan to work with national level feed mill. At communtiy level mini feed mill could be operated by women. . If USAID. Could set up social entprise around feed.						Facilitated by WF (Consultant doing the assessment)			
Activities											
1.5.1.1 Assessment of existing feed (carp, prawn, tilapia, catfish) quality, demand, availability of ingredients and feeds, production capacity, and supply networks at national and ZOI level (Consultant)		same as above.							Report on assessment		
1.5.2.3 Issue call for business models/concepts from private sector businesses and organizations on increased availability of improved feed in		samem as avove.									
1.5.2.4 Review and evaluate the business models/concepts, co-design business plans with selected applicants and sign grant agreements or contracts (cost sharing)		same as above.									
1.5.2.5 Facilitate implementation of agreed business plans, grant management and reporting		same									

1.5.1.5 Facilitate the process of setting up of private sector laboratories to provide triple function of testing for 1) feed ingredients, 2) finished feed products and 3) the fish and shellfish produced in terms of nutrient and micronutrient content	Set up laboratories to test the 3 dimensions; Project to subsidize some of the money needed for the labs & provide technical support.	entry point: is it accessible to everyone to test feed. (fish feed enterprenneru) . .						WF to lead; selected private companies	Report on the testing results		
1.5.1.6 Use of feed calculator (mobile) app for small and medium scale feed producers for optimizing their feed formulation and ingredient selection	App to calculate the feed - apps(offline) shared with farmers										
ESTABLISH INNOVATIONS FOR FEED INVOLVING WOMEN.					for seed and feed need to track where the seed and ffeed go and who is buying supply price. And	Tariq.					
set up social enteprise about feed.											
Output 1.5.2 Nutritious pond concept adopted and scaled	Share concept with project beneficiaries (direct & indirect); Monitor the adoption effects/impact	modelling has to ensure affordability for different intersectional groups.							Journal article nutritious pond; report on the performance ; dataset on feed		
1.5.2.1 Estimation of nutrient budget and nutrient flow in an integrated rice-aquaculture systems for efficient inputs of nutrients and quantifying areas of enhancing ecosystem service as a part of integration	Understand the nutrient budget (e.g. nitrogen) to quantify and optimize the use of feed.									FCR (feed conversion ratio)	
1.5.2.2 Scaling of nutritious pond concept by engaging private sector											

1.5.2.3 Performance monitoring (e.g. growth, feed efficiency, GHG emission, carrying capacity, robustness against disease resilience, water use efficiency etc.)												
Outcome/Sub-IR 1.6: 1.6. Enhanced capacity and role of MFF and its associations in supporting SSA for improved management practices	MFF are crucial for sustainability and exit strategy. Need to get them on board .									CBLD-9: Percent of USG-assisted organizations with improved performance [IM-level] (main reference to MFF but also to other private, public and NGOs	
Output 1.6.1 Institutional analysis of MFF performed and alternatives to enhance their capacity identified									Sign MOU with MFF		
Activities											

1.6.1.1 Facilitate participatory institutional analysis of the MFF and its associations to see their existing roles and capacity around production and market systems (with particular focus on supporting functions) and managing natural resources	will engage consultant to review capccity overall to support aquaclture.	Ensure ToR covers gender integration. ensure that it covers MFF incentives for working on maisntreamding gender in differnet aquaculture areas and also working wtihd ifferent profiles of farmers/ producers, servcie providers....(. Share baseline/VC findings with MFF to identify ways to engage them in achieving project . explore if tehre are incentives for working with women entrepreneurs. review baseline findings to present different integration strategies for women	routine monitoring: gender integration in reporting and minuting of meetings.						Key findings presented (report + presentation)		
1.6.1.2 Proposals submitted by MFF in relation to developing inclusive market system and sustainable management practices which benefit the project beneficiaries	Based on the findings, MFF will submit proposals to fill in the identified gaps.	Assess if MMF understands what is inclusive market system. Fine tuned after consultants approval. Two things: assessment + coming up for plan where they can be supported . Two: five year strategic plan for machina. Could support upgrading some of hatcheries as quick wins									
1.6.1.3 Review the proposal to be submitted by MFF and facilitate drafting plan on implementation of the market systems identified	Sign agreements on best proposals.								Agreements signed (MoAs under the main MoU); Deliverables to be identified after agreement.		

1.6.1.4 Coordinate implementation of the systems identified above around SSA business (Consultant-KMS)	The consultant	explroe MFP broader platform. WF is key player							Meetings, workshops.		
Purpose- IR 2: Access of SSA to domestic markets increased and consistent supply of food safe fish and fish products ensured [suggest to reframe as improved income and livelihoods through market system approach]	**forward linkages.**									**EG.3.2-26: Value of annual sales of producers and firms receiving USG assistance [IM-level]**	
Outcome/Sub-IR 2.1: Clustered production using BAPs to improve direct marketability of product increased	2 consultants to develop market-based approach for SAIL including backward and forward market (inputs and output - fish & fish product supply)	GAP: not clear how genderwill be integrated into the assessment + value chain interventions.					Collectives seen as a strategy to increase the power of the farmers in the market.			Custom 2.1 - a: Number of clusters selling fresh fish following BAPs Custom 2.1- b: number of processors selling fish product BAPs	
Output 2.1.1 Improved market linkages among aquaculture market actors									Market strategy document;	Qualitative assessment	
Activities											

2.2.1.1 Value chain analysis of fish feed (partly covered din 1.5.1.1) and seed (covered in 1.4.1.1) and market system strategy development (2 consultants)	to define strategies in better engaging the actors	Ensure gender/inclusino lens included in assessment. Note framework and tools already exist for WorldFish used in Bangladesh.	baseline: rouine:								
2.2.1.2 Stakeholders consultation workshop with fish market actors (wholesale, transport, retail, processing), and associations at national and ZOI level and identify priority intervention areas	Strategies validated Sharing the strategy with stakeholders and identify priority areas for piloting. For each of the identified areas have at least one proposal for piloting.	invitation of stakeholders: ensure good crossection of reps of value chain actors (both women and men) who are able to reflect the different gender barriers/constraints and opportunities for differnet profiles of actors Ensure workshop also integrates gender into the agenda to ensure selection of intervention areas includes options that work for differnet profiles of SSA based on gender, age, wealth etc...	baseline: xxx						Workshop		
2.2.1.3 Issue call for piloting fish marketing collectively engaging small-scale aquaculture farming households and explore possible fields of cooperation with buyers like Blue Circle Foods in USA among others	Collective marketing piloting proposals	opportunity to explore empowerment options for different profiles of SSA farmers based on their need (women entrepreneeurs, IDP (women and men) linked up to aquaculture farmers.	baseline: include questions around who is involved in fish processing and marketing baseline (FGD); explroe what fish marketing IDP currently involved with								
2.2.1.4 Issue call for strategies of intervention /action plans on the identified priority areas	Proposals on priority areas	Ensure that the selection of strategies/action plans includes options that meet expressed need of different profiles of VC actors + locations are accessible for differnet actors	baseline: xxx routine: xxx								

2.2.1.5 Review proposals submitted on priority areas of intervention and on piloting fish marketing collectively and engaging small-scale aquaculture farming households and explore possible fields of cooperation with buyers like Blue Circle Foods in USA	Monitoring of piloted activities through partners and WF								Contract signed with partners from winning proposals. Action plans, reports, data on performance monitoring of piloted activities (Partners). WF to monitor the activities directly as well and produce reports.		
2.2.1.6 Facilitate piloting of priority areas and fish marketing collectively engaging small-scale aquaculture farming households and explore possible fields of cooperation with buyers like Blue Circle Foods in USA	WF to support the implementation of the piloting activities.	assume that VC analysis will identify range of options that are profitable/ more inclusive and will be suitable for differnet profiles of VC actors explore range of pilots include range of diff									
2.2.1.7 Assessment and possible introduction of clustered BAPs certifications for for local (hotels, schools, hospitals and supermarkets) and regional marketability of products		assume that VC analysis will identify feasibility of different						Consultant to be hired	Report; intervention strategy on introducing certifications;	number of certifications released	
Outcome/Sub-IR 2.2: Food safety practices adopted /integrated into fish processing and fresh fish trading										Custom 2.2 : Food producers and traders working according to HACCP	
Output 2.2.1 Enhanced capacity of fish processing and fresh fish trading actors to adopt food safety practices	The training will be provided by WF and by the 6 advanced processors from 2.1										

Activities											
2.2.2.1 Related to 3.2.1.4 plus assessment of fish processing and	Assessment of the existing conditions.								Report		
Facilitate development of national fish health management plan through a consultative process led by Dept. of Fisheries & MFF	Developed based on the findings on 2.2.2.1								Health management plan (Mohan)		
Issue call for business models/concepts from private sector businesses entities and organizations on improved post-harvest (fish and fish products) market linkages	Proposals on how to pilot post-harvest processing practices										
Review the proposals submitted on business models/concepts from private sector businesses and organizations on improved post-harvest market linkages											
Facilitate implementation of agreed business models/concepts on improved post-harvest (fish and fish products)market linkages for food safe practices	Exploring strategy and potential implementation of safe post-harvest processes								Reports from key findings on pilots;		
2.2.2.2. Provide capacity building and information to fish product processors and fresh fish collectors/traders	Based on the identified gaps, provide the necessary support to ensure that food safety practices are adopted.								Training, manuals		
Purpose/IR 3: Improved nutrition diversity and safety and inc				Women's increased access to and control over nutritious fish (DO)						MISSING	

SUB IR RESULT 3.1. IMPROVED ADOPTION OF NUTRITION AND WASH BEAHVIOURS											
new output 3.1.1: increased AWARENESS on nutrition, WASH and food saftey practices											
[REFRAME AS ACTIVTY]Output 3.1.1: Established network for increasing extension of key nutrition and WASH messages through engaging local nutrition platforms (e.g.. SUN CSA) make it activity not output , repalce with increased knowledge	these networks already exist and are well etsablished. MAIN priority would be to consult with them to get support with identifying partners, accessing material, identifying partners, and ensure learning from project is featuring in discussions)	assumption is that there is already secondary lit on what are main nutrition challenges in the targetted locations that can be used to inform priortization of nutrition messages								HL.8.2-a :Percent of households with access to a basic sanitation service [ZOI-level] HL.8.2-b: Percent of households with soap and water at a handwashing station on premises [ZOI-level] Custom 3.1: People that have accessed information on nutrition and WASH: digital and social media platform analytics	
Activities											
[add Review baseline findings to prioritze key nutrition behaviours to prirotize and for whom			baseline: to enclude relevant nutrition questions to understand key nutrition behaviours including intra household								

3.1.1.1 Consultation workshop to identify complementarities and potential partnership with local and International NGO's working in health, nutrition and WASH in selected township	identify strategic partners to support the awareness activities	review secondary literature on main nutrition challenges for different profiles of people based on intersectional markers to priortize what nutritions messages and for whom. use workshop to validate baseline findings in workshop in order to priortize identifying which parnters have expertise on nutrition for these profiles in targetted areas. ensure criteira for selection (where possible) includes partners expertise on working around gender/ men engagement strategies. approach known nutrition stakeholders (SUN, Save , HKI, NGOs with expertise in nutrition in	baseline: include key nutrition messages. n/a. consultation workshop preferablly should happen after baseline								
3.1.1.2 Development and printing of communication materials on nutrition and WASH based on the Essential Nutrition Actions and Essential Health Actions messages; includes the importance on consumption of micronutrient-rich small fish (SIS), farming SIS, etc.	Most material on nutrition exists already. Need to elaborate the ones on WASH - collected by SUN CSA	Prioritize relevant nutrition messages									

3.1.1.3 Engage social media platforms such as Facebook, local software application, etc. in providing digitized nutrition, WASH practices, and food safety messages	Part of Quennie and Aman responsibilities.		Routine: capture how the different SBCC modalities are reaching different hosuehold members (women, men, children) and how it impacts distribution of fish for consumption, more diverse food, and decisions about how income used for nutrition)								
added: Develop SBCC nutrition strategy targetting differetn household members +communtiy		REVIEW BASELINE FINDINGS to priortize nutrition messasges Ensure Strategy includes separate strategy for engaging with men: (wihtin HH, and also men in communtiy (influential leaders, religious, head men, teachers etc)									
added: Develop specific men engagement strategy as part of SBCC (social behavioiur change communication) strategy											
3.3.1.2 Conduct of Training of Trainers focusing on Nutrition especially on the consumption of fish and Small Indigenous fish and vegetables resulting in dietary diversity, and improved WASH practices to implementing partners	ToT on consumption										

3.3.1.3 Social Behavior Change communication activities on nutrition and improved WASH practices such as cooking demonstration, formation of Mothers support group, nutrition month campaigns, etc. at different venue	SBCC: Practical demonstrations										
3.2.1.3 Pilot testing of WASH package materials (e.g. soap, tippy taps, etc.) to increase adoption of improved WASH practices among beneficiary households MOVED FROM 3.2.	identify partner experienced in WASH and sign agreement .										
[NEW] explore poential for GTA in nutrition curriculum in selected sites		explore feasibility of piloting gender transformative curriculum in selected locations (small scale). Approach HKI + Bangladehs worldfish team for discussion on suitability of adapting nurturing connections									
3.2.1.5 Scaling through different dissemination strategies	Messages to increase awareness among non beneficiary stakeholders on healthier practices (diverse diet and safe food & health										

3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (MOVED FROM 3.3. as refers to increasing awareness)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.	3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT HERE: move to 3.3.1)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.	3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT HERE: move to 3.3.1)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.	3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT HERE: move to 3.3.1)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.	3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT HERE: move to 3.3.1)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.	3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT HERE: move to 3.3.1)	Partners (XXX) plus others to be identified. ToT to deliver training at ground level.
Outcome/Sub-IR 3.2: ~~Improved access to diverse, safe and nutritious food~~ [RENAME: improved consumption of diverse, safe and nutritious food]	Increase the availability of safe and nutritious food for the consumer through an intervention in the production stage									Custom 3.2 - a: Food safety and nutrient score (related to market) Custom 3.2 - b: Households with Food Consumption Score threshold >35	
[NEW output 3.2.1: Improved access to diverse, save and nutritous food [rename to improved knowledge on how to achieve food saftey] *changed it from su-IR to output level*							Background information to analyze the context				
Output 3.2.1: Improved knowledge an~~d practices based on EHA, ENA~~, Food safety, vegetable and mola-carp polyculture		suggesting to delet here as it is more relevant to ouptut 3.1 about increase knowedge and awareness.					Background information to analyze the context				

Activities											
3.2.1.4 Food safety (and Nutrient) analysis on local fish based processed products;	Collect fish product samples form different market in a different times (nutritional and safety aspects). Connected with IR 2 - piloting of nutrient rich and safe products (Identifying alternatives).						Baseline: to include assessment on the awareness of farmers on the safety of the products they are consuming and if this has some impact in their consuming patterns. Would they consume more fish if they new is safer?				
3.2.1.1 Provision of seed kits depending on the types of seed identified that are grown in the area for vegetable dyke production among beneficiary households; after development of vegetable seasonal		establish criteria for selecting 'who' shoiuld get the seed based on need + suitability of resources Training of target group on how to use seed. If women, orientation of parnter to get their buy-in									
3.2.1.2 Provision of Small indigenous fish species (SIS) seed among beneficiary											
~~3.2.1.3 Pilot testing of WASH package materials (e.g. soap, tippy taps, etc.) to increase adoption of improved WASH practices among beneficiary households [DOESN'T FIT, move to 3.1]~~	identify partner experienced in WASH and sign agreement .	NOW COVERED IN 3.1.									

Outcome/Sub-IR 3.3 Fish consumption for young children and women of reproductive-age increased through SBCCs and nutrition education by infants [SUGGEST DELTE THIS OUTCOME ALLTOGETHER AS IT IS COVERED UNDER reframed 3.2]										HL.9-4 : Number of individuals receiving nutrition-related (professional) training through USG-supported programs [IM-level] HL.9.1-d: Percent of women of reproductive age consuming a diet of minimum diversity [ZOI-level] HL.9-I; Prevalence of healthy weight (WHZ ≤ 2 and ≥-2) among children under five (0-59 months) [ZOI-level]	
Output 3.3.1: Improved knowledge and consumptions behaviors on fish											
Activities											
ADD: Includes nutrition messages in SBCC strategy promoting consumptioni of nutrition fish											
~~3.3.1.1 Training and workshop on nutrition sensitive fish agri-food system to increase understanding on the linkage of agriculture/ aquaculture and nutrition in addressing malnutrition in Myanmar for implementing partners in selected townships (DOES NOT FIT HERE: move to 3.3.1)~~	~~Partners (XXX) plus others to be identified. ToT to deliver training at ground level.~~							~~WF; partners to engage at ground level~~			

~~3.3.1.2 Conduct of Training of Trainers focusing on Nutrition especially on the consumption of fish and Small Indigenous fish and vegetables resulting in dietary diversity, and improved WASH practices to implementing partners (Consultant)~~	~~ToT on consumption~~	moved this						~~Consultant: partners to engage at ground level~~			
~~3.3.1.3 Social Behavior Change communication activities on nutrition and improved WASH practices such as cooking demonstration, formation of Mothers support group, nutrition month campaigns, etc. at different venue~~	~~SBCC: Practical demonstrations~~										

CROSS CUTTING

particpatory community appraisal — partners (whoever implementing at ground level) oriented on gender before meeting

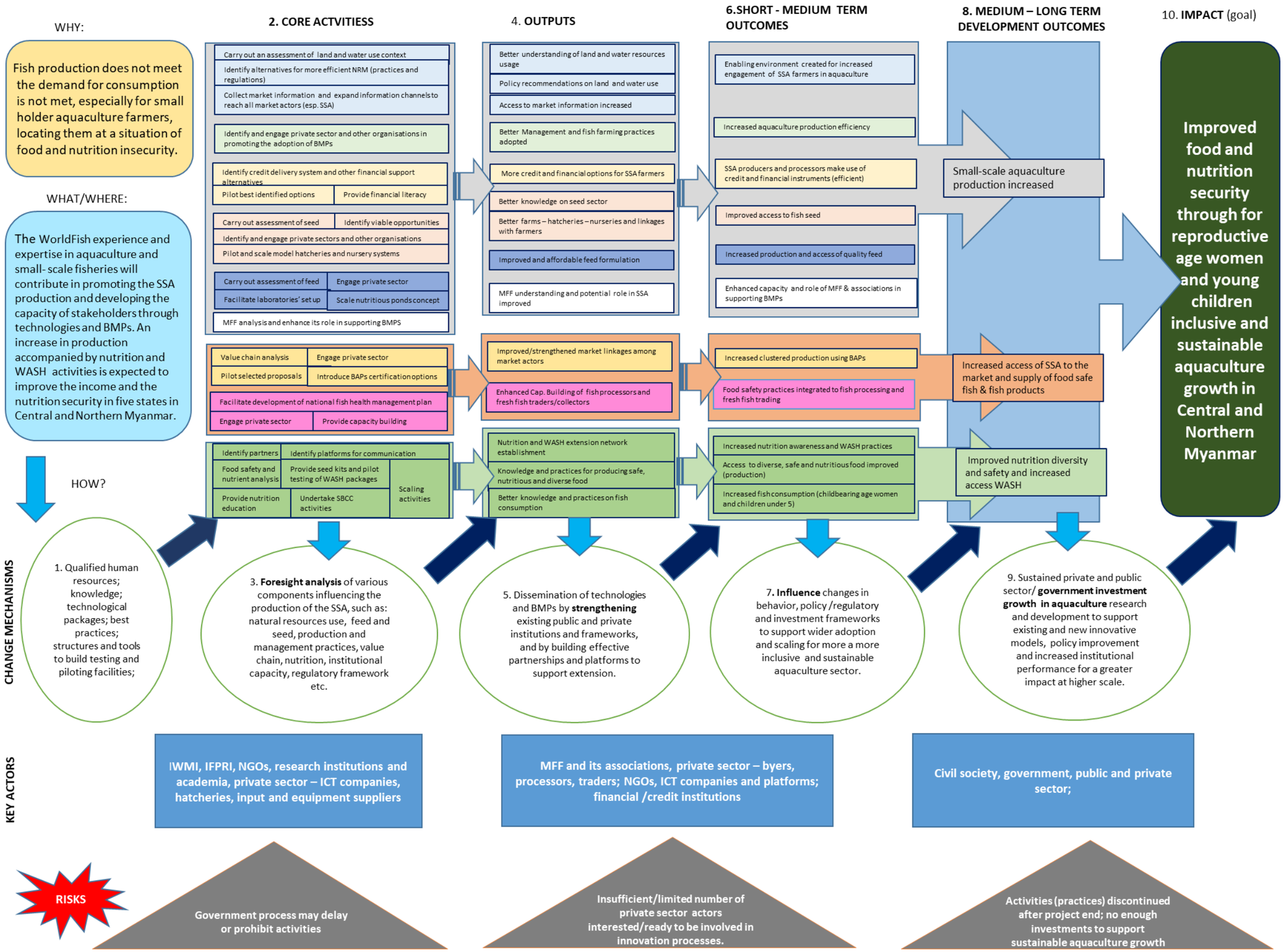
IP have community engagement meeting. Mark can help.

communtiy need assessment (faciltated by NGO IPS)
Tot for implementing partner
all extension material to be reviewed for gender integration

MEL

ensure gender interated in annual review and planning
year 2 planning cycle: ensure gender integration for planning for next year.

What are the main gender research questions : what do we want to learn…need to show with nutrition.	USAID priority to learn about nutrition outcomes. Means that any research/ experimental design


WHY:
Fish production does not meet the demand for consumption is not met, especially for small holder aquaculture farmers, locating them at a situation of food and nutrition insecurity.
WHAT/WHERE:
The WorldFish experience and expertise in aquaculture and small- scale fisheries will contribute in promoting the SSA production and developing the capacity of stakeholders through technologies and BMPs. An increase in production accompanied by nutrition and WASH activities is expected to improve the income and the nutrition security in five states in Central and Northern Myanmar.
HOW?
2. CORE ACTVITIESS
Carry out an assessment of land and water use context
Identify alternatives for more efficient NRM (practices and regulations)
Collect market information and expand information channels to reach all market actors (esp. SSA)
Identify and engage private sector and other organisations in promoting the adoption of BMPs
Identify credit delivery system and other financial support alternatives
Pilot best identified options
Provide financial literacy
Carry out assessment of seed
Identify viable opportunities
Identify and engage private sectors and other organisations
Pilot and scale model hatcheries and nursery systems
Carry out assessment of feed
Engage private sector
Facilitate laboratories' set up
Scale nutritious ponds concept
MFF analysis and enhance its role in supporting BMPS
Value chain analysis
Engage private sector
Pilot selected proposals
Introduce BAPs certification options
Facilitate development of national fish health management plan
Engage private sector
Provide capacity building
Identify partners
Identify platforms for communication
Food safety and nutrient analysis
Provide seed kits and pilot testing of WASH packages
Scaling activities
Provide nutrition education
Undertake SBCC activities
4. OUTPUTS
Better understanding of land and water resources usage
Policy recommendations on land and water use
Access to market information increased
Better Management and fish farming practices adopted
More credit and financial options for SSA farmers
Better knowledge on seed sector
Better farms – hatcheries – nurseries and linkages with farmers
Improved and affordable feed formulation
MFF understanding and potential role in SSA improved
Improved/strengthened market linkages among market actors
Enhanced Cap. Building of fish processors and fresh fish traders/collectors
Nutrition and WASH extension network establishment
Knowledge and practices for producing safe, nutritious and diverse food
Better knowledge and practices on fish consumption
6.SHORT - MEDIUM TERM OUTCOMES
Enabling environment created for increased engagement of SSA farmers in aquaculture
Increased aquaculture production efficiency
SSA producers and processors make use of credit and financial instruments (efficient)
Improved access to fish seed
Increased production and access of quality feed
Enhanced capacity and role of MFF & associations in supporting BMPs
Increased clustered production using BAPs
Food safety practices integrated to fish processing and fresh fish trading
Increased nutrition awareness and WASH practices
Access to diverse, safe and nutritious food improved (production)
Increased fish consumption (childbearing age women and children under 5)
8. MEDIUM – LONG TERM DEVELOPMENT OUTCOMES
Small-scale aquaculture production increased
Increased access of SSA to the market and supply of food safe fish & fish products
Improved nutrition diversity and safety and increased access WASH
10. IMPACT (goal)
Improved food and nutrition security through for reproductive age women and young children inclusive and sustainable aquaculture growth in Central and Northern Myanmar
CHANGE MECHANISMS
1. Qualified human resources; knowledge; technological packages; best practices; structures and tools to build testing and piloting facilities;
3. Foresight analysis of various components influencing the production of the SSA, such as: natural resources use, feed and seed, production and management practices, value chain, nutrition, institutional capacity, regulatory framework etc.
5. Dissemination of technologies and BMPs by strengthening existing public and private institutions and frameworks, and by building effective partnerships and platforms to support extension.
7. Influence changes in behavior, policy /regulatory and investment frameworks to support wider adoption and scaling for more a more inclusive and sustainable aquaculture sector.
9. Sustained private and public sector/ government investment growth in aquaculture research and development to support existing and new innovative models, policy improvement and increased institutional performance for a greater impact at higher scale.
KEY ACTORS
IWMI, IFPRI, NGOs, research institutions and academia, private sector – ICT companies, hatcheries, input and equipment suppliers
MFF and its associations, private sector – byers, processors, traders; NGOs, ICT companies and platforms; financial /credit institutions
Civil society, government, public and private sector;
RISKS
Government process may delay or prohibit activities
Insufficient/limited number of private sector actors interested/ready to be involved in innovation processes.
Activities (practices) discontinued after project end; no enough investments to support sustainable aquaculture growth

Sr.	Organization	Township	Village Tract	Village Name	Farmer's Name	Father's or Spouse name	Tpyes of Farmer (Grow out/ Nursery)	Farmer or Group Leader	Phone number	Internet Access Y=Yes N= No			Available Applications (Application Farmer uses e.g. Viber, Messenger or WhatsApp)		Viber, Messenger or WhatsApp Number (The number Farmer uses for the applicaiton)		Rema
										Self	Neighborhood Farmers	If neighborhood, who?	Self	Neighborhood Farmers	Self	Neighborhood Farmers	
1	Pact	Salin	Shan Su	Te Kone	U Tin Lin	U Tun Sein	Grow out	U Zaw Min	09 785 432 072								
2	Pact	Salin	Shan Su	Te Kone	U Than Myae Aye	Daw Naing Naing Htwe	Grow out		09 253 680 760								
3	Pact	Salin	Shan Su	Te Kone	U Sein Aung	Daw Kyi Htwe	Grow out		09 446 659 336								
4	Pact	Salin	Shan Su	Te Kone	U Saw Aung	Daw Kyi Aye	Grow out		09 454 696 556								
5	Pact	Salin	Shan Su	Te Kone	U Zaw Min	Daw Myaing	Grow out		09 458 797 337								
6	Pact	Salin	Shan Su	Te Kone	U Thein Win	Daw Han Myint	Grow out		09 762 838 186								
7	Pact	Salin	Shan Su	Te Kone	U Win Maung	Daw Myint San	Grow out		N/A								
8	Pact	Salin	Shan Su	Te Kone	Daw Thein Nie	U Hla Swe	Grow out		09 774 627 384								
9	Pact	Salin	Shan Su	Te Kone	U Kyaw Zin Lin	Daw Khin Myo Zin	Grow out		N/A								
10	Pact	Salin	Shan Su	Te Kone	U Win	Daw Win	Grow out		09 403 718 224								
11	Pact	Salin	Shan Su	Te Kone	Daw Khin Mar	U Aung Phyo	Grow out		09 421 651 558								
12	Pact	Salin	Shan Su	Te Kone	U Zaw Naing Oo	Daw Nyo NyoWin	Grow out		09 953 093 750								
13	Pact	Salin	Shan Su	Te Kone	Daw Cho Cho Lwin	U Aye Soe	Grow out		09 886 296 507								
14	Pact	Salin	Shan Su	Te Kone	U Than Hla	Daw Htom	Grow out		09 408 791 050								
15	Pact	Salin	Shan Su	Te Kone	U Aung Yin	Daw Aye Than	Grow out		09 421 272 426								
16	Pact	Salin	Shan Su	Te Kone	U Toe Hla	Daw Yee	Grow out		09 251 176 151								
17	Pact	Salin	Shan Su	Te Kone	U Ant Khaing Soe	U Soe Win	Grow out		N/A								
18	Pact	Salin	Shan Su	Te Kone	U Lu Saung	Daw Mya Kyi	Grow out		N/A								
19	Pact	Salin	Shan Su	Te Kone	U Phoe Lwin	Daw Htay Kyi	Grow out		09 259 686 631								
20	Pact	Salin	Shan Su	Te Kone	U Myoet	Daw Phyo Ye Khin	Grow out		09 774 986 035								

21	Pact	Salin	Shan Su	Te Kone	U Aung Myint	Daw Nyunt Yee	Grow out		N/A								
22	Pact	Salin	Shan Su	Te Kone	U Win Hsaung	Daw Amar Tin	Grow out		09 429 896 916								
23	Pact	Salin	Kyo Wun	Tei Bo Kan	Daw Nu	U Ngwe Thaung	Grow out	U Hlaing Myo Linn	09 885 971 301								
24	Pact	Salin	Kyo Wun	Tei Bo Kan	U Khaing Soe Lin	Daw Sein Mar	Grow out										
25	Pact	Salin	Kyo Wun	Tei Bo Kan	U Hlaing Myo Lin	Daw Yin Yin Htwe	Grow out		09 253 043 440								
26	Pact	Salin	Kyo Wun	Tei Bo Kan	U Zaw Lin Oo	Daw Ei Khaing	Grow out		09 266 318 466								
27	Pact	Salin	Kyo Wun	Tei Bo Kan	U Kyi Shwe	Daw Saw Mya	Grow out		09 887 576 752								
28	Pact	Salin	Kyo Wun	Tei Bo Kan	U Han Soe	Daw Hla Htay	Grow out		09 792 400 442								
29	Pact	Salin	Kyo Wun	Tei Bo Kan	U Win Thein	Daw Cho	Grow out		09 256 327 298								
30	Pact	Salin	Kyo Wun	Tei Bo Kan	U Toe Win	Daw Thandar Aye	Grow out		09 898 165 688								
31	Pact	Salin	Kyo Wun	Tei Bo Kan	U Aung Chan	Daw Than Su	Grow out										
32	Pact	Salin	Kyo Wun	Tei Bo Kan	U Myint Wai	Daw Than Aye	Grow out		09 259 447 948								
33	Pact	Salin	Kyo Wun	Tei Bo Kan	U Than Oo	Daw Mar Kyu	Grow out		09 892 467 900								
34	Pact	Salin	Ah Nauk Kan Baung	Myaung Hla U	U Myint Ko	Daw Khin Aye Mie	Grow out	U Maung Aye									
35	Pact	Salin	Ah Nauk Kan Baung	Myaung Hla U	U Maung Aye	Daw Aye San	Grow out										
36	Pact	Salin	Ah Nauk Kan Baung	Myaung Hla U	U Zaw Lin	Daw Myo Myat Hla	Grow out										
37	Pact	Salin	Ah Nauk Kan Baung	Myaung Hla U	U Win Hlaing Thein	U Thein Swe	Grow out										
38	Pact	Salin	Ah Nauk Kan Baung	Myaung Hla U	U Ohn Kyaw	U Kan Aye	Grow out										
39	Pact	Salin	Ah Nauk Kan Baung	Myaung Hla U	U Maung Myint	Daw Khin San Nyunt	Grow out										
40	Pact	Salin	Ah Nauk Kan Baung	Myaung Hla U	Daw Aye		Grow out										
41	Pact	Salin	Ah Nauk Kan Baung	Myaung Hla U	U Kyaw Zin	U Tun Sein	Grow out										

42	Pact	Salin	Ah Nauk Kan Baung	Myaung Hla U	U Pho Mya Than	U Kan Oo	Grow out										
43	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Nyo	Daw Win Yee	Grow out	U Maung Aye	09 770 294636								
44	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Khin Soe	Daw Thein Kyi	Grow out		09 542 960 53								
45	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Win Naing	Daw Phyu	Grow out		09 890 988 072								
46	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Myint Thu	Daw Thida Aye	Grow out		09 443 451 746								
47	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Lin Soe	Daw Yin Yin Aye	Grow out		09 422 309 742								
48	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Kyaw Thu Ya	Daw Aye Aye Thin	Grow out		09 777 934 622								
49	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Mya Thwin	Daw Than Than Oo	Grow out		09 426 792 122								
50	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Zaw Min	U Hla Thaw	Grow out		09 446 425 551								
51	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Thar Aung	Daw Kyuu	Grow out		09 797 483 091								
52	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	U Moe Kyaw	Daw Sein Sein Yee	Grow out		09 259 400 738								
53	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	Daw Khin Shwe Win	U Maung Tar	Grow out		09 890 986 039								
54	Pact	Salin	Ah Nauk Kan Baung	Wan Pyayt	Daw Tin Tin Htwe	U Htein Win	Grow out		09 402 696 203								
55	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Tin Win	Daw Aye Thein	Grow out/ Nurserer	U Than Htay									
56	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Aung Myo	Daw Mar Lar	Grow out		09 455 957 452								

57	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Win Myint	Daw Ma Khaing	Grow out											
58	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Myint Thein	Daw Aye Than	Grow out											
59	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Than Htay	Daw Htay Kyi	Grow out		09 256 634 628									
60	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Soe Win	Daw Myint Kyi	Grow out		09 692 502 216									
61	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Than Win	Daw Yin Myint	Grow out											
62	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Than Zaw Oo	Daw Mar Lar	Grow out		09 400 633 898									
63	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Naing Oo Lwin	Daw Ma Hla	Grow out		09 257 323 298									
64	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Ko Kyi	Daw Khin Than Myint	Grow out		09 664 043 033									
65	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Thet Soe Htike	Daw Nilar Win	Grow out		09 981 979 802									
66	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Soe Myat Aung	U Soe	Grow out											
67	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Zaw Zaw	U Nyan Win	Grow out		09 259 626 765									
68	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Phyo Zaw	U Nyan Win	Grow out		09 262 914 803									
69	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	Daw Win Kyi	U Thant Zin	Grow out		09 678 336 302									
70	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Min Min Zaw	Daw Khin Htay	Grow out		09 779 181 491									
71	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Chit Ko Ko	Daw Kyi Lwin	Grow out											
72	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	Daw Khin San Wai	U Hla Ko	Grow out											
73	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	Daw Thein Thein Kyi	U Khin Mg Tun	Grow out		09 789 007 458									
74	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	Daw Khin Aye	U Mya Win	Grow out		09 422 615 533									
75	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	Daw Khaing Zar Lin	U Kyaw Oo	Grow out		09 446 423 822									
76	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	Daw Tin Mie	U Win Tint	Grow out											
77	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	Daw Khin Aye Myint	U Kyaw Khaing Win	Grow out											
78	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Than Lwin	Daw Htay	Grow out											

79	Pact	Salin	Ta Mar Chaung	Ta Mar Chaung	U Aung Zaw Lin	Daw Hnin Aye	Grow out										
80	Pact	Salin	Ah Nauk Kan Baung	Ah Nauk Kan Baung	U Myo Myint Shwe	Daw Thin Thhin Aung	Grow out	U Myo Myint Shwe	09 259 617 086								
81	Pact	Salin	Ah Nauk Kan Baung	Ah Nauk Kan Baung	U Khin Maung Zin	Daw Mar Oo	Grow out		09 256 458 582								
82	Pact	Salin	Ah Nauk Kan Baung	Ah Nauk Kan Baung	U Kyaw Soe Moe	Daw Mya Yamin Maung	Grow out		09 405 054 533								
83	Pact	Salin	Ah Nauk Kan Baung	Ah Nauk Kan Baung	U Nyunt Win	Daw Tin Tin Oo	Grow out										
84	Pact	Salin	Ah Nauk Kan Baung	Ah Nauk Kan Baung	U Han Tin	Daw San	Grow out		09 407 212 761								
85	Pact	Salin	Ah Nauk Kan Baung	Ah Nauk Kan Baung	Daw Khin Myat Aye	U Than Tun	Grow out										
86	Pact	Salin	Ah Nauk Kan Baung	Ah Nauk Kan Baung	Daw Moe Moe	U Aung Kyaw Moe	Grow out		09 789 045 300								
87	Pact	Salin	Kan Pyar	Kan Pyar	U Kyaw Aung	Daw Soe Soe Win	Grow out	U Phoe Ni	09 449 482 215								
88	Pact	Salin	Kan Pyar	Kan Pyar	U Myo Nyunt	Daw Win Min Hla	Grow out		09 401 580 177								
89	Pact	Salin	Kan Pyar	Kan Pyar	U Thaung Han	Daw Htay Yee	Grow out		09 772 323 616								
90	Pact	Salin	Kan Pyar	Kan Pyar	U Win Zaw Htike	Daw Khin Chaw	Grow out		09 411 980 513								
91	Pact	Salin	Kan Pyar	Kan Pyar	U Pho Ni	Daw Yee	Grow out		09 423 356 672								
92	Pact	Salin	Kan Pyar	Kan Pyar	U Tin Hlaw	Daw Htay Htay Maw	Grow out		09 401 593 327								
93	Pact	Salin	Kan Pyar	Kan Pyar	U Ye Lwin	U Maung Soe	Grow out		09 695 942 069								
94	Pact	Salin	Kan Pyar	Kan Pyar	Daw May Thu Aung	U Zaw Latt	Grow out		09 449 482 215								
95	Pact	Salin	Kan Pyar	Kan Pyar	Daw Yee Htwe	U Tin Thein Aung	Grow out		N/A								
96	Pact	Salin	Kan Pyar	Kan Pyar	U Aung Kyi	Daw Htay	Grow out		09 446 029 512								
97	Pact	Salin	Kan Pyar	Kan Pyar	U Kyaw Gyi	Daw San San Moe	Grow out		09 429 179 396								
98	Pact	Salin	Kan Pyar	Kan Pyar	U Myint	Daw Saw Hla	Grow out		09 448 376 108								
99	Pact	Salin	Kan Pyar	Kan Pyar	U Nyo Seint	Daw Eaint Pone	Grow out		09 782 847 763								
100	Pact	Salin	Kan Pyar	Kan Pyar	U Thein Soe	Daw Tin Ngwe	Grow out		N/A								

101	Pact	Salin	Kyo Wun	Kyo Wun	U Tun Tin	Daw Mar Sein	Grow out	U Soe Min									
102	Pact	Salin	Kyo Wun	Kyo Wun	U Khin Sein		Grow out										
103	Pact	Salin	Kyo Wun	Kyo Wun	U Bo Sein Lwin	Daw Hla Shwe Sin	Grow out		09 444107843								
104	Pact	Salin	Kyo Wun	Kyo Wun	U Kyaw Shwe		Grow out										
105	Pact	Salin	Kyo Wun	Kyo Wun	U Tun Tun Win		Grow out										
106	Pact	Salin	Kyo Wun	Kyo Wun	U Than Aung		Grow out										
107	Pact	Salin	Kyo Wun	Kyo Wun	U Aung Hsan Lwin	Daw Htar Htar Yee	Grow out										
108	Pact	Salin	Kyo Wun	Kyo Wun	U Khin Maung Myint	Daw Htay	Grow out										
109	Pact	Salin	Kyo Wun	Kyo Wun	U Myint Kyaing	Daw Mya Ngwe	Grow out										
110	Pact	Salin	Kyo Wun	Kyo Wun	U Thein Soe	Daw Tin Htay	Grow out										
111	Pact	Salin	Kyo Wun	Kyo Wun	U Maw Maw	Daw Thein Aye	Grow out										
112	Pact	Salin	Kyo Wun	Kyo Wun	U Kyi Thein	Daw Mya San	Grow out										
113	Pact	Salin	Kyo Wun	Kyo Wun	U Win Khaing	Daw Naing	Grow out										
114	Pact	Salin	Kyo Wun	Kyo Wun	U Sein Wai	Daw San	Grow out										
115	Pact	Salin	Kyo Wun	Kyo Wun	Daw Mwe Mwe		Grow out										
116	Pact	Salin	Kyo Wun	Kyo Wun	U Kyaw Don	Daw Saw Hla	Grow out										
117	Pact	Salin	Kyo Wun	Kyo Wun	U Aye Min	Daw Tin Nwet	Grow out										
118	Pact	Salin	Kyo Wun	Kyo Wun	U Aung Soe Moe	Daw Zar Zar Aye	Grow out										
119	Pact	Salin	Kyo Wun	Kyo Wun	U Maung Ko	Daw Myint Aye	Grow out										
120	Pact	Salin	Kyo Wun	Kyo Wun	U Moe Kaung	Daw Ei Ei Nyein	Grow out		09 261 689 822								
121	Pact	Salin	Kyo Wun	Kyo Wun	U Maung Kan	Daw Shwe	Grow out										
122	Pact	Salin	Kyo Wun	Kyo Wun	U Ba Tin	Daw San Shwe	Grow out										
123	Pact	Salin	Kyo Wun	Kyo Wun	U Kyaw Khaing Win		Grow out		09 676 677 404								
124	Pact	Salin	Kyo Wun	Kyo Wun	U Chit Thae	Daw Wai Linn	Grow out										
125	Pact	Salin	Kyo Wun	Kyo Wun	U Kan Myint	Daw Aye Gyi	Grow out										
126	Pact	Salin	Kyo Wun	Kyo Wun	U Zaw Wann		Grow out										
127	Pact	Salin	Kyo Wun	Kyo Wun	U Win Soe	Daw Khin Cho Aye	Grow out		09 264 119 815								
128	Pact	Salin	Kyo Wun	Kyo Wun	U Htay Linn	Daw Win Maw	Grow out		09 696 281040								
129	Pact	Salin	Kyo Wun	Kyo Wun	U Win Naung	Daw Myint Myint Oo	Grow out										
130	Pact	Salin	Kyo Wun	Kyo Wun	U Tun Kyaw	Daw Khin Pa Pa	Grow out		09 441 389 045								
131	Pact	Salin	Kyo Wun	Kyo Wun	U Soe Min Naing	Daw Hla Myo Kyaw	Grow out		09 406 303 313								

132	Pact	Salin	Kyo Wun	Kyo Wun	U Htay Ko Ko		Grow out		09 881 142 176								
133	Pact	Salin	Kyo Wun	Kyo Wun	U Moe Kyaw	Daw Khin Nyo	Grow out		09 455 661 464								
134	Pact	Salin	Kyo Wun	Kyo Wun	U Zin Lin Oo	Daw Hnin Pa Pa Khaing	Grow out		09 403 053 958								
135	Pact	Salin	Kyo Wun	Kyo Wun	U Aung Thin		Grow out										
136	Pact	Salin	Kyo Wun	Kyo Wun	U Maung Maung Lwin	Daw Mya	Grow out										
137	Pact	Salin	Kyo Wun	Kyo Wun	U Bo Win	Daw Mar Mar Khaing	Grow out										
138	Pact	Salin	Kyo Wun	Kyo Wun	Daw Nyo	U Aye Ko	Grow out										
139	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Tin Hla	Daw Mar Aye	Grow out	U Tin Hla	09 663 043 550								
140	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Kyi Ya	Daw Ohn Kyin	Grow out										
141	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	Daw Win Mine	U Tun	Grow out										
142	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Soe Thu	U Htay Win	Grow out										
143	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Kyi Thein	U Nyein	Grow out										
144	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	Daw Nilar Htay	U Doe Lone	Grow out										
145	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Tu Naing	Daw Saint Saint Aye	Grow out										
146	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	Daw Yin Mya	U Khin Maung Htay	Grow out										
147	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Khin Maing Myint	Daw Than New	Grow out										
148	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Bo Chit	Daw Win Hmie	Grow out										
149	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Win	Daw Zee Gwet	Grow out										
150	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Ye Ko	U Win	Grow out										
151	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Zaw Win Mg	Daw Myint San	Grow out										
152	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Aung Hla	Daw Thein Hmie	Grow out										
153	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Chit Ngwe	Daw Than Htwe	Grow out										
154	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Ni	Daw Mei Kyi	Grow out										

155	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	Daw Khin Mie	U Aung Nyunt	Grow out											
156	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Kyaw Min Thike	U Win Shwe	Grow out											
157	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	Daw Lwin	U Nyan Mein	Grow out											
158	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Hla Thein	Daw Kyi San	Grow out											
159	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Aung Htay	Daw Myint Myint Hlaing	Grow out											
160	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Sein Win	Daw Pyar	Grow out											
161	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Min Thu	Daw Aye Khaing	Grow out											
162	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Mann	Daw Htay Kyi	Grow out											
163	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Hla Thein	Daw Kyi San	Grow out											
164	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	Daw Pago Kyi	U San Aye	Grow out											
165	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	Daw Mar Lar Kyi	U San Aye	Grow out											
166	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U San Myint	Daw Shwe Yee	Grow out											
167	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Myint	U Ohn Myaing	Grow out											
168	Pact	Salin	Yone Pin Kan	Maw Kawt Kan	U Win Naing	Daw Kyin	Grow out											
169	Pact	Salin	Yone Pin Kan	Min Kan	U Kyaw Sein	Daw Myaing	Grow out	U Hlaing Myo Linn	09 787 864 255									
170	Pact	Salin	Yone Pin Kan	Min Kan	U Khin Maung Shwe	Daw Win	Grow out											
171	Pact	Salin	Yone Pin Kan	Min Kan	U Aung Ko Latt	Daw Let Let Win	Grow out											
172	Pact	Salin	Yone Pin Kan	Min Kan	Daw Khin Thein	U Bo Thein	Grow out											
173	Pact	Salin	Yone Pin Kan	Min Kan	U Naing Win	Daw Aye Nwet	Grow out											
174	Pact	Salin	Yone Pin Kan	Min Kan	U Win Naing	Daw Maw	Grow out		09 787 604 190									
175	Pact	Salin	Yone Pin Kan	Min Kan	Daw Tin Htay	U Maung Myint	Grow out											
176	Pact	Salin	Kyo Wun	Ywar Thar Kone	U Toe	Daw Mar Mar Aye	Grow out	U Toe	09 253 550 008									

177	Pact	Salin	Kyo Wun	Ywar Thar Kone	U Aung Thu	U Kyi Hlaing	Grow out		09 426 443 937								
178	Pact	Salin	Kyo Wun	Ywar Thar Kone	U Than Doe	Daw Hla Kyin	Grow out		09 898 616 288								
179	Pact	Salin	Kyo Wun	Ywar Thar Kone	U Sein Min Naing	U Tun Hmie	Grow out		09 674 990 037								
180	Pact	Salin	Kyo Wun	Ywar Thar Kone	U Khin Zaw	Daw San Aye	Grow out		09 259 806 212								
181	Pact	Salin	Kyo Wun	Ywar Thar Kone	U Aung Kyi Win	Daw Myint Htay	Grow out		09 681 783 908								

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Inland Fisheries Market System Analysis

Small-Scale Aquaculture Investments for Livelihoods and Nutrition in Myanmar (SAIL)

February 2020

Photo: Sebastien Moineau/Asper Consulting

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CDZ: Central Dry Zone

DOF: Department of Fisheries

FAO: United Nations for Food and Agriculture

GAD: General Administration Department

GAqP: Good Aquaculture Practice

GoM: Government of Myanmar

JETRO: Japan External Trade Organisation

MFF: Myanmar Fisheries Association

MLCS: Myanmar Living Condition Survey

MOALI: Ministry of Agriculture Irrigation and Livestock

MSA: Market System Analysis

NES: National Export Strategy

PNTR: Permanent Normal Trade Relations

SAIL: Sustainable Aquaculture Investment for Livelihoods and Nutrition in Myanmar

SBCC: Social Behavioural Change Communication

SIS: Small Indigenous Species

SRS: Self-Recruiting Species or Self Breeding Species

SSA: Small Scale Aquaculture

VAD: Value added

Introduction

This Inland Fisheries Market System Analysis (MSA) aims to provide WorldFish with a systemic analysis of the market constraints associated with the inland fisheries market and how this can benefit Small Scale Aquaculture (SSA) in Myanmar.

SSA is defined by WorldFish as the farming of aquatic organisms by small-scale farming households or communities, usually by extensive or semi-intensive, small investment in operational costs, including largely family labour and adopting low-cost production technology appropriate to their resource base.

The structure of this MSA is as follows:

1. Section 1: Introduction
2. Section 2: The inland fisheries market
3. Section 3: Research methodology
4. Section 4: Opportunities for pro-poor and fish consumption impact
5. Section 5: Intervention area
6. Section 6: Market System Analysis
7. Section 7: Market system performance

The purpose of this MSA is contribute to the outcome of the Small-Scale Aquaculture Investments for Livelihoods and Nutrition in Myanmar (SAIL). SAIL is a USAID-funded project implemented by WorldFish that aims to provide a mean of ensuring the improved availability of diverse, safe, affordable nutrient-rich foods, especially for women and young children from poor and vulnerable households. The project has three main outputs:

8. Small-scale aquaculture production increased through strategic activities including improved land and water use, increased access to high quality inputs (feed, seed and equipment), capacity development and research into production and access to credit.
9. Market-based system approaches further developed and utilized to increase access to food safe fish and fish products by poor people. Capacity building will ensure that market systems function more effectively, sustainably and to the benefit of the poor.
10. Enhanced nutrition and WASH practices delivered via Social Behaviour Change Communication (SBCC). Capacities developed into the production, processing and consumption of food safe aquaculture and other fish-based products.

The inland fisheries market

Aquaculture in Myanmar comprises three subsectors, listed in order of importance as follows: inland (freshwater), coastal (brackish water), and marine. Fisheries production is classified into three

categories: (a) marine fisheries, (b) freshwater capture fisheries, and (c) aquaculture1. This MSA only deals with (b) freshwater capture fisheries, and (c) aquaculture. Where available and relevant data and analysis for these two categories of production has been disaggregated. When data on these two production categories is analysed together, it is referred to as the inland fisheries in this MSA.

Inland fishery production relies mainly on Myanmar's 6 million hectares of floodplains; the river system is complemented by numerous lakes and 260 reservoirs. A total of 181,000 hectares are used for breeding, rearing and harvesting fish and crustaceans in Myanmar. Of total aquaculture ponds, 92,000 hectares are used for shrimp culture and 89,000 hectares for fish culture2.

Freshwater capture fisheries

Inland freshwater capture fisheries activity involves the leveraging of both leasable and open fisheries.

1. Leasable fisheries are dominated by larger commercial enterprises, although there is often room for the participation of sub-lessees and fish sellers. These fisheries are floodplain fishing grounds to which the government grants a yearly or long-term lease through a bidding system. These leases may come with certain requirements, such as an obligation on the part of the lessee to restore the habitat, replenish stock and enhance waterways. The lessee stocks fish seeds after flooding and is able to cultivate and capture all fish in his given area.

2. Open fisheries, meanwhile, include all traditionally and legally exploited bodies of open water including rivers, streams, lakes and reservoirs, where fees are charged according to fishing method and gear. Although the government technically requires that all fishing activity be approved, it recognizes the practical and ethical hurdles to monitoring sustenance fishing, which accounts for a large portion of open fishery activity. This difficulty in registering sustenance fishing also makes it difficult to monitor fish capture effectively3.

The Government of Myanmar (GoM) estimates that freshwater capture fisheries production is 1.6 million tons per year. Myanmar's coastline is dominated by major river deltas and these, along with numerous lakes and smaller river systems, support a wide array of species and productive environments. Much of the inland fisheries productivity stems from the large floodplain areas created during the monsoon and the high biodiversity of fish species. Fishbase lists 511 freshwater fish species as present in Myanmar. A total of 311 fish species are present in the Myanmar portion of the watershed of the Ayeyarwady River, of which approximately 62 percent (193) are endemic and 32 percent (100) are known only from Myanmar (Baran et al. 2017).

According to national statistics, between 2003 and 2012, freshwater fish catches in Myanmar increased by 330 percent with catch increasing from 1.25 million tons in 2012 to 1.38 million tons in 2014. In 2014, freshwater capture fisheries accounted for 27 percent of fish production in Myanmar

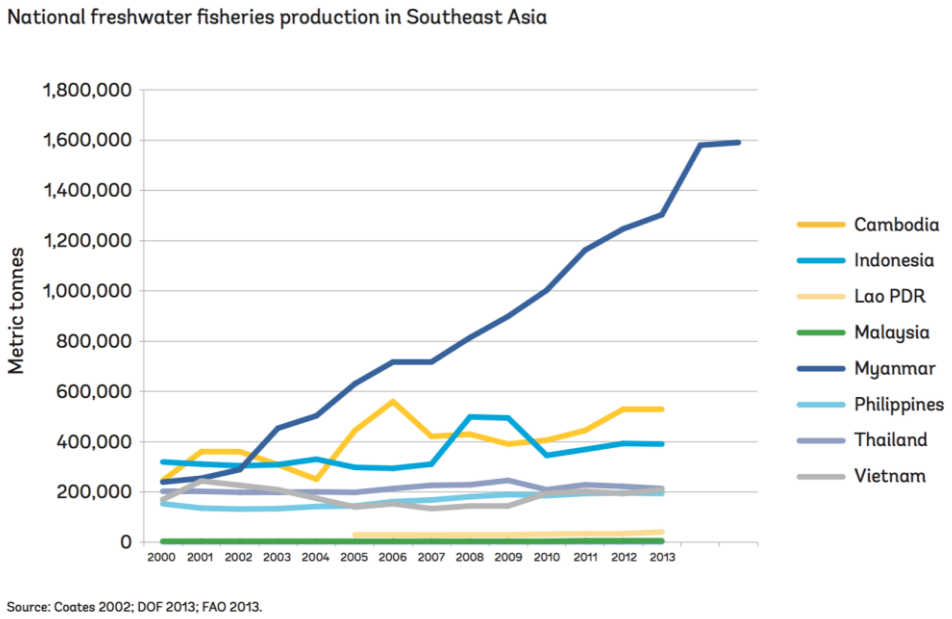
1 The World Bank, Myanmar Country Environmental Analysis Sustainability Peace and Prosperity: Forest, Fisheries, and Environmental Management Fisheries Sector Report 2019

2 Ibid

3 Myanmar Ministry of Commerce, International Trade Center, National Export Strategy, Fisheries Sector Strategy 2015-2019

(…) however, freshwater statistics reveal an unlikely linear growth trend. This is even more striking if Myanmar's performance is compared to that of other Southeast Asian countries (Figure 1).4

Figure 1: National freshwater production in Southeast Asia



Source: Coates 2002; DOF 2013; FAO 2013.

Aquaculture

Aquaculture itself is the cultivation of the natural production of fish, shellfish and aquatic plants through close husbandry efforts5. Different types of aquaculture production vary by the level of intervention in the natural growing process. While generally deemed as either extensive or intensive, most production occurs on a continuum between these two extremes. Extensive production is the most basic form. It is performed in enclosed areas of ocean, natural and man-made lakes, and other bodies of water, and it relies mainly upon natural food sources, post-larvae and environmental conditions. Intensive production, meanwhile, leverages technology in order to increase fish density and output. By optimizing growth through the management of variables such as water quality, feed, temperature and density, this type of farming is able to increase yields, control disease and reduce mortality. Due to its relative complexity, intensive aquaculture requires significant investment, technology and labour resources6.

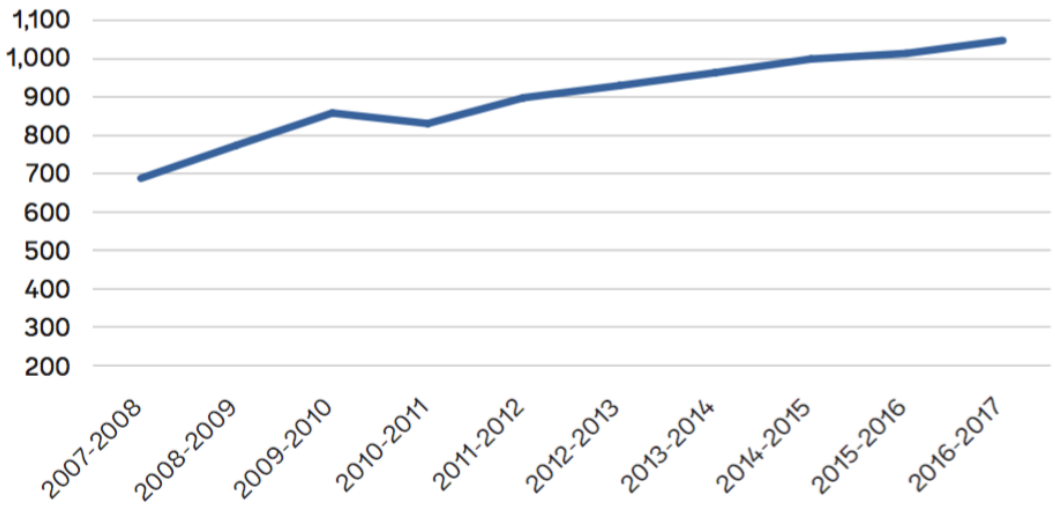
According to the FAO statistics for 2015, Myanmar was the world's eighth largest aquaculture producer (excluding aquatic plants and non-food products), producing an estimated 1 million tons annually. Two species dominate aquaculture production: Rohu fish (*Labeo rohita*) and Tiger shrimp (*Penaeus mondon*). The importance of farmed fish in the domestic market is growing, and it is estimated that 21 percent of the fish consumed nationally now comes from aquaculture (Belton et al. 2015).

4The World Bank, Myanmar Country Environmental Analysis Sustainability Peace and Prosperity: Forest, Fisheries, and Environmental Management Fisheries Sector Report 2019

5 http://biology.kenyon.edu/stures/Compsnelson/Aquaculturepage.htm

6 The World Bank, Myanmar Country Environmental Analysis Sustainability Peace and Prosperity: Forest, Fisheries, and Environmental Management Fisheries Sector Report 2019

Figure 2: Aquaculture production (metric tons) 2007-2017



Source: DoF 20177

Recent studies have been conducted to estimate the sectoral contribution of aquaculture to GDP using primary data by (a) estimating value added at the farm-gate and (b) scaling up to the national level (Bene et al. 2015; Hishamunda, Cai, and Leung 2009).

Table 1: Estimated direct and indirect value added from aquaculture in Myanmar in 2016

Component	Direct VAD[a] (US$ per acre)	Operational pond area (acres)	Total direct VAD (US$)	Economic multiplier	Total indirect VAD (US$)	Aquaculture GDP (US$)[g]
Fish	693[b]	260,300[d]	180,443,537	1.041[f]	187,808,579	368,252,116
Shrimp	141[c]	119,166[e]	16,853,699	1.041[f]	17,541,606	34,395,305

Source: The World Bank8

77 The World Bank, Myanmar Country Environmental Analysis Sustainability Peace and Prosperity: Forest, Fisheries, and Environmental Management Fisheries Sector Report 2019

8 Ibid

Table 2: Estimated contribution of aquaculture to Myanmar's GDP, 2016

Aquaculture GDP (US$, billions)	Agricultural GDP (US$, billions)	National GDP (US$, billions)	Agricultural GDP as share National GDP (%)	Aquaculture GDP as share Agricultural GDP (%)	Aquaculture GDP as share National GDP (%)
0.4[a]	16.1[b]	63.2[b]	25.46[b]	2.50[c]	0.64[c]

Notes: a Own estimate (Table 3); b World Bank (2018); c Own estimate based on a and b.

Source: The World Bank9

The estimated contribution of aquaculture to Myanmar's agricultural and national GDP is small at just 2.5 percent of agricultural GDP and 0.6 percent of national GDP (Table 2). The following points standout from Table 1. First, direct value added (VAD) per acre is much higher for fish than for shrimp. This is unsurprising given the very low stocking densities and levels of input use found in Myanmar shrimp aquaculture. Second, indirect VAD is similar in magnitude to direct VAD, given an economic multiplier of just over 1. This indicates that aquaculture development has substantial spill overs beyond the farm by way of labor markets, demand for goods and services used in producing fish, and the consumption expenditures of fish farmers and workers. Third, the contribution of fish farming to GDP of US$368 million is more than 10 times higher than the US$34 million contribution of shrimp farming.

Research methodology

The research methodology is based on a desk review of relevant data, in signed articles, studies and reports as well as primary research in the form of private and public stakeholders' interviews, interviews with water, aquaculture, nutrition and gender specialists from WorldFish as well as field observations.

The first part of this research took place during the "Scoping Study in 5 States/Regions of Myanmar" that took place from 16th November 2019 to 21st January 2020 in Myanmar. The primary data was collected from 19th to 20th November in Shan East, from 27th to 30th November in Mandalay Region, from 2nd to 4th December in Sagaing Region, from 5th to 7th December 2019 in Magway Region, from 6th to 8th January in Shan South and from 9th to 12th January 2020 in Kachin State.

The second part of this research consisted of a value chain analysis with a focus on seeds and feeds. The seeds and feeds value chain analysis took place from 20th January to 31st January 2020 in Shan East, Shan South and Mandalay.

The third phase of this research, presented in this report, builds on the data collected during phase one and two above described. The third phase consisted of an analysis of opportunities for pro-poor and fish consumption impact (section 4), an overview of intervention area (section 5), an analysis market structure and constraints, including the seeds and feeds value chain analysis (section 6), and an analysis of market performances (section 7). This methodology follows the principles of the Market Systems Approach.

9 The World Bank, Myanmar Country Environmental Analysis Sustainability Peace and Prosperity: Forest, Fisheries, and Environmental Management Fisheries Sector Report 2019

The market systems analysis was first submitted to WorldFish on 12th February for comments. Comments were provided by WorldFish on 15th February.

A workshop was held in Yangon from 17th to 26th February 2020 with WorldFish and SAIL's project partners such as the Myanmar Fisheries Federation (MFF) and NGOs. The primary objective of the seven-day workshop was to present, discuss and refine the findings and conclusions of the seeds and feeds value chain and the market constraints analysis. These refinements have been included in the final version of the inland fisheries market systems analysis that was submitted to WorldFish on 3rd March 2020.

The ultimate objective of the workshop held in Yangon in February was to engage with project partners and stakeholders to design interventions, including "quick-wins", for each of the project areas that SAIL will deliver as part of its implementation strategy.

Opportunities for pro-poor and fish consumption impact

Opportunities for pro-poor impact

Myanmar's fisheries sector is officially reported to provide employment to 3.2 million people, 800,000 full-time and 2.4 million part-time, amounting to 6 percent of Myanmar's population (WorldFish 2018), though some sources claim that this figure is likely to be an underestimate. Regional participation varies considerably, with the coastal states and regions showing much higher employment levels than most inland areas10.

Based on the above estimate and the estimations from the 2017 Myanmar Living Conditions Survey (MLCS) that reveals that 24.8 percent of the population is poor, it can be estimated that 793,600 poor people are involved in aquaculture. The poverty line in 2017 was 1,590 kyat per adult equivalent per day (in 2017 quarter 1 kyat). Those with consumption levels at or below 1,590 kyat per day are considered poor. The geographic dimension of poverty is however an important factor to consider especially as inland fisheries production systems are mostly found in rural areas. The poverty headcount is 2.7 times higher in rural areas (30.2 percent) than in urban areas (11.3 percent). It can be estimated that 966,400 poor people are involved in inland fisheries.

The poverty headcounts from the 2017 MLCS shows that the relative poverty head count in the intervention area are, in decreasing order, Kachin, Magway, Sagaing, Shan and Mandalay (Figure 3).

10 The World Bank, Myanmar Country Environmental Analysis Sustainability Peace and Prosperity: Forest, Fisheries, and Environmental Management Fisheries Sector Report 2019

Figure 3: Poverty head count in 2017

Source: The World Bank

However, the absolute number of poor people presented in the table below shows the highest number of poor people can be found in Shan

Table 3: Number of poor people in intervention area

States/regions	Number of poor people (000)
Shan	1,507
Sagaing	1,499
Magway	1,268
Mandalay	741
Kachin	570

Source: Adapted from The World Bank

It is important to note that poverty has a strong geographical dimension. Disparities exist between conflict, flood and drought affected and non-affected areas, as well as economic indicators (i.e. access to electricity) in each state or region, between townships and within townships. IDPs population are particularly vulnerable as they often share main of the characteristics of poor people (Figure 4). In addition, much of the population remains vulnerable to falling into poverty, particularly in the face of an unanticipated negative shock.

Figure 4: What are the characteristics of the poor?

Source: The World Bank

The scoping study observed that a large number of SSA farmers had a low level of education, limited land security due to unclear licensing process or fear the consequences of applying for a license (i.e. getting fine), and limited access to modern assets beyond a GSM, or a smart phone, and were often located in remote areas with limited access to services and infrastructure (e.g. electricity and roads). It can therefore be concluded that most SSA are poor, however, the exact headcount of absolute number of poor SSA farmers will need to be conformed through a comprehensive quantitative survey.

Opportunities for fish consumption impact.

Fish consumption per capita in 2002 was 26.18 kg. However, according to the World Bank, the reported per capita consumption of fish is roughly 60 kg per person per year. Other sources and studies suggest figures in the range of 25–30 kg per year. An FAO study carried out in 2006 suggests a figure of 21 kg per capita per year11.

Fish accounts for 50 percent of the quantity of animal source food (that is, meat, eggs, dairy, and fish combined) consumed in Myanmar, making it the single most important animal protein (Belton et al. 2015), although there are large regional and state variations. The above-mentioned FAO study suggested a per capita fish consumption rate of 6.4 kg in Northern Shan State and a 25.4 kg figure for the Ayeyarwady region12. Fish is therefore a key item in the food diet of poor people.

During the scoping, most SSA respondents have expressed a desire to increase their production to increase the fish intake of their family and to sell the additional surplus that will be generated through improved production methods. Most of them, however, seemed unprepared or could not afford to make any investment in feed or seed beyond their current level of capital expenditures. This suggests that any interventions will initially need to either off-set or co-share the cost associated with increasing production, or focus on zero-cost, low cost transformation and management practices, at least initially. Private companies who have an incentive or commercial interest could also bear the cost of these interventions.

The food consumption of young kids is also undermined by a number of taboos and traditions that might evolve for the benefits of the kids' nutrition. For example, in Sagaing, mother from one village

11 FAO Fisheries & Aquaculture - National Aquaculture Sector Overview - Myanmar
12 The World Bank, Myanmar Country Environmental Analysis Sustainability Peace and Prosperity: Forest, Fisheries, and Environmental Management Fisheries Sector Report 2019

do not provide solid food to their children until they are three years old. Another example, is the reluctance of mothers to feed their children fish over the fear of chocking by ingestion of bones. It is important to better understand these beliefs and traditions, and their underlying causes and consequences, in order to work with the communities to refine these.

Intervention area

The SAIL project area encompasses the Central Dry Zone (CDZ) (Magway, Mandalay and Sagaing states) as well as areas to the north and east of the CDZ (Kachin and Shan states). These states/regions appear to be outside the main aquaculture production area that is highly spatially concentrated in the lower Myanmar (i.e. Ayeyawadi, region, Bago Region, Yangon Region and Mon state) which represents an opportunity for local economic development. The development of more dynamic, connected and coordinated cluster of inland fishery production in the intervention area can also support the diversification of farming systems and provide additional source of revenue and food (fish and vegetables) for a number of additional people.

Specific townships, within the intervention area, have been selected by SAIL during the scoping study. The methodology and indicators for selecting potential townships are presented in the report: "Scoping Study in five States/Regions of Myanmar". The proposed township selected are presented in Table 4 below. Subsequently, SAIL proposed to add Mandalay township, Mandalay region and Myktyna township, Kachin State to the proposed selection.

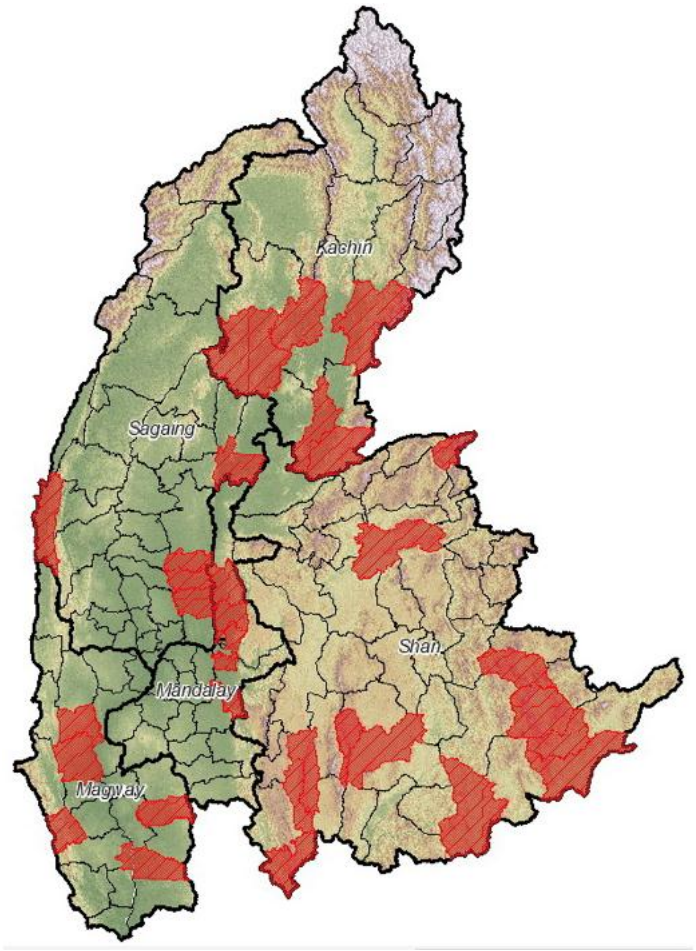
Table 4: SAIL list of potential townships - January 2020

Regions/ States	Mandalay	Kachin	Shan East	Shan South	Magway	Sagaing
Townships	Madaya	Mohnyin	Monghpyak	Nyaungshwe	Ngape	Shwebo
	Sintgaing	Mogaung	Kengtung	Pekon	Myothit	Khin-U
	Patheingyi	Waingmaw	Mongkhet	Nansang	Salin	Wetlet
	Myittha	Bhamo	Tachileik	Taunggyi	Seikphyu	Tigyaing
	Singu	Mansi	Mongton	Loilen	Sinbaungwe	Kale
		Mitkyina		Pinlaung		

Source: SAIL Scoping Mission

The map below provides an overview of the intervention area and potential list of townships in which SAIL will work.

Figure 5: Intervention area and spatial distribution of potential townships



Source: WorldFish 2020

Township level socio-eco-aqua data13

Table 5: Socio-eco-aqua township data summary

13 Adapted from data collection to establish selection criteria and selecting townships, SAIL Scoping Mission, January 2020

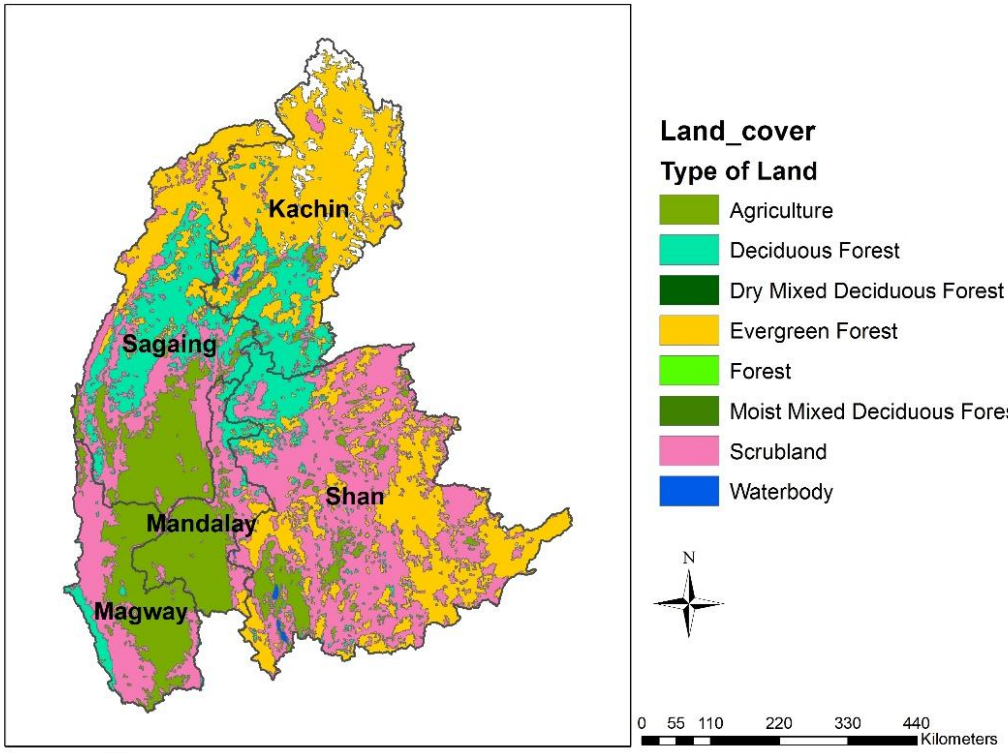
Selected townships	Aea (Km2)	Households (Number)	Population Density (hab/ Km2)	Per capita income (Kyatt)	Under 5 under weight (%)	Population without sanitation (%	Agricultural land (% total)	Licensed pond (number)	Pond ares (acres)	IDP (Number)
Kachin										
Mohnyin	2,157	24,161	50.72	952,388	2.60	2.20	16.20	206	342	8,096
Mogaung	3,317	24,898	31.66	751,175	2.50	0.40	20.10	83	220	455
Waingmaw	2,682	12,370	18.65	699,824	2.40	7.00	7.80	123	262	15,855
Bhamo	3,089	16,621	24.26	1,083,110	3.30	7.10	17.70	23	77	2,170
Mansi	6,227	52,591	41.42	1,127,598	1.40	0.60	9.20	139	106	6,460
Mitkyina	3,205	1,719	2.01	814,744	1.90	1.00	3.30	10	2	-
Mandalay										
Madaya	1,099	58,645	191.17	787,796	3.71	33.60	77.10	2,718	5,261	-
Sintgaing	448	33,579	276.98	953,286	3.51	15.90	97.00	249	466	-
Patheingyi	594	52,990	362.56	2,169,668	2.02	23.80	77.10	263	441	-
Myittha	892	46,017	181.34	1,298,654	3.08	25.20	90.40	111	231	-
Singu	1,509	34,533	84.75	663,776	3.86	29.90	56.80	29	164	-
Shan East										
Monghpyak	3,503	34,096	39.07	982,176	0.01	27.90	18.60	318	671	-
Kengtung	4,594	17,196	14.16	789,645	1.60	39.50	9.00	460	509	-
Mongkhet	3,917	37,673	36.96	1,012,302	1.60	9.60	8.50	151	154	-
Tachileik	2,052	6,165	11.26	1,132,263	0.16	34.90	6.20	34	22	-
Mongton	2,720	19,404	31.08	893,700	0.47	57.10	25.20	20	8	-
Shan South										
Nyaungshwe	1,477	42,634	105.55	658,748	3.30	39.80	61.50	109	1,053	-
Pekon	2,074	20,084	37.10	526,091	3.40	13.10	26.60	73	73	-
Nansang	3,670	23,227	26.75	835,494	2.60	36.60	44.80	39	59	-
Taunggyi	2,007	94,869	180.08	1,130,469	0.86	9.10	78.50	69	78	-
Loilen	1,323	25,417	30.83	711,882	0.96	51.80	31.60	23	34	-
Pinlaung	3,397	42,083	45.03	862,713	2.60	12.60	30.60			-
Magway										
Ngape	1,205	39,764	112.02	1,730,784	4.50	17.00	83.00	108	103	-
Myothit	2,323	55,605	84.03	1,701,019	3.70	23.90	82.50	143	94	-
Salin	1,973	60,263	108.58	1,993,183	0.59	20.20	78.90	27	55	-
Seikphyu	1,206	25,972	74.08	2,104,381	4.20	81.40	73.40	7	32	-
Sinbaungwe	1,003	44,618	153.53	2,432,409	2.80	20.30	95.70	5	18	-
Pwintbyu	2,383	31,622	51.68	1,880,621	0.02	84.80	58.00	-	-	-
Sagaing										
Shwebo	1,059	57,297	213.35	3,911,122	3.90	22.00	98.90	1,128	2,338	-
Khin-U	1,046	32,624	116.81	1,924,579	2.70	39.00	99.00	314	563	-
Wetlet	1,319	46,712	125.74	1,965,345	1.20	39.30	98.60	94	506	-
Tigyaing	1,834	26,389	57.07	2,696,628	3.30	22.10	51.90	243	486	-
Kale	2,337	72,769	119.43	1,379,955	2.60	18.90	48.40	504	378	-

Township level water data14

Within the CDZ, variability in water resources and insufficient capacity to manage that variability lies behind much of the prevailing poverty and food insecurity. Access to safe and reliable water, not just for agriculture (including livestock and aquaculture), but also for domestic use, is widely acknowledged to be a key constraint to livelihoods and peoples' wellbeing (McCartney et al., 2013). For example, in early 2020, water scarcity in southern Sagaing resulted in the cessation of reservoir releases for irrigation in order to conserve limited supplies. Flooding is also an important factor negatively affecting livelihoods and economic development in the CDZ (McCartney et al, 2013).

14 International Water Management Institute, SAIL Scoping Phase: Water Resource

Figure 6: Land cover map of the intervention area



Source: SOBA

Water shortages are also common in Shan State, in part because of the lack of water resource development. Only 51% of households have access to improved water supply (Table 5) and many continue to depend on rivers and lakes for domestic water. In 2018, over 1000 households in Kalaw, Pintaya and Nuang Shwe suffered from dry season water shortages as a consequence of drought. Similar water shortages affect other townships in the state. By contrast Kachin is relatively water abundant though conflict between the central Government and local ethnic groups has constrained water resource development and is a key factor undermining both food and water security, particularly for internally displaced people living in camps in the state. Water constraints can contribute to the difficulties such communities face in accessing livelihoods, such as fishing and farming.

Table 6: Summary water information by State/Region

State/Region	Area (km^2)	Mean annual precipitation (mm)	Mean annual potential evapotranspiration (mm)	Percentage of houses with good source of water (piped, artesian well, covered well) (Maung, 2017)	Irrigation-Beneficial Area (FAO, 2011)+
Mandalay	38,987	759	1,655	87.3	135,392
Magway	45,927	866	1,644	66.6	118,712

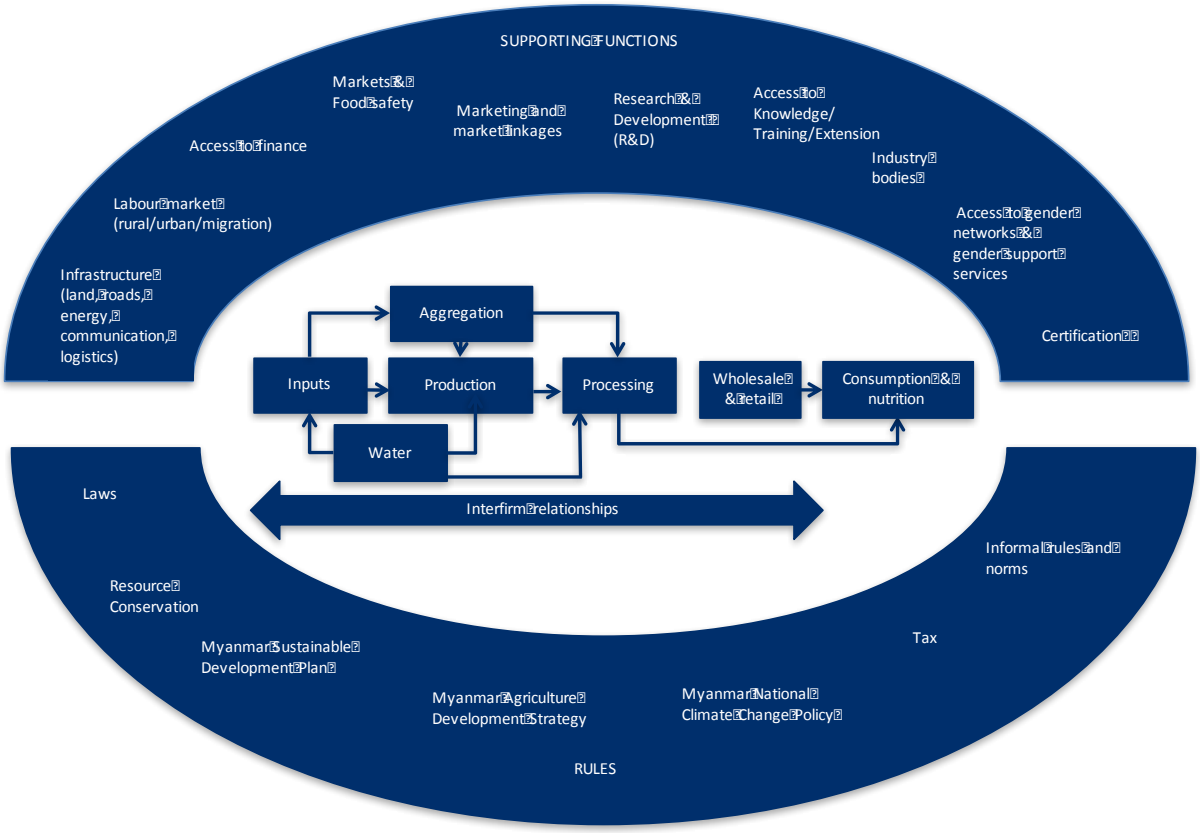
Sagaing	96,172	1,528	1,505	74.9	149,714
Kachin	89,906	1,853	1,301	65.7	40
Shan (N &E)	62,394	1,182	1,480	50.9	44,858

There is great uncertainty over the extent of informal irrigation and the actual area irrigated at any given time. For the CDZ states, there are some estimates that the area of informal irrigation may be as great as formal irrigation (ESCAP, 1995). Estimates of total irrigated area in the CDZ range from 256,578 ha to 685,246 ha (McCartney et al., 2013).

Market System Analysis

Figure 7 below outlines the structure of the inland fisheries market system in terms of the core value chain, supporting functions and rules which can be formal and informal. Each part is described in details in the following sections.

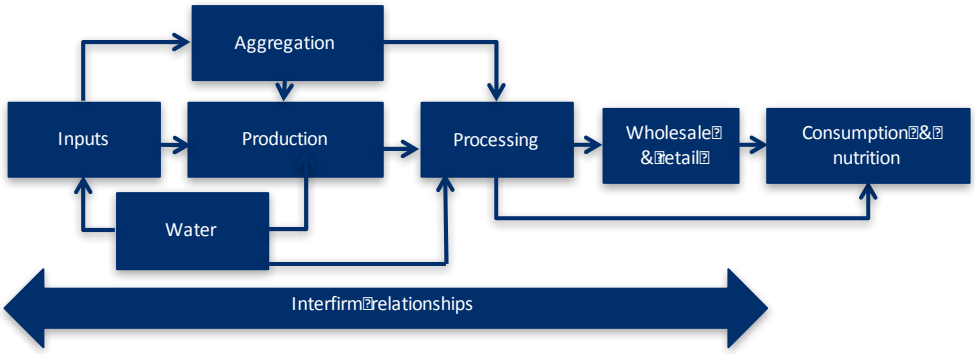
Figure 7: The Inland fisheries market system



The inland fisheries value chain

Figure 8 below shows the inland fisheries value chain. Each stage of the value chain is described below.

Figure 8: Inland fisheries value chain

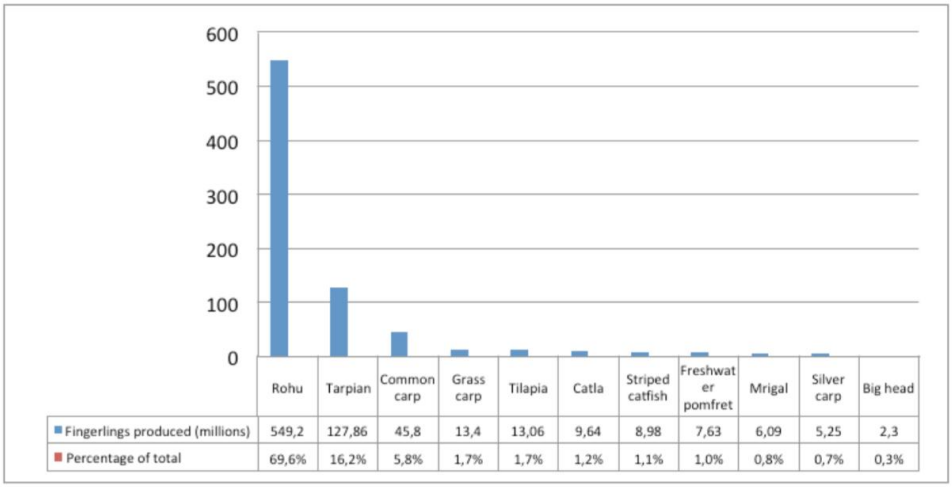


Inputs

Seed

The government supports the freshwater fisheries sector through its hatchery programmes, having released over 789 million fingerlings in 2013. Nevertheless, the hatchery programme is unable to meet sector needs. Moreover, increased supply of fish seeds and variety is limited by a lack of awareness of international demand and the absence of R&D for the purposes of adopting new production techniques and species. In addition, the DOF reports stocking 102 million fish seeds originating from the DOF hatcheries in open natural and constructed waterbodies, including Inns, in 2017–2018 (DOF 2018).

Figure 9: Government hatchery production by species



	Rohu	Tarpian	Common carp	Grass carp	Tilapia	Catla	Striped catfish	Freshwater pomfret	Mrigal	Silver carp	Big head
Fingerlings produced (millions)	549,2	127,86	45,8	13,4	13,06	9,64	8,98	7,63	6,09	5,25	2,3
Percentage of total	69,6%	16,2%	5,8%	1,7%	1,7%	1,2%	1,1%	1,0%	0,8%	0,7%	0,3%

Source: DoF statistics.

Shan East

The two hatcheries in Kengtung are the main sources of seeds in the cluster. The main species produced by these hatcheries are rohu, common carp, grass carp, local tilapia, whee phae (hilly hilsa), and mrigal. Choice of species grown is driven primarily by local fresh fish market preferences.

The hatcheries have a combined production volume of 700,000 fingerlings. As per DOF, this is not sufficient to meet the estimated requirement of 1.2 million seeds in Kengtung alone. Supply gap can potentially be met in part through productivity improvement. However, production is generally

constrained by water availability and quality. The hatcheries depend on rainfall for their water source and, as such, breeding and nursery operations are only generally carried out from April to November. If the water level becomes too low in one pond, the breeders are moved or distributed to other ponds. Growers in townships with access to water throughout the year (e.g., Mongphayk) complain that late availability of fingerlings in Kengtung results in sub-optimal productivity of their own farms.

The broods are primed for reproduction through hormone injection carried by the owner of the hatchery. Spawning is done in a circular tank which is refilled with rainwater. The eggs are gathered and placed in a hapa. The larvae or hatchlings are then transferred to a clean hapa and fed with egg yolk. After three to four days, the fries are transferred to the nursery pond. Production of 1-inch fingerlings takes about 30 to 45 days. The fingerlings are fed with ground pellet (grinding of the commercial pellet done by the hatcheries and growers) and rice bran. In essence, nursery operation is carried out by both hatcheries and growers or farmers

The price of fingerlings ranges from 20 MMK to 30 MMK per inch with mrigal as the most expensive since these are the most difficult to produce. Gross profit margin of hatcheries is about 10% to 20%.

The most saleable size is the 1-inch fingerlings. Growers complete the nursery cycle in their own nursing ponds for 3 to 6 months prior to stocking in their grow-out ponds.

The growers pick up the fingerlings in the hatcheries which are packed in oxygenated plastic bags. Unlike in other area, the hatcheries in Kengtung do no provide mortality allowance. This is most likely because they have the monopoly of the market and patterned after the trading practices of fingerlings consolidators at the Thailand and China borders.

The operators had no formal training on hatchery operations. They acquired their know-how through on the on-job training from their parents.

Hatcheries do not provide advisory support to their customers. Significant upgrading in terms of infrastructure, practices, and technical know-how will be needed to build capacity to deliver embedded services to customers. Profitability will need to be improved to make embedded service delivery a viable proposition.

Fingerlings for tilapia, which is the main species cultured by farmers and the most saleable fish in Shan East, are sourced from consolidators from the Thai and China borders and sometimes directly from hatcheries in Thailand. Price of 1 inch fingerling is about 60 MMK or 1,29 Baht. Fingerlings smaller than 1 inch cost 1 Baht. Although the Thai/China fingerlings are more expensive than the local tilapia, growers still prefer the former. As per growers, the local tilapia has a longer culture period and is generally smaller than the monosex tilapia from Thailand or China. This implies that seed investment decisions of growers are influenced by length of culture period especially for species with high consumer demand.

Shan South

Table 7: Hatcheries in Nyaungshwe

Type of Hatchery	Number of Hatchery	Major Species	Production (in pieces)	Markets
Circular spawning	1 private	Grass carp	More than 500	Yangon/Delta/Others: 80%

Type of Hatchery	Number of Hatchery	Major Species	Production (in pieces)	Markets
tank + hatching hapa		Common carp	million	South Shan: 20%
	Established by father	Rohu		
With nursery and grow-out ponds	and now managed by daughter and husband; acquired skills and know-how from father + college education and short-term training	Silver barb		
	1 DOF	Grass carp Common carp	4 to 5 million	Stocking of water bodies: 50% to 60%
	Trained technicians	Rohu Silver barb Cyprinus intha Catla		Yangon/Delta/Others: 20% to 40% Within South Shan: 10% to 20%
Traditional hapa	1 private	Common carp Grass carp	More than 600,000	South Shan: 100%
With nursery and grow-out ponds	Acquired skills and know-how from father	Rohu Silver barb		

As can be seen from the above table, Nyuangshwe circular hatcheries are important sources of fingerlings not only in South Shan but also for growers in Yangon, Delta, and other states. Farmers within South Shan generally prefer to pick up the fingerlings at the hatcheries. Fingerlings sold to growers outside of South Shan are sent via bus lines. Hatcheries generate new clients through word of mouth referral.

The main seed market is for 1-inch fingerlings as these are cheaper and are easily transported. Hatcheries provide 5% to 10% mortality allowance. A few growers buy from Mandalay private hatcheries where prices are generally lower than Nyaungshwe hatcheries.

Demand for fingerlings is higher than supply. Key constraint to scaling up of production is the limited access to water especially during the dry season. Government prioritizes water access of farm land especially those planted in paddy. Other issues raised by operators include: (i) high cost of electricity; (ii) land tenure (private hatcheries); and (iii) capacity limited by hatching jars (DOF).

There are a few enterprises in Nyaungshwe which are specialized in nursery operations. Fries/hatchlings are sourced from the Nyaungshwe hatcheries. Main customers are growers within South Shan. One nursery operator recounted fish mortality due to pesticide run-off from nearby farms.

Private seed producers in Nyaungshwe can potentially be tapped to provide advisory services. Aside from relatively high profit margin (about 50% to 60% of sales), the owners have good basic technical skills which can further be developed through training and technical assistance. Practices and infrastructure would require some upgrading to be aligned to good aquaculture practices. Delivery of embedded services can also potentially contribute to their objective of increasing market share.

Sagaing

There are two private hatcheries in Kale township and one DOF hatchery in Shwebo. There is also a DOF hatchery near Kale, although it is administratively located in Shin State. The main species cultured in private hatcheries are rohu, grass carp, common carp, catla, and mrigal. The hatcheries have nursery and grow-out ponds.

The other main actors in the fish seeds value chain in Sagaing are the traders who purchase seeds from the hatcheries and sell to growers. Hatcheries give the traders a 5% commission.

Growers may also buy directly from the hatcheries. One hatchery sold the fingerlings on credit but repayment rate was low at 15%. It is important to understand reason/s for non-repayment and assess whether credit complemented with advisory services can improve repayment rate. In the short term, it may be more prudent for the hatchery to improve quality of fingerlings, ensure timely production (aligned with water availability for grow-out ponds) and complement this with effective advisory services as a means of growing its client base.

Magway

The state has no private hatchery and two DOF hatcheries in Tandwinggyi and Pwyinpyu. Growers source their seeds from DOF hatcheries and Mandalay especially in Kume. They prefer the later for quality seeds. The growers generally buy 1-inch fingerlings.

Given the constraints on both water quality and availability as well as absence of commercial feed suppliers, focus should be on facilitating access to seeds of species that thrive well in inns under extensive culture system and the promotion of self-reproducing species.

Mandalay

Table 8: Hatcheries in Mandalay

DOF	Private Hatcheries
Pathein Gyi	Kume
Myit Thar	Ar Thit
Natyekan	San Pya (for own grow-out ponds)
Madaya	Kyaw Sen
	Kume

There are nine hatcheries in Mandalay operating as part of a vertically integrated hatchery and production farm. Four of the hatcheries are operated by DOF and the remaining five are private enterprises. Major species include rohu, common carp, grass carp, mrigal, catla, and other exogenous species. Pangasius fingerlings are sourced from Yangon hatcheries.

The hatcheries sell their seeds to growers in Mandalay, Yangon, Magway, Kale, and other states. Mandalay growers absorb about 40% of the production. Fingerlings sold to Yangon are sent via bus. Fingerling are transported in plastic bag with 500 to 1,000 pieces of 1-inch fingerlings and placed in a box for protection. Growers from neighbouring townships in Magway pick up the fingerlings themselves from the hatcheries. San Pya hatchery only produce seeds for their own grow-out ponds.

Mandalay hatcheries especially those owned by private enterprises are said to offer the best price. It would seem though that hatcheries in Mandalay are less profitable than their counterparts in other states.

Risk of in-breeding has been raised by growers in Mandalay. It is not clear whether the problem of in-breeding is more prevalent among hatcheries in Mandalay vis-à-vis hatcheries in other states or if growers in Mandalay are more discerning than their counterparts owing to their relatively more advanced technical know-how.

Aside from in-breeding issues, hatcheries face water access constraints during the dry season. Hatcheries are generally dependent on rainfall. Although Mandalay has a better irrigation system, priority is given to rice and other agricultural crops.

Kachin

Table 9: Distribution of hatcheries per township in Kachin

Township	DOF	MFF
Naimo	1	2
Putao	1	-
Shwegu	1	-
Monghan	1	2
Bhamo	1	1
Myitkyina	-	3
Total	**5**	**8**

There are thirteen hatcheries in Kachin of which, eight are owned by private enterprises. The remaining five are DOF hatcheries. Major species are rohu and other native carp species.

Hatcheries are generally underutilized and operating below par. Survival rate is generally low ranging from 20% to 50%. The hatcheries are part of an integrated nusery and grow-out production system.

Key takeaways

1. There is an effective demand for seeds particularly for one-inch fingerlings across all the six target areas. Preference for one-inch fingerlings among growers is driven by: (i) affordability – lower upfront cash investment; (ii) ease of transport; (iii) availability of nursery ponds from a majority of growers and (iv) risk mitigation – to reduce losses in case of natural disasters such as flooding or drought and ensure on time stocking of their grow-out ponds. Small size fingerlings (one inch and less), which are technically still fries, are vulnerable to predation and have a low survival rates compared to bigger sized seeds. This implies low survival rate and sub-optimal utilization of ponds. In addition, small size fingerlings imply longer cultivation period. The negative implications of using very small seeds appear to more severe among growers in Magway who stock directly to grow-out ponds (especially inns).

2. Generally, growers purchase bigger size fingerlings under the following conditions: (i) secondary species for polyculture farms - own nursery ponds are sufficient only for main species; (ii) no nursery ponds; (iii) late water availability; and (iv) grow-out ponds with sufficient water and, thus, can stock several times within the year.

3. Specialized nurseries and those having integrated hatchery–nursery-production enterprises can contribute to promote optimal utilization of grow-out ponds if they can: (i) produce ready-for-stocking fingerlings earlier than nurseries owned by grow-out operators; and (ii) make fingerlings available throughout the year especially to growers with adequate water supply. Monosex/Genetically Improved Farmed Tilapia(GIFT) may be a viable species to jumpstart the promotion of use of bigger sized fingerlings.

4. The low number of enterprises specialized in nursery operations may be attributed to the dominance of integrated hatchery–nursery–grow-out and nursery–grow-out production farms. Considering the rational for these systems, it is unlikely that grow-out farms will forego their own nursery operations. As such, it may be more viable to strengthen capacity and capability of existing nurseries to increase survival rate and produce good quality fingerlings. Nurseries in small grow-out farms generally have the lowest survival rate ranging from 30% to 40% (to be validated as most of them do not keep records).

5. The current production systems of hatcheries are not resilient to climate change. Hatcheries have limited know-how, skills, and resources to implement resiliency measures in responding, coping and adapting to climate change particularly water shortage and lower amount of rainfall. Due to adverse weather conditions (either too hot or too cold, prolonged dry and rainy seasons, delay in the start of rainy seasons), hatcheries are neither able to reach their optimal production nor serve farmers at the time that they need the seeds. For many of the farmers, late stocking beyond the favorable period meant increased risks. For consumers, especially those with a strong bias to locally farmed fish, late stocking means more pronounced seasonality of fish availability and vulnerability to price fluctuations.

6. The majority of the hatchery operators acquired skills and know-how through informal on-the-job training from their elders. Training for farmers and hatchery operators is carried out on-site on an ad hoc basis, as for example at the U Hla Kyaw Family Fish Hatchery in Nyaung Shwe several years ago.

7. In-breeding is not well understood among hatcheries and growers.

8. Except in Sagaing where traders play a prominent role in the distribution of seeds, hatcheries generally sell directly to farmers. This can provide opportunities for hatcheries to create customer loyalty through delivery of embedded advisory services (face-to-face technical advice, point-of-purchase brief technical guidance for those delivered by bus, and remote advisory services via SMS and calls).

9. Hatcheries that may most likely benefit from delivery of embedded services to retain customers and increase sales are these that have (i) production volume can be significantly increased at affordable/minimal investment; (ii) healthy profit margin or potential to improve profitability; and (iii) an interest to expand within the short-term. Promotion of embedded services among hatchery operators will require upgrading of technical, business, and customer skills.

10. A greater percentage of seed production from DOF hatcheries is allocated for re-stocking of public water bodies.

11. Choice of species produced by hatcheries in the project areas is primarily influenced by consumer demand. As such, buy-in from fish retailers and consumers is important to promoting uptake among hatcheries and grow-out operators.

Market constraints

1. Limited technical capacity of hatcheries to improve productivity and quality, diversify to other species, scale up to meet local demand, and innovate
2. Limited diversity of fish seeds available leading to a lack of diversity and limited availability of high-nutritious fish on markets
3. Limited availability and access to high quality and diverse broodstocks leading to inbreeding and limited diversity
4. Limited knowledge and exposure to modern aquaculture production and postharvest technologies
5. Weak effective demand for bigger sized fingerlings
6. Lack of business management skills
7. Market distortion created by DoF hatcheries create market entry barriers for private hatcheries
8. Absence of small and large scale nursery operators
9. Limited technical know-how and skills to improve survival rate

Feeds

The aquaculture sector struggles with inadequate quantity and quality feed supply. Importation limits on enriched flours and other key inputs compels hatcheries to use oilseed cakes as an alternative. However, there is also a short supply of cake for the fisheries sector since a large majority of the cake is absorbed by the livestock sector. Also, it has only been possible to import oilseed cake since 2012 and current volumes remain insufficient to satisfy a growth in hatcheries production. Another issue is the uncertain quality of the cake that is imported, as border controls of oilseed cake imports remain inadequate due to limited testing facilities and the absence of standards against which to evaluate the product. In order to stimulate hatcheries production and demand for quality feeds, it is important to ensure fish farmers are informed of the issues associated with feed quality.

On the other hand, the difficulties to import enriched flours provide an opportunity for Myanmar to develop local/regional feed production facilities using ingredients sourced locally. This approach will be much more climate friendly and is in line with the current trend to produce locally and consume locally (shorter supply chain). However, it will not address the short supply of ingredients. Addressing this supply issue will require innovative solutions that can complement oilseed cake and rice barn. Another challenge mentioned by some farmers during the scoping study is the availability of rice barn now that paddy can be exported. It is also important while considering the shelf life of feed. Farmers met during the scoping study mentioned that imported feed had a longer shelf life than that produced in Myanmar.

There are about 11 aquaculture feed mills in Myanmar producing sinking and floating pellets. Domestic consumption of commercial aqua feeds in 2018 was estimated at 500,000 MT with about 100,000 MT imported from Thailand and Vietnam. (Aung, November 2018) Commercial feed consumption is projected to increase to 700,000 MT in 2020. There are no specifications or standards for animal feed imposed by the government of Myanmar. Feed millers are free to use their own nutritional formulas.

Key ingredients used in the manufacture of feeds include rice bran, fish meal, peanut cake, soybean cake, sesame oil, sunflower cake, and other oil-based cake. Local production of raw materials and ingredients is not sufficient to meet competing demands of various sectors. During the past two years, for example, farmers preferred to sell fresh peanut to exporters for the Chinese market rather than local oil mills since the former offered a higher price. Importation of ingredients except for rice bran has significantly increased during the recent years. The quality of ingredients is also inconsistent and vulnerable to contamination (e.g.: aflatoxin for groundnut).

Htoo Thit, one of largest aqua feed companies in Myanmar, operates a quasi-contract farming system, under which farmers who bought feed on credit from dealers accredited by the company are required to sell through wholesalers affiliated with the company. The outstanding feed credit is deducted at the time of sale. Land use certificates are required as collateral for the feed credit. Under the contract farming scheme, farmers are not allowed to set-up poultry farms over the grow-out pond. This is said to be in response to complaints of customers that fish has "poultry smell and taste" and fear of contamination.

In the project areas, commercial feed pellets are used mainly by growers of tilapia (monosex; Thai or China seeds) and Pangasius. Growers of the various carp species use farm-made feeds consisting of rice bran, groundnut cake, cottonseed cake, sunflower cake, soybean cake, and broken rice.

Table 10: Feeds use and source of feeds in project areas

Project areas	Major Species	Feeds	Source of Feeds
Shan East	Tilapia With rohu, mrigal, whee phae, and other carps as secondary species	Commercial pellet (ground) during nursery and limited quantities during grow-out	Htoo Thit/De Heuss/ Thai and Vietnamese brands: input retailers in Kengtung Some growers who prefer Thai brand buy from the border area
		Rice bran Peanut cake MySAP formulated feeds	Rice mills Input retailers – hard to source in recent months Home based production for own ponds; only in Kengtung
Shan South	Rohu Carp Barb	Commercial pellet (ground) during nursery; few bags during grow-out for those raising rohu	Yangon – delivery by express bus (1,000 MMH/bag transport cost)
		Rice bran Peanut cake	Rice mills Oil mill; most of the oil mills have shifted to soybean due to tight supply of peanuts and declining price of peanut oil in the world market

Project areas	Major Species	Feeds	Source of Feeds
Sagaing	Rohu	Rice bran	Local retailers
	Carp	Broken rice	
		Peanut cake	
		Sesame cake	
Magway	Carp	Rice bran	Local retailer
		Natural food – algae and plankton	
		In inns, fish is fed only during the nursery stage. Grow-out – natural food	
Mandalay	Rohu	Rice bran	Rice mills/ Oil mills
	Carp	Broken rice	Local retailers
		Peanut cake	
		Sunflower cake	
		Cottonseed cake	
		Fermented feeds	Own production
	Pangasius	Pellet feeds	Own feed mills
Kachin	Rohu	Rice bran	Local retailers
	Carp	Broken rice	
		Peanut cake	

Across all project areas, rice bran and oil cakes are the major feed components among carp farmers. A complaint raised by growers across all states is the inconsistent quality of rice bran. Large rice mills tend to produce finer rice bran than small scale mills.

Key takeaways

1. Promotion of monosex tilapia/GIFT – carp polyculture can potentially drive farmers to invest in better quality feeds including commercial pellets. Feed companies are more inclined to invest in the development of a distribution channel when there are clear market opportunities.

2. In areas where growers choose to engage solely with carp species, better feed rations, use of better quality and sufficient quantities of rice bran, peanut cake, and other oil cakes may be a more viable strategy to improve farm productivity and gustatory and nutritive quality.

3. In many cases, growers have limited knowledge on how to optimize their feeding strategies especially the interactions between feeding behavior and environmental parameters and the contribution that natural productivity makes to the nutritional status of the culture system. From an economic perspective, the high costs that accrue to feed use suggest that the optimization of feed management practices will have a significant impact on the economic viability of a grow-out pond.

4. Collective procurement and/or processing of feeds (adjusting and scaling up of MySAP/MyCUTURE business models) can lay the groundwork for farmers to lower feed costs and judiciously use feeds.

5. The selection of feeds by farmers is usually based on affordability and quality. Farmers generally assess quality based on past feed performance. From a more technical perspective, one of the more important criteria for feeds selection is their efficiency in terms of their Feed Conversion Ratios (FCR). Many farms, however, do not keep records and documentation of their production, productivity, costs and benefits, as well as of the environmental conditions (e.g. rainfall, presence

of algae etc.). Consequently, FCR is not rigidly monitored. Building capacity of growers to monitor FCR and demonstration of outcomes of different feeding regimes can potentially stimulate effective demand for better feeds.

6. Quality of rice bran appears to be a problem across all project areas. A directory of rice mills with good quality bran appropriate for fish feed can help farmers make informed decision. A one-off orientation of rice mills on rice bran quality may also help alleviate the problem.

Market constraints

1. Limited availability, accessibility and affordability of feeds in rural areas
2. Low use of commercial feeds/nutritious feeds
3. Poor feed management practices
4. Increasing lack of feeds ingredients and lack of innovation to find alternative ingredients for feed
5. Lack of market research on feeds
6. Inconsistent quality of feed ingredients and vulnerability to food safety risks
7. No commercial feed retailers in South Shan
8. Companies have difficulties to access financial services and do not offer financing options to farmers

Grow-out pond production

Table 11: Snapshot Description of Grow-out Pond Operations

Project areas	Description
Shan East	Nursery + grow-out ponds Water source: Kengtung – rainfall; water quality seems not good; Mongphyak – streams, rivers, rainfall; year round water access Farm size: 3 to 8 acres Semi-intensive system especially for tilapia – carp polyculture Growers use commercial feeds but positive impact diluted with use of small sized fingerlings; practices not generally aligned with GAqP Water constrained in townships such as Kengtung - only one stocking per year Mongphayk – stocking can be done twice a year Labour: household members Partial harvesting: vendors direct the harvesting and provide the labour Acquired skills and know-how from parents, peers, and from experience (trial and error) Some farmers attended DOF/MySAP training
Shan South	Nursery + grow-out ponds Proliferation of integrated fish poultry farm using commercial feeds About 30 farms have adopted rice-fish farming; access to water pump to maintain water level and aeration appears to be critical Water source: dam/irrigation, rainfall Farm size: 3 to 20 acres Limited use of better feeds + small sized fingerlings + low labour inputs - farm management and

Project areas	Description
	maintenance leading to long culture period Risk of pesticides' contamination from nearby agricultural farms One stocking per year Labour: household members Partial harvesting: owner does the harvesting and delivery to buyer
	Difficulty in obtaining land certification use and license Some farmers have attended at least one DOF training but generally they felt it lacked depth
Mandalay	Nursery + grow-out ponds Water source: dams, creeks, streams, rainfall Farm size: 5 acres and above (Madaya) Multiple stocking per year Relatively high FCR (Madaya) Hired workers + household members
	Difficulty in obtaining land certification use and license Majority have attended at least one training on aquaculture; grow-out ponds interested in updated technologies

Key takeaways

1. Weak compliance to GAqP and limited capacity to mitigate effects of climate change undermine profitability of operations.

2. Growers in a township generally grow the same species. Diversification of fish species can reduce risk of falling prices during peak harvest season and improve nutritional outcomes. Species such as tilapia and mola that consume plankton can also improve water quality in ponds and in effluents at harvest. Growers especially in Magway though are not so 'happy" when mola naturally enters their ponds as they believe that these compete in the utilisation of feeds. It is important that these beliefs are addressed and farmers are trained on how to manage mola–carp–tilapia polyculture farms to ensure optimum pond performance.

3. Incomes are eroded due to lack of economies of scale (e.g.: small individual purchases of inputs, high transport cost per unit of produce, etc.) Farmers in the same village tend to help each other and share information but there have been little initiatives to exploit opportunities for collective procurement and marketing.

Market constraints

1. No or limited access and availability a of Small Indigenous Species (SIS, e.g. Mola) and Self Recruiting Species (SRS), eels, prawns and non-exotic species seeds (e.g. Mrigal)

2. Lack of information about the quality of seeds and farmers/traders/aggregators are unable to distinguish between good and poor quality seeds

3. Limited knowledge and access to knowledge about fish and pond management including climate smart technologies

4. Limited or no access to fishing gears

5. Weak bargaining power of farmers

6. High transaction costs

Leasehold fisheries (Inn) production

The range of freshwater fish species farmed and variety of technologies deployed in their production is extremely limited, being comprised largely of Indian major carps raised in polyculture in semi-intensively managed ponds15.

The maps and charts used by the DoF in the Inn Book date back many years and need to be updated to include hydrological changes in river courses, wetland extent, and land use.

The MyFish 2 project plans explore management options for leasehold fisheries (Inn) in the delta. This project is accumulating the first detailed database for Inn in modern times. It is also evaluating the effectiveness of the common practice of stocking with fingerlings from hatcheries.16

Market constraints

1. No innovation in leasehold fisheries management e.g. production of seeds and fingerlings

2. No GIS for demarcation of Inn, tender, and open fishing grounds; license freshwater fishers; and ID cards technology are not being used

3. Limited understanding and analysis of the Inn's management, the impact of stocking in open and natural water bodies its impact on the environment and biodiversity

4. Conflict between companies managing inns and small holder aquaculture farmers and/or fisherman, conflict between fishing and farming areas

Processing

A key challenge faced by fisheries processors is the limited supply of fish for processing. The production in the in the intervention area is currently lower than the demand which means fish is imported from other parts of the country and even, sometimes from Thailand. A key challenge for fisheries processors is the difficulty of increasing processing volumes due to low and irregular supply of raw materials. This was mentioned by a processor of smoked-fish in Sagaing during the scoping mission. What was noticeable in this cottage processing unit adjacent to the house of the owner was the likely cross-contamination that was occurring between the poultry roaming on smoked fish processed to be exported to the Indian market.

Another challenged is the absence or inadequate supply of clean water for human consumption. This issue at landing sites and ice factories leads to possibilities of contamination of fish and crustaceans. In processing plants, the absence of a clean water supply can lead to failures in compliance with sanitary, phytosanitary and technical barriers to trade measures. To ensure compliance, processors need to invest in large water treatment facilities, which heightens production costs17.

15 The World Bank

16 The Wold Bank

17 Myanmar Ministry of Commerce, International Trade Center, National Export Strategy, Fisheries Sector Strategy 2015-2019

The limited availability of key inputs such as spices, food preservatives or even breadcrumbs makes it difficult for processors to innovate.

Market constraints

1. Limited supply of fish for processing

2. Lack of knowledge, productive assets and market linkages to process nutritious and healthy products and/or prevent nutritional degradation

Consumption and nutrition

Across all project areas, growers sell their fish harvest in the local market either directly to fish retailers or through traders. Interviews with fish retailers and traders in Shan East, Shan South, and Mandalay indicate that local fish production in these areas is not sufficient to meet local demand.

Table 12: Fish supply in local market in selected townships/state

Project Areas	Indicative supply and demand conditions
Shan East Kengtung Market	Fish retailers harvest directly from the grow-out ponds. They bring their own laborers or harvesters. Retailers deduct 300 MMK per viss from buy-in price to cover harvesting costs. The retailers usually maintain a network of 10 to 15 grow-out farmers to ensure daily supply. Local aquaculture production accounts for 70% to 80% of supply. The remaining supply comes from China, Thailand, and Yangon. Fish supply from Yangon consists primarily of capture fisheries and "bigger size" farmed species Imported fish from China and Thailand fills up the gap during the dry season. Generally, consumers prefer the local farmed fish for the following reasons: (i) cheaper than Yangon fish; (ii) perceived to be fresh (still breathing) vis-à-vis "iced fish" from Yangon, China, Thailand; and (iii) better taste – which most fish retailers relate to non-use of ice and freshness. When local supply of farmed fish is low or almost nil during the dry season, fish demand is also low. As per vendors, households cut down on fish purchase during the dry months as they do not like so much the "imported iced fish" due to freshness, taste, and price issues mentioned above. Households generally prefer to buy medium to large size fish as these are perceived to be more "economical", easier to cook, and more "satisfying" to share than small size fish.
Shan East Mongphayk Market	A few of the grow-out ponds also have stalls in the market. Grow-out ponds sell directly to fish retailers. About 60% to 70% of supply comes from local aquaculture production. Fish supply is augmented by supply of "iced fish" from Thailand.
Shan South Nyaungshwe Market	Grow-out farmers sell to fish traders who in turn supply the local retailers. Local production accounts for about 40% of supply in terms of weight (volume). Iced fish from Yangon augments local supply. Fish from Yangon consists of capture fisheries and bigger size farmed fish species. Households generally buy locally produced fish. Preference is for small to medium sized fish primarily due to price considerations. Main customers of the fish from Yangon are the restaurants/hotels.

Mandalay region Mandalay market	Grow-out ponds sell to traders. Fish retailers get their supply from traders. The larger grow-out ponds also undertake wholesale and retail functions. Daily requirement is estimated at 70,000 to 80,000 viss. Local production supplies 60% of fish market. The remaining 40% comes from Yangon. Households generally prefer locally produced fish. Although not validated, it is said that a small percentage of local production is sold in Kachin public markets.

Studies have indicated that prices per calorie of the most micronutrient-dense foods in Myanmar are considerably higher than those of staple foods such as rice, which are calorie-dense yet relatively low in micronutrients. These studies suggest that a key factor leading many Myanmar households to over-consume staples such as rice and under-consume more nutrient-dense foods is their inability to afford the latter. (Mahrt, Mather, Herforth, & Headey, June 2019)

Table 13: Price comparison of staples and protein sources

Food Items	Price per gram (kyats/gram)	Price per calorie (kyats/calorie)	Ratio of price/calorie to rice
Rice (Emata)	0.42	0.12	1.0
Rice (local variety)	0.46	0.13	1.1
Rice (Ngasein)	0.38	0.10	0.8
Chicken	5.80	2.90	23.8
Pork	3.82	0.97	7.9
Ngapiyae (fish sauce)	1.23	2.22	18.2
Ngagyin (Mrigal)	3.54	4.08	33.5
Ngayant (snakehead)	2.95	3.98	32.7
Ngamyitchin (rohu)	2.26	2.24	18.4
Ngapyayma (climbing perch)	2.12	1.20	9.9
Other small freshwater fish	2.12	2.14	17.6
Other dried small seawater fish	3.07	1.79	14.7
Other dried small freshwater fish	3.13	1.46	12.0
Other dried medium freshwater fish	3.67	1.63	13.4

Source: (Mahrt, Mather, Herforth, & Headey, June 2019)

The harvest and availability of SIS vary with the seasons. As such, it generally commands a higher price in the market vis-à-vis the commonly farmed species and capture fisheries. Most of the supply comes from capture fisheries and, to a limited extent, from ponds where SIS naturally enters or grows. There is no purposive farming of SIS in the target areas.

Aside from supply and affordability issues, consumption of mola and other SIS is to some extent hindered by higher intensity of labour and preparation/cooking time required vis-à-vis common farmed species. Likewise, there are many parents that are concerned with the potential of choking on fish bones especially for children below five years old.

Majority of the consumers are aware of fish as a source of protein supply but there appears to be little awareness of fish as a source of micro-nutrients and lipids as well as the calcium content of fish bones. There seems to be also limited awareness on how cooking method can potentially affect nutrient content.

Key takeaways

1. Supply deficits of farmed fish and inability of majority of the project areas to produce fish year-round have significant impact on animal protein and nutrient intake of households in these areas given the strong preference for locally farmed fish.

2. The high price of SIS in the local market is good for farmers but may be detrimental to making it a popular choice among resource constraint households. Scaling up its production through pond culture can potentially reduce the price. Interventions to increase SIS production should be supported with introduction of recipes that are easy to prepare and cook, and favour the entire utilisation/consumption of the fish.

3. Improving supply chain efficiency and farm productivity can significantly reduce the gap between price per calorie of fish and rice. Likewise, species and product formats that have low price per calorie should be included in nutrition education. Integrating price awareness in nutritional campaigns may have a greater potential of gaining the attention of nutrition influencers in households such as mothers and grandmothers.

4. Inclusion of cooking methods/food preparation in nutritional campaigns is important to prevent nutritional degradation and potentially can motivate increased fish consumption.

5. The consumer places a high level of trust in the retailer. Consumers have the tendency to transfer the responsibility of some of their consumption decisions to the retailers. As such, retailers should be among the key partners in any nutrition communication action.

Market constraints

1. Consumers are not aware of the nutritional benefit of the different species of fish

2. Under five years old and children do not benefit from regular consumption of fish and diverse food

3. Small size fish from the wild is expensive due to low and erratic supply

Interfirm relationships

Small volumes of outputs pre-dispose SSA growers to weak bargaining position in the market. Incomes are eroded due to lack of economies of scale (e.g.: small individual purchases of inputs, high transport cost per unit of produce, etc.) Growers in the same village tend to help each other but there have been little initiatives to exploit opportunities with respect to collective procurement and marketing.

Generally, there is a high degree of information sharing among growers and hatcheries in the same village but quality of information shared depends on community knowledge base which in turn is shaped by their access to relevant information. In many cases, aquaculture farming practices are perpetuated through peer-to-peer interactions. A new practice or technology is adopted by a wider majority when proven to be beneficial, accessible, and affordable. Growers with stronger networking contacts have a greater absorptive capacity and are the more innovative farmers.

Growers generally do not see each other as competitors despite selling into the same market or even the same buyer. Growers do not feel any competitive pressures nor do they have real incentives to compete on performance, thus stifling upgrading.

Traders and fish retailers appear to be unorganized and, thus, do not have the platform for a meaningful exchange of information that can trigger upgrading in their operations. They do, however, exchange market and product information informally but quality of information shared can be significantly improved.

Marketing relationships between fish intermediaries – growers and growers – seeds and feeds suppliers are informal and characterized by the concept of personalized economic relations. The preferred supplier-buyer relations proliferated in efforts to find ways to minimize risks and vulnerabilities to opportunistic behavior. The depth of the relationship differs with each relation but, over time, repetitive transactions with the same person develop trust. On both sides, there is reduced search, negotiation, and monitoring costs because the supplier lives up to the norms and values of reciprocity and comes close to becoming part of the family mindset. The bonds between people engaged in exchange are determined by informal rules or social institutions and serve to enforce the terms of the exchange.

Key takeaways

1. Households engage in SSA in the same village know each other quite well. These personal and social relationships, improved bargaining position, and reduced cost of transaction through economies of scale can be harnessed to get players to work together.

2. If growers jointly bought their fingerlings and feeds together, they can potentially present a sizeable demand to encourage feed suppliers to sell to them directly, but also make it possible to bargain to procure the inputs at a cheaper price and of better quality. Strong and well managed grower groups can give members a structure and an organization with which to resolve many of the constraints they face in improving their livelihoods as well as an opportunity to act on market opportunities they identify.

3. Collective enterprises can also provide the platform for the promotion of value addition. Thrust of project's support may be directed to assisting grower groups to engage in communal business oriented activities that would allow them to take on additional functions in the chain such as bulk procurement of feeds, production of nutritious feeds, operations of fish collection centre and retail outlet (in areas far from public market) and processing. Likewise, it is best to start with low-risk low-cost collective initiatives so as not to overwhelm growers especially if they are not used to working in formal organizational structure.

4. There is a need for a social infrastructure that would provide opportunities for SSA supply chain players including feed and seed producers to meet and interact as a first step to building trust which is essential in formation of collaborative relationships. Rather than forming new coordination structures, it is recommended to build on local socio-cultural events and festivals as venues for players to socialize in informal settings and on existing social networks such as informally organized supply chains (traders and their preferred suppliers; hatcheries and their regular customers), village development councils, MFF and their constituents, etc. to make use of their existing governance structures and built-in constituency.

5. An influential core group can be leveraged to involve their peers and make that one small shift that produces widespread change. In collective groups, it is natural for many people to wait and see how things go. A strategy that the project can use is to informally form a core group of champions consisting of people identified as early adopters and use this group to win over the early majority. This will allow the project to build strategically and incrementally so that the change process acquires momentum.

Supporting Functions

Figure 10 below shows the inland fisheries market supporting functions.

Figure 10: Inland fisheries market supporting functions

Infrastructure

In terms of land, telecommunication and utilities supply, land security is the largest issue hampering Myanmar's aquaculture.

Land

Land is the fundamental resource at the foundation of aquaculture and integrated systems. There are various classifications and categories of land under Myanmar law, which determines their jurisdiction and use. There are a number of key concerns that can impact on the development of the aquaculture sector, and the risks associated with land. These are summarised below:

1. Rural land classifications do not accord with the actual land use on the ground or perceptions of its status by customary land tenure and systems;
2. Demarcation of different land categories is not always clear and often disputed;
3. There is a degree of confusion on the status of land and ownership due to the number of old, conflicting laws on land classification and consequential differing and overlapping understandings and definitions which can then potentially contribute to land conflicts and tenure insecurity.18 This can particularly impact on smallholders, women and ethnic communities practicing traditional farming;

18 Food Security Working Group-Land Core group, 2012. Legal Review of Recently Enacted Farmland Law and Vacant, Fallow and Virgin Lands Management Law, Yangon, Myanmar P.9

4. There are overlapping ministerial jurisdictions on land, particularly between the Ministry of Natural Resources and Environmental Conservation (MONREC) and the Ministry of Agriculture, Livestock and Irrigation (MOALI). For instance, management of bodies of water on forestry land is under the MOALI and provides for different types of public access;

5. Formal land ownership and extent of registration at the individual and household levels are low and possibly in the region of 15%;19

6. Existing customary land tenure and land use systems are, to date, poorly documented. Where some research has been conducted20 there appear to be broad rules concerning community tenure and systems for allocation for household and individual use across the ethnic group with variations in practice at the community level; and

1. The existing legal frameworks appear inadequate for the formal recognition and protection of customary communal land tenure rights and a new legal mechanism specifically designed for the Myanmar country context is needed (LCG, 2015).21

Fundamentally, there are some important legal barriers to growth of the aquaculture, and as shown above there is little that positively and transparently articulates specific support to the development of existing ponds and/or the emergence of new ponds as well as processing, storage and other aquaculture facilities. Indeed, any investment in production or processing requires securing a reliable license and source of supply provided by clear land and resource rights to ensure an economic return whether it is by the private sector, SSA or communities.

According to the land policies adopted by the previous democratic government, profound changes to the current land-related economic, social, and political-institutional landscape in Myanmar should have been made. With its complex history of political and armed conflict and protracted displaced populations.

Market constraints

1. Difficulty to secure land ownership (and land use limit aquaculture investment and create concerns and fears for farmers

2. Lack of consistency, clarity and cost on the process to obtain pond license, lack of trust by farmers and business on the outcome of the application they make to obtain a land title or a land use permit

Roads

The institutional structure for Myanmar's transport sector is complex as there is no single agency with clear oversight of the sector. Responsibilities have been shared between six ministries, various city development committees and state-owned transport enterprises, where relevant. There is no formal coordinating platform to develop an overall strategy for the sector and no clear lines of responsibility within the fragmented institutional structure. Among the government agencies overseeing the transport sector, the Ministry of Transport (MOT), the Ministry of Rail Transportation (MORT) and the Ministry of Construction (MOC) play pivotal roles.22

Roads are covered/surfaced between major cities such as Yangon, Mandalay, Nay Pyi Taw, Malawmyaing, Taungyi. But those in mountains, forests and rural areas are primarily dirt, narrow, rough and gravel. There are three main highways or corridors running north-south in Myanmar, namely:

19 Land Core Group, 2015. PowerPoint presentation on the customary land studies in Chin and Shan States

20 See for instance Gret, 2012, LCG, 2015 on Chin and Shan

21 Land Core Group (2015), A Summary of the National Dialogue on Customary Communal Tenure of Rotational & Fallow Taungya: Policy Brief prepared for Land Core Group, LIFT, Yangon

22 ASEAN-Japan Transport Platform Project, Myanmar Road Transport Administration Department

3. Yangon – Mandalay (Rangoon – Mandalay) Highway. The road passes through major cities in central Myanmar such as Bago (Pegu), Taungoo, Pyinmana, new capital Naypyidaw and Meikhtila (Meiktila). This road is 695 km long;
4. Yangon – Pyay (Rangoon – Prome) Road. This road was built by the aid of the Japanese Government, and considered the best road in Myanmar. It runs west of the Pegu Range (Bago Yoma) is 288 km long; and
5. Western Union Highway. This is part of a proposed Pathein – Monywa Highway, which connects towns and cities on the west of Irrawaddy River (Ayeyarwaddy). The road is still under construction and for the most part the condition and the quality of the road is very bad.

Another important road network extends from these three corridors that are economically important in Myanmar. These are:

6. Mandalay – Lashio Road, 262 km, an important for road for the China-Myanmar border trade;
7. Meikhtila – Taunggyi Road, 205 km; and
8. Pyay – Magway Road (Prome – Magwe Road), 202 km, a continuation of Yangon-Pyay Highway, along the east bank of Irrawaddy.23

About 10% of roads in Myanmar are developed, and about 40% are graded roads while the remainder are mostly dirt tracks. During the monsoon season, some roads can't be used for transportation. Some mountain and rural roads are in poor condition, and become impassable during the rainy season. Some roads have pavement sections that run only a few miles and then deteriorate into potholes, washboard ripples, dirt and rocks. Maps showing roads are often unreliable. Sometimes well-defined roads on maps disappear into dried creek beds. Most of the paved roads are in the cities and main towns.

Farm-to-market roads, and links between rural and urban market centres, are very poor in many of the townships resulting in transportation costs and high post-harvest losses. These are also significant barriers for farmers to gain quick and easy access to market information.

Market constraints

1. Lack of road system limits potential sites for cluster development around SSA hubs and limit quick access to market and market information

Energy

Myanmar's national electrification ratio is only 32%. Access to electricity limits economic opportunity in the rural areas. Processors for example state that not having access to higher voltage electricity, bars them from scaling up the size of their machines. Diesel generators or solar systems are often used to supply electricity for economic activity (as well as for private use), and those who cannot afford their own pay others for the service of providing electricity. Average annual per capita electricity consumption is 160 kWh, roughly one-twentieth the world average24. In general electricity provision service is unreliable.

Energy mix

About 75 % of Myanmar's electricity on the national grid is generated through hydroelectricity; 20 % with natural gas, 3 per cent with coal and 2 per cent with other sources25. Most mini-grids operated without licenses, as there is currently no legal framework for small power producers. Foreign

23 http://DoF.asiatradehub.com/burma/roads.asp
24 Source: Smart power for Rural Development Myanmar Mini-Grid Market Assessment, Rockefeller Foundation, 2016
25 Myanmar Climate Change Strategy and Action Plan (MCCSAP) 2016–2030, Ministry of Natural Resources and Environmental Conservation (MoNREC), the Republic of the Union of Myanmar, 2016

Investment Law (2012) Rules, however state electricity generation under 10MW is reserved for Myanmar operators. The national grid suffers inefficient generation and has an aging transmission and distribution network resulting in 20% losses. Often however, diesel generators supply the electricity that the grid fails to supply in areas not covered by the grid or during electricity black-outs, which are still frequent.

Energy policy

Three plans guide the energy sector: National Electrification Plan (World Bank, universal electricity access by 2030), Myanmar Energy Master Plan (ADB), and National Electricity Master Plan (JICA). Since the Electricity Law (2014), the Ministry of Electric Power, region and state governments and leading bodies of Self-Administrated Zones (SAZ) and Self-Administrated Divisions (SAD) have the power to grant permits to allow persons to engage in electricity related works, including generation, transmission and distribution of electric power.

The difficulty of regular access to energy has been identified as a key challenge by most enterprises consulted for the elaboration of the 2015-19 NES. The fishery sector is no different. The absence of a reliable and consistent supply of electricity in rural and urban areas makes it challenging for processors to ensure supply and quality consistency of their products. Irregular supply of electricity also requires enterprises to run expensive generators which increase the cost of doing business.

The fisheries s sector can generate some of its required electricity while new national level electricity generation capacity is created. The electricity demand in the fisheries sector is mainly for water pumping, refrigerated storage, ice production and processing. There are a number of initiatives in Myanmar from the private sector, non-governmental organizations and ministries (the Myanmar Scientific and Technological Research Department and the Ministry of Energy) to pilot alternative energy production. Support to these alternative energy production initiatives would help increase the production and quality management capacities of the sector. There is a specific need to simplify the negotiations and procedures required to set up alternative energy production units.

During the scoping study, some hatcheries mentioned electricity to pump and oxygenate water was an issue. However, inland capture and aquaculture production do not need energy in quantities that cannot be generated by sustainable and off-the-grid sources of power such as solar, wind and mini-hydro. Some of these solutions can be created and have been observed on-farm ((i.e. vortex in Kachin state). However, ice production is more reliant on electricity to power machines and factories often should rely on grid-system and expensive diesel generators that require significant investment to purchase, fuel and maintain.

Market constraints

1. Lack of availability of low cost power

Communication

Media and ICT landscape

In a survey by BBC Media Action, access to mobile phone (65%) ranks first of all media platforms for respondents in rural areas, followed by radio (59%), TV (47%), Internet (20%), Radio on mobile phone (16%), satellite dish for TV (15%) and newspaper (10%)26. Internet in rural areas though is

26 MYANMAR, How the people of Myanmar live with climate change and what communication can do, Anna Colquhoun, Henning Goransson Sandberg and Muk Yin Haung Nyoi, Climate Asia, BBC Media Action, 2016

most likely also accessed through mobile phone. Main source of information on changes in the weather and environment for farmers specifically was the radio (67%, compared with 55% overall), and 61% had a radio set in their homes, Myanmar radio (82%) and Shwe FM (48%) being the most popular channels among farmers, who mostly tuned in from 6–8am, and 7–9pm.27.

Mobile telephone ownership and use

After liberalizing the telecommunications market in 2014, the majority of the population went from no access to phone, straight to access to smartphones and data. Household mobile phone ownership across Myanmar has grown dramatically to 87% in urban and 66% in rural areas28. However actual rates of use are lower: 77% in urban areas and 56% in rural areas. A reason for the difference in rates between access and use, is most probably due to the costs associated with mobile phone use (top-up, charging29, etc.). Women are 28% less likely than men to own a mobile phone, with related disparities in digital skills and use, and it affects women and girls access to opportunity and agency and informed decision making30. Most farmers have two SIM cards, because signal can still be very patch in rural areas.

Low levels of digital literacy

Myanmar farmers generally have low levels of digital literacy31. They do not use their smartphones to browse websites and their experience of the internet is primarily driven through Facebook; They change accounts often, because they change their phone or SIM card. Agro dealers and agricultural extension staff are generally the gateway to introduction of the use mobile apps for agriculture.

Mobile apps

There is an array of app designed for farmers and other actors in the agri-food value chains revolving around access to agriculture information about growing practices, agri-inputs, market prices and weather information. These app are slowly moving into the space of micro finance and mobile money and trade. Independent trade platforms are also emerging, targeted more towards the trader that the farmer, however not exclusively. In order to address inclusion of elderly or sight impaired, many of these apps provide sound-bites of the information available.

Geodata for Agriculture and Water

Several initiatives are underway exploring how satellite images for geo data on land use and water can be made useful for agriculture. Some are working together with local agri-apps to make useful information available to farmers directly. None of these seems to be focusing on aquaculture.

FinTech

Myanmar has a few nascent mobile money service providers, including B2B solutions, bill payment, peer transactions, etc. (wave money, Ongo, OK$, PayHere/1Stop, etc.). Financial services, made

27 MYANMAR, How the people of Myanmar live with climate change and what communication can do, Anna Colquhoun, Henning Goransson Sandberg and Muk Yin Haung Nyoi, Climate Asia, BBC Media Action, 2016

28 Myanmar Living Conditions Survey 2017: Key Indicators Report", Myanmar: Central Statistical Organization (CSO) Ministry of Planning and Finance, UNDP and WB, 2018

29 In rural areas without electricity people commonly pay for 100 MMK for their phone to be charged at a solar-powered service provider.

30 Ending the Gender Digital Divide in Myanmar, IREX, 2017

31 *Myanmar Rapid eTrade Readiness Assessment*, UNCTAD, 2018

available through digital channels can include payments, credit, savings, transfers and insurance and since rural populations are underserved by the formal financial sector, fintech offers a possible solution to reach them.

Market constraints

1. Market players are not exploiting ICT

Logistics

The Logistics Performance Index assesses a country's logistics based on efficiency of the customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time. Myanmar is ranked 139th out of 167 countries worldwide which is very low compared to other fishery countries such as Thailand and Indonesia which were ranked 34th and 51th respectively32.
During the scoping study, apart from Mandalay and Sagaing markets where the good seem to be moving quickly and in decent conditions (e.g. refrigerated trucks and ice) from other parts of Myanmar such as Bago, most fresh fish transported locally was not properly transported. Wholesalers in Kengtung market use cool boxes and ice to ship fish to neighboring townships. Apart from these two examples, the logistic of the fish market is underdeveloped due to a lack of infrastructure, specialized services and most importantly limited value of fish and limited purchasing power of most consumers.

Market constraints

1. The market is not performing well for high-value live and fresh fish, eels and shrimps due to a lack of cold chains and specific supply chains

2. Ice is expensive when ice factories are not located around harvesting point and markets

Labour market

The majority of Myanmar's rural population is fully or in part dependent on agriculture for their livelihoods, and 70% of the population is rural. Even a high proportion the landless population is traditionally linked to agriculture as farm labour, this link that has been on the decline. Rural households are shifting towards more diverse livelihoods and non-farm work. As agricultural production intensifies and mechanization increases, so do labour shortages in the peak seasons of crop production. However, mechanisation is limited in aquaculture and machines cannot substitute the highest labour-intensive production and post-harvest activities such as harvesting and processing.

The labour market for SSA involves family members, part time and full time workers. Finding casual, part time or full time labour has not been mentioned as an issue by any of the respondents interviewed during the scoping study. Most of the SSA and businesses interviewed were working with family members. The largest businesses visited a dry fish factory in Mandalay employed around 30 workers all from the surrounding areas. They were mostly women and were getting 5,000 Kyatt per day, plus lunch and were working seven days a week.

Wages and skills

32 World Bank Logistics Performance Index

Studies show that fixed rate daily wages of women are approximately 20%33 to 30%34 less than what men earn for the same work, based on the premise of the division of labour upheld. For more strenuous tasks one would hire men and women labourer are called for typically for weeding etc. They often have little bargaining power as usually there is a set village price which is adjusted every growing season.

However, labourers with specific skills do get higher wages and more responsible jobs. At the bottom end of the spectrum are those conducting purely physical labour, and higher up the ladder we find those with skills, or good with math skills (and being reliable with money) to handle cash payment transactions for someone. Usually farmers, in need of these skills, will know how to find them as their "added value" is known in the village35.

Labour and migration

Lack of job opportunities and mechanization are some of the push factors for migration, while pull factors are the opportunities and higher wages in cities or even abroad. For poor households, internal migration is one of the most common coping strategies to stabilize their livelihoods in the face of environmental, social and economic shocks. For these household's migration is often the only option to bridge seasonal agricultural income and employment.

Due to agriculture's seasonal nature, Myanmar has very high mobility of people within the country for labour purposes. International migration is mostly taken up by medium to high land holding households to improve their livelihood situations and rarely by landless households. In some parts of the country, turnover of labour is very high due to the constant migratory flux, resulting in a constant need for training, especially in the agri-processing industry. However, this was not mentioned by any of the respondents during the scoping study.

Market constraints

1. Lack of skilled labour in hatcheries and nurseries (i.e. injection and stripping)

Access to finance

Myanmar's financial sector is significantly underdeveloped, an issue which is compounded for many rural sector stakeholders, including in aquaculture. Banking facilities in such areas are inadequate. Traditionally the formation of cooperatives was a main way to access agriculture loans through the co-operative department of the Ministry of Agriculture. Often local agri-co-operatives were established with the sole purpose to access state funds/loans for machinery, and none of the other benefits that come to mind for agri-coops were explored. Currently growing engagement from outside actors, may result in change. The history of co-operative development, as part of the state-planned economy, has tarnished the cooperative brand. A new law on co-operatives is in development36.

The second source of credit is that semiformal financial institutions micro finance projects by LNGOs and INGOs have developed in Delta, dry zone, and in some other remote areas. A number of RSCs also provide such credits for rice farmers with monthly interest rates of 2-3 % varying from region to region. However, the coverage of such credit system is limited to reach throughout the country.

33 Delivering Prosperity in Myanmar's Dryzone, Lessons from Mandalay and Magwe on realizing the economic potentioal of small-scale farmers, Oxfam, 2014.
34 Assessment Women and the economy, DFAT, 2016
35 Scoping study on Services in Agri-sector, Hopeng, Hsiseng, Lawksaawk and Yawngan, Researcher, 2017
36 Consultancy on Co-operative Systems in Myanmar, Jo-Anne Ferguson, LIFT, 2013

Licensed pawned shops and gold shops are also the sources of credits for farmers in Myanmar. The monthly interest rate is about 2-3% with collateral such as gold and other properties including land. The last one is the informal credits systems of private money lenders. Most farmers in the rural areas have to depend on the informal loans. Large farmers, the traders or brokers are the sources of informal loans which take about 5-10% monthly interest rate. Rate of interest, the amount of money and return period are based on mutual agreements between farmers and money. Extension Services

A pressing concern for the fisheries sector is that most commercial banks are located in urban areas with very limited outreach to rural regions. This situation makes it almost impossible for rural fishermen and farmers, as well as processors, to access the financial resources required to increase production.

Discussions with businesses from the MFF executive board and SSA in Mandalay highlighted the difficulty of accessing finance capital for projects with a high dependency on their own financial resources. When businesses have sufficient resources, they prefer to enter in a joint venture with a Chinese partner who would provide in-kind credit at a rate of around 8% compare to traditional bank would that would provide cash loan at 13-14% and require significant collateral.

According the World Bank, the Global Treasure Bank will be encouraged to provide loans of up to US$ 500 per acre to fish farms.

Market constraints

1. Inability among many farmers to provide collateral (e.g. land titles/land certification use)
2. Lack of financial institution and product providing small loans to SSA farmers
3. Risk aversion and lack of capacity (product design & finance) among some market players in the chain particularly farmers to avail of credit services
4. Limited financial access to banking facilities, high interest rates and collateral

Markets and food safety

Fish selling is almost exclusively the domain of women. Women are especially active in the retail trade while men may dominate wholesaling activities. Range of activities in fish retail vending includes weighing, gutting, cleaning or cutting a whole fish to the desired size or product form. Cleaning, gutting, and slicing are marketing tools employed by vendors to maintain the loyalty of regular clients and attract new customers.

Fish vendors differentiate local farmed fish products by displaying these “live” or “still breathing”. As per vendors, consumers consider product “freshness” as the most important factor that determines purchasing decision. In one way or another, “live” fish display provides local farmed fish a “freshness” advantage over Yangon and imported farmed fish. However, current merchandising and post-harvest practices accelerate product deterioration and offer little assurance of food safety.

Fish retailers use little or no ice primarily because of the following: (i) consumers perceive iced fish as “not fresh”; and (ii) the high cost of ice since ice plants are located far from the market or outside

of the township. Vendors have had no training on proper fish handling. They also have no access to facilities and services essential for the hygienic handling of fish, for the protection of health and wellbeing, and for ensuring consumer health. They have little formal education and from observing their work practices it is apparent that they lack information on basic sanitation and proper handling of fresh fish.

At the township level, the Township/City Development Council is responsible for the following: (i) issuance of health certificate to food stall; (ii) recommendation for licensing of food stall; and (iii) medical examination of food handlers. It is not, however, clear whether these functions also cover the stalls located in the public market.

It seems that there are limited efforts to promote food safety compliance among fish retailers in public markets. The Myanmar Consumers Union, a non-profit organization and a member of Consumer International. has been conducting awareness campaign on food safety during the recent years. In the fisheries sector, awareness campaign was directed primarily to micro scale dried fish and fish paste processors mainly in Yangon and key fish processing areas. The campaigns and training are conducted by volunteers. On the other hand, the Food Science and Technology Association (FoSTA) conducts training on food processing and Good Manufacturing Practices. In the fisheries sector, the association has worked primarily with fish paste and dried fish processors either as part of their advocacy campaigns or through consultancy assignments undertaken by members.

Another issue raised by public health experts and trade groups sometime in 2019 was the proliferation of integrated poultry-fish farms, which can increase the risk of spreading salmonella and other bacterial diseases. Concern was also raised on the risk of heavy metals like arsenic, copper, zinc, lead and mercury accumulate at dangerous levels in fish raised on integrated farms. The MFF permits up to 1,000 chickens to be raised per acre of fish farm.[37]

Key takeaways

1. Implementation of food safety is fragmented and characterized by weak inter-ministerial cooperation.

2. Production and marketing of good quality and safe fish require that the chain operates in an integrated way with each player taking care of the fish well. For this to happen, everybody must implement good practices. This means that the players in the chain should have a harmonized understanding of the food safety and quality standards and how to implement these standards. Facilitating access to basic tools and infrastructure (hygienic stalls, tippy taps, waste containers, etc.) will also be important in promoting compliance to food safety and improving product quality.

3. The consumers have important roles in terms of creating the demand for safe food. If they are more aware of food safety and if they are more familiar with the value of consuming safe food, they will demand food safety. This market demand for food safety can push players to adopt new practices. Perhaps, this can also push the government to enforce food safety in public markets including upgrading of infrastructure.

4. To influence social norms, a collective approach is necessary rather than an approach that aims at individual behavioural change. Change has to be chain wide and should move towards same direction. Change does not happen at scale unless people talk to one another about

37 https://myanmar-now.org/en/news/are-these-controversial-fish-farms-a-danger-to-public-health

wanting to change and enrolling in the change process. It is, therefore, important to facilitate widespread manifestation of social norms change so that people "see" change.

Market constraints

5. Lack of facilities in the market to facilitate safe fish handling

6. Market vendors lack knowledge of product quality, cannot afford to invest/upgrade their stall/shop and lack basic business skills

7. Lack of public awareness and lack of hygiene across all functions in the value chain

Marketing and market linkages

Most of the SSA farmers in Myanmar access market information from the nearby market through their neighbouring or the traders that come to their villages. Price and market information also seem to circulate through mutual relationships among the traders and informally through the traders, local transporters and neighbours to the producers. Market information services are not widely accessed by SSA farmers.

Currently, most agricultural commodities prices are broadcast through various radios and FM channels as well as in TV programs. However, broadcasting of aquaculture product prices seem to be limited. Ministry of Commerce broadcasts market information and prices on the website, DoF.myanmartradenet.com and the Commerce weekly journal. "e Trade Myanmar" is the only private market information service company using Information Technology through the website, DoF.etrademyanmar.com, eTM mobile APP and Short Message Service (SMS). The Automatic Price Information System (APIS) was initiated by FAO in 2011 in collaboration with Ministry of Commerce to give everyone easy access to real-time price information from the major CEXCs through a brief and inexpensive telephone call.

The availability of market information for SSA farmers and small traders at the township market level is very limited. Most SSA farmers try to know market price offered by brokers and traders just at the time they want to sell the crop. There are now several mobile applications through which market information has distributed. Some of these APPs are Green Way, Golden Paddy, Htwet Toe, etc. However, none of these applications currently has a dedicated aquaculture interface.

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Commerce to give everyone easy access to real-time price information from the major CEXCs through a brief and inexpensive telephone.

All SSA and SMEs need connections to their customers if they are to understand the market demand, supply, price, quality and receive orders. Lack of farm and business and management skills, poor IT infrastructure and poor connections to many local and state/region markets make marketing of SSA and SMEs difficult and costly. SMEs like seed suppliers, typically do not have effective marketing strategies, or good customer relationship management. They don't know how to choose target markets through market analysis and market segmentation, and do not have a good understanding of customer needs. This leads to a lack of specialised service offerings to customers and reduces the amount of new business they receive.

During the scoping visit, none of the actors met were supporting marketing or market systems information through facilitating round tables and meetings with buyers in new markets. Local development of these skills will be needed to promote a sustainable of the inland fisheries market in the future.

Market constraints

1. Weak bargaining power of farmers; pricing system primarily based on size and "freshness" (which refers mainly as 'fish is breathing') which disincentives quality, food safety, and nutritional value

2. Limited direct commercial linkages between producers and processors challenges the consistency of both quality and supply and limits opportunities for integration and value addition

3. Weak market information flows

4. High transaction costs

5. Poor marketing activities make it more difficult for SSA and SMEs to find new business opportunities and create partnerships with buyers

6. Market information flows to support the development of the sector are weak and limited, although networks and mobile applications are emerging to share market knowledge. There is an un-met demand amongst SSA farmers and business for market, technical information and on-line services.

Research and Development

Only 0.8 percent of the recurrent budget of MOALI is allocated to the DOF (Tezzo et al. 2018). Partly as a result, the DOF capacity to conduct research and extension, or otherwise engage substantively in the development of the sector, is extremely limited. The DOF operates three training centers for the promotion of knowledge dissemination and capacity building for DOF staff, fishers and fish farmers. These are as follows: (a) Institute of Fisheries Technology, Yangon; (b) Upper Myanmar Fisheries Training Center, Sagaing; and (c) Pyapon Fisheries Training Center, Ayeyarwady. The facilities deliver training to private sector stakeholders and DOF staff, but the number of courses and trainees is

limited, and it is unclear whether course content is of practical use to those trained. There is little, if any, other government aquaculture extension and research38.

The allocation of only 0.8 percent of the ministry's recurrent budget to the DOF confirms the government's relative disregard toward the sector.

There also seem to be a disconnect between research, innovation, development and market within DOF and the private sector.

Market constraints

1. Limited budget allocation to conduct R&D for value-added aquaculture in general and SSA in particular

2. Limited budget allocation to research, produce and maintain reliable statistics, geospatial and market data on inland fisheries in general and SSA in particular

3. Disconnect between research, innovation, development and market between DoF and the private sector

4. Human resources and capacity are inadequate to support effective resource management, training, and extension activities.

Access to Knowledge/Training/Extension

Human resources and capacity are inadequate to support effective resource management, training, and extension activities. However, where technical ability exists in the DoF, it tends to be in aquaculture, (for example, conventional hatchery management). Nevertheless, many of the staff to be found in township or district offices have been educated and trained for administration roles. The routine rotation of the DOF state/region fisheries officers every few years by the ministry may be an attempt to increase broad-based knowledge of fisheries, but these rotations also disrupt many long-term development projects that depend on collaboration with the DOF. Most senior DoF staff are former military officers and lack a background in formal fisheries education, or practical experience in fisheries and aquaculture management39. DoF extension services lack depth, breadth and outreach.

In addition, hatcheries, feed suppliers and market players do not provide advisory, training and extension services that can benefit farmers. MFF training offers are limited and trainers lack training themselves.

Farmers' collaboration is limited, so is their capacity to structure themselves to access training. In some of the project area, like in Kachin aquaculture is a secondary source of income and farmers are not willing to invest in training. In addition, there is limited number of aquaculture services providers, their knowledge has not been tested and is, according to farmers too general. Overall, almost all farmers and hatcheries in the project areas have acknowledge the need for technology and knowledge but they don't really know where to turn for this services, they are not willing to pay for training services while most unlikely able to afford training. There is a lack of on-site providers to help growers improve their farming practices.

38 The World Bank

39 The World Bank

Market constraints

5. Limited capacity of DoF and MFF to provide training to fish farmers in general and to SSA in particular

6. Limited technical know-how and weak adoption of GAqP across all functions in the chain.

Industry bodies

The MFF is a member organization of the Union of Myanmar Federation of Chambers of Commerce and Industry that supports and promotes the fisheries sector in Myanmar. The MFF is divided into functional associations ranging from subsectors such as the Marine Fisheries Association to individual fisheries product amalgamations, such as the shrimp entrepreneur association. The MFF has a technical advisory board where several specialists from the private sector, universities, and retired fisheries department's high-ranking officers are members. The federation carries out advocacy on behalf of its membership at the local, provincial and national levels, and promotes foreign investment in and export from the Myanmar fisheries sector. The most active and influential members are owners of very large fishing and farming operations, and it is the interests of this segment of the industry that the MFF generally seeks to promote rather than small-scale activities. The MFF was established under the auspices of the former military government. Senior MFF members continue to enjoy close relationships with senior-level military or ex-military officials. These relationships give the MFF a high degree of influence over policy initiatives in the fisheries sector giving it, reputedly, the power to block or water down reforms that do not to favor members' interests such as the implementation of more stringent fisheries management initiatives40.

Market constraints

1. MFF is not reaching its potential to support SSA development as well as financial and technical support from third parties, or to act as the main focal point for coordination, planning, information sharing, and investment

2. MFF vision, mission and objectives do not seem to be formalised and coordinated at the central, state/region level and township level

3. Limited lobbying for small-scale fishers' registration

Access to gender networks

Social capital in Myanmar varies by location, with at one end of the spectrum tight-knit communities that support each other well, to the communities disrupted by conflict where trust is low on the other extreme. Often gender inequalities are aggravated in the latter communities. Gender based discrimination is more pronounced in places of hardship. As such, especially in conflict and post conflict regions, gender-based atrocities do take place. There is currently no national legislation related to violence against women and girls, including sexual harassment of women in the workplace, and there is no data available41. Human trafficking is also a serious problem that was mentioned by a

40 Ibid

41 Assessment Women and the economy in Myanmar: An assessment of DFAT's private sector development programs, DFAT, 2016

Mauk Kon CSO in Kengtung during the scoping study. Mauk Kon was set up thanks to a grant from LIFT in 2011 to provide food security and nutrition. There main issue is that they don't have the means to access remote areas where human traffickers go to buy women and babies that will become slave and child soldiers.

Gender disparities

Studies show that daily wages of women are approximately 20%42 to 30%43 less than what men earn for the same work. In rural areas, specifically male daily wage earners are paid on average 47% more than females44.

In terms of access to productive resources, women in Myanmar face more barriers than men in accessing or owning land e.g., participating in consultations and decision-making processes regarding land, and in utilizing dispute mechanisms.45 Internalized gender roles, differences in education, skills and abilities, or lack of time or money cause social or cultural gender-inequalities46.

Care work in the home

Overall, the society seems to agree on equal capacities and equal right to opportunities between the sexes. There are however some persisting traditional expectations when it comes to care-work in the family, division of labour, etc. Hence, despite high tertiary education, we find low rates of participation in the workforce for women, especially in professional and managerial roles. There is a strong societal pressure for women relinquish their personal career as soon as they start a family, or when parents are in need of care47. Men are twice as likely to be engaged in paid work than women, and a mere 1% of men is engaged in unpaid household work48.

Rural communities and households

A recent survey49 found that 53% of rural women felt involved in local decision-making, compared with 68% of rural men. Rural women often required men's permission to attend community meetings, and relied on male household members for information about community decisions. The financial resources in the household are often managed by the woman in Myanmar. Decisions on bigger spending and household investments are more often made by the head of the household, usually the male.

Inland fisheries households

In fisheries value chains men and women have distinct roles, and their socio-economic status influences their power relations. Women and men can have dominant roles, or they can be in positions of high dependency. Women constitute about half the population involved in fisheries development activities. In some developing regions women have become important fish entrepreneurs who control

42 Delivering Prosperity in Myanmar's Dryzone, Lessons from Mandalay and Magwe on realizing the economic potentioal of small-scale farmers, Oxfam, 2014.
43 Assessment Women and the economy, DFAT, 2016
44 Vulnerability in Myanmar: A Secondary Data Review of Needs, Coverage and Gaps ,HARP-F and MIMU, 2018
45 Linking Women and land in Myanmar- Recognizing gender in the national land use policy, Transnational Institute, 2015.
46 Linking Women and land in Myanmar- Recognizing gender in the national land use policy, Transnational Institute, 2015.
47 Assessment Women and the economy in Myanmar: An assessment of DFAT's private sector development programs, DFAT, 2016
48 Infographic_Gender_Equality_in_Myanmar_Aug2017_MIMU_IG004_A3.pdf, accessed 28 January 2019
49 MYANMAR, How the people of Myanmar live with climate change and what communication can do, Anna Colquhoun, Henning Goransson Sandberg and Muk Yin Haung Nyoi, Climate Asia, BBC Media Action, 2016

significant amounts of money, finance a variety of fish-based enterprises, and generate substantial returns for households and communities.

Compared with men, women often face more problems related to technology, finance for enterprise expansion, and transport. Their plight is worsened at the market level where they encounter price fluctuations for their products, or where social and/or cultural pressures limit their market opportunities to locations that are close to home. If women are able to access local markets, they may still be unable to access the national or global markets that men have access to. They often assume responsibility for their families' daily subsistence needs, which sometimes drastically depletes their working capital.

In aquaculture, women often carry out most of the work of feeding, harvesting and processing fish and shell fish. They can become managers of small household enterprises, such as fish ponds, and thus improve their families' income and nutrition. However, women tend to have limited control over ponds and inputs for aquaculture, so they rarely participate in production beyond satisfying their household needs. When aquaculture production intensifies, it increases the labour burdens on women and youth, affecting their production, productivity and welfare50.

A number of women pond owners were met during the scoping study and generally those who had working capital seem to have differentiated themselves in the market through vertical integration (i.e. nurseries) or processing (e.g. smoked fish in Kale, Sagaing).

Wholesalers or sellers at the market in all five states/regions visited were exclusively women which suggest that a number of women are involved in the post-harvest stage and transportation. Although the actual transport is more likely executed by men, for small quantities of fish women control and manage the resource from the post production to the marketing stage.

Market constraints

1. Lack of awareness and examples of successful gender associations/networks and lack of specific support available for women economic empowerment
2. The quality of sex-disaggregated and gender data on inland fisheries has been low and not systematic
3. Special needs of women in relation to child care are not being sufficiently considered by businesses employing women
4. Increased aquaculture production increase labour burdens on women and youth, and women are not involved in production-related decision (e.g. purchase of inputs)

Certification

National Food Safety Policy, Myanmar National Legislation, Standards and Norms in line with CODEX principles as well as Enforcement and Surveillance for Inspection/testing are still under development in Myanmar. As of 2018, developing and coordinating the National Quality Infrastructure (NQI) with all departments, ministries and stakeholders in Myanmar, is the main responsibility of National Standard and Quality Department (NSQD) of the Ministry of Education.

50 http://DoF.fao.org/3/a-i6623e.pdf

Control Union and SGS are currently the international companies providing certification. Control Union is mainly for organic certification and SGS is providing Good Manufacturing Practices (GMP)/ HACCP certification.

Good Manufacturing Practices

GMP systems are designed to ensure that goods are consistently produced according to specific levels of quality standards. Applicable at all stages of production, GMP standards seek to ensure adequate levels of product safe- ty and quality.

The application of GMP and quality management enhancements in Myanmar is challenged by the absence of trained technicians capable of applying GMP processes in factories, feed plants, ice plants and landing sites. Current public vocational training programmes on GMP are outdated and university curricula do not offer adequate courses on the subject. The one private GMP training course available in Myanmar, and its adjoining certification of production processes, is costly for many processors[51].

Good Aquaculture Practices (GAqP)

Good Aquaculture Practices (GAqP) involves a series of protocols and systems intended to ensure product quality and safety and environmental production system design; incoming seed stock; facility biosecurity; feeding management, procurement and storage; production techniques to maximize fish health; harvest; and cleaning and sanitation basics. Not only would it ensure that production achieves high levels of quality while simultaneously reducing both health and environmental hazards, but the introduction of quality management principles would put enterprises on a path towards trade with more demanding markets.

Myanmar's fisheries sector faces several hurdles in its attempt to implement GAqP. Foremost among them is the lack of technical knowledge among aquaculture stakeholders. The Institute of Fisheries Technology has limited capacities in aquaculture techniques and technologies training due to its small size, limited budget and inadequate facilities. This lack of training capacity cannot be filled by DoF and MFF, neither of which have sufficient vocational training capacities. Limited extension services capacities limit the effective transfer of production techniques and monitoring of farms. The limited collaboration with regional technical partners limits the building of national skills and capacities in the fisheries sector[52].

Market constraints

1. Lack of awareness of GAqP and GMP
2. Lack of training capacity by DoF, MFF, the private sector to create GAqP and/or GMP training modules and roll them out

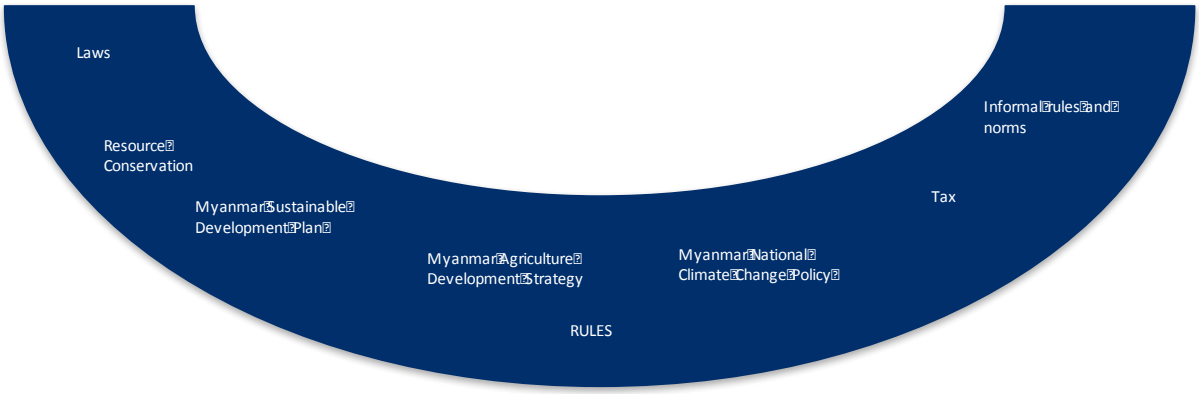
Rules

Figure 11 below shows the inland fisheries market rules.

51 Myanmar Ministry of Commerce, International Trade Center, National Export Strategy, Fisheries Sector Strategy 2015-2019

52 The World Bank

Figure 11: Inland fisheries market rules



Laws

The 2008 Constitution is the basis of the legal framework for fisheries. Myanmar's natural resources such as fisheries, land, and forestry are owned by the State and the rights to ownership and access to these assets are assigned by the respective government departments. The aquaculture sub-sector is regulated by the Aquaculture Law (1989)

The Law relating Aquaculture defines aquaculture as meaning "the propagation of fish species, breeding of fish through different stages of growth in natural or artificial waters by various culturing techniques".

The Law relating to Aquaculture No. 24/89 also regulates the application for aquaculture leases and licences. In addition, the Marine Fisheries Law No 9/1990 and the Freshwater Fisheries Law No 1/1991 seem to contain licensing requirements for aquaculture activities as well.

The Aquaculture Law (1989) legalized ponds which had been constructed previously and promoted the expansion of large-scale aquaculture by providing a mechanism for allowing pond construction on 'wastelands' (land for which no legal title has been issued). Following the law's implementation, large areas of 'wasteland' (much of it already cultivated by farmers without land-use certificates) was allocated to companies and individuals with close links to the military. The Aquaculture Law remains a union level law, meaning that states and regions cannot draft their own legislation with respect to aquaculture. The Aquaculture Law is similar to the marine and freshwater fisheries laws in that it is mainly an instrument for revenue collection. Issues such as water rights, protection from other user impacts, exotic species control, and zoning are not included.

This law establishes the rules by which DoF may allocate, in accordance with existing land laws, agricultural and waste land for aquaculture activity, and outlines licensing rules. Such grants must be in accordance with existing land laws and farmers are required to develop at least 75% of the leased land into pond surface area. The law also allows DoF to designate other fishing waters to any type of aquaculture. It should be noted that both the Marine Fisheries Law and the Freshwater Fisheries Law allude to aquaculture activity. While the former's definition of fishery includes the breeding and hatching of fish, the latter specifically includes aquaculture and stocking in its definition of regulated activity. As such, fish farmers are also subject to the regulations and procedures ascribed under these two laws. At the moment, all foods produced in Myanmar are

regulated by the National Food Law of 1997 which oversees the production, import, export, storage, distribution and sale of food53.

Aquaculture development is also constrained by the Farmland Law (2012) and the Vacant, Fallow, and Virgin (VFV) Land Law (2012). These two laws significantly changed the way land is governed in the country.

1. The Farmland Law (2012) restricts the conversion of land registered for rice cultivation for any other permanent purposes without authorization being given. The Farmland Law stipulated that land can be bought, sold and transferred on a land market with land use certificates. In a country where large numbers of people tilling the land or practicing aquaculture do not have formal land titles is highly problematic. Many farmers are facing difficulties in the registration of their farm lands.

2. The VFV Land Law (2012) has contributed to weakening land tenure for small landholders. The Vacant, Fallow and Virgin Land Law stipulates that all land not formally registered with the government can be allocated to domestic and foreign investors (linking with FDI law).

Interviews with farmers conducted during the scoping study confirmed the above-challenges and highlights the concerns, and sometimes fears from farmers to engage with DoF to apply for a land title, or a conversion of land registered for rice cultivation that was converted into ponds (often because the land was flooded). Farmers are concerned that they could be fined or imprisoned when the authority finds that this conversion has taken place without authorisation. This is a serious barrier for farmers to engage with DoF, and potentially with other market players (e.g. seed suppliers).

Market constraints

1. Farmland Law restricts the conversion of land registered for rice cultivation for any other permanent purposes without authorization being given

2. VFV Land Law contributed to weakening land tenure for small landholders

3. Farmers still face difficulties to get land titles and license for their existing ponds or do not want to declare/register their ponds

4. Farmers are worried because they cannot prove the ownership/legality of their ponds;

5. New aquaculture farmers are having difficulties getting a license and existing farmers are concerned with penalties they could get.

Resource Conservation

The agricultural sector is intrinsically linked to the natural resources and healthy ecosystems for soil fertility, sufficient water and many other environmental services. The inland fisheries sector can have a significant impact on the environment, especially in terms of water pollution from use of fertilizers, pesticide and drugs for the production of phytoplankton and the curing of disease. During the scoping study a limited number of farmers reported issues with fish diseases and those who had have dealt

53 Myanmar Ministry of Commerce, International Trade Center, National Export Strategy, Fisheries Sector Strategy 2015-2019

with the problem by using pesticides. Nevertheless, the level of chemical inputs used by SSA seems relatively limited considering the extensive nature of these production systems. The limited utilisation of chemical inputs is a market opportunity for SSA to transition to an 'all-organic' mode of production for a growing health-conscious consumer-base in cities and, increasingly, in rural areas.

The inland fisheries sector can also have a significant impact on biodiversity of existing water systems, and associated biotopes (e.g. Inle lake, Pekon Lake, and the Ayweardyi river in Kachin and Sagaing region). According to the World Bank, Myanmar has a large number of freshwater sites of high ecological value. The 2004 Myanmar Wetland Inventory surveyed 99 different wetlands and identified 17 sites as globally important. Inle Lake, Indawgyi lake, and Mogaung Chaung are all Ramsar sites and stretches of the Ayeyarwaddy River support populations of Irrawaddy Dolphin.

Inle Lake, which forms part of the 1,891 square mile Inlay Lake Biosphere Reserve has at least nine endemic fish species including the famous Inle Carp (*Cyprinus intha*). In recent years, a number of exotic fish species, including *Oreochromis nilotica* have found their way into the lake and look to be displacing some of the native fish species. A long-term Restoration and Conservation Plan for Inlay Lake was agreed in 2014 but funding for full implementation is yet to be found. Action needs to be taken urgently to conserve this unique resource and the iconic livelihoods of the Intha people.

The Pekon Lake Conservation Committee met during the scoping study, that regroup around 200 aquaculture farmers in this area was created to preserve their environment and the water quality. The water quality is monitored by Yezin University. The water quality is affected by pesticide and fertiliser and the Tigyit coal mine upstream in the Pa'o autonomous area. The Pekon Lake Conservation Committee, led by a group of Kayain ethnic people, advocate to deter the use of pesticide and fertiliser and to stop the coal mine to operate, however their success has been so far limited. The so called Pekon lake is in fact a water reservoir that has a greater surface than Inle lake but is a lot less populous and touristic.

The impact single use plastic has on the fish supply chain is not to be underestimated in high density tourist areas such as Inle Lake. There is scientific evidence that micro plastic often ends in the fish food chain and represent a threat to wild and bred aquatic organism in general, and fish in particular. This represent a health issue SAIL might want to address as part of an activity to promote healthy food, by for example, conducting analysis on the amount of plastic found in fish.

The main local environmental impacts associated with the environment include:

1. Establishment of large or medium size aquaculture farms inland with no prior environmental impact assessment
2. Leasing of inns with no proper monitoring, community involvement and environmental impact assessment
3. Annual release of fish seeds in river systems, lakes, reservoirs and other bodies of water by DoF without impact monitoring
4. Building of large ponds on previously undeveloped land or farmland, increasing pressure on biodiversity
5. Introduction of exotic species that can threaten local and endemic species (e.g. Inle or Inthar Carpe) and Small Indigenous Species
6. Intensive non-organic poultry-fish and/or pig-fish farms

7. Intensive use or chemical fertilisers and pesticides

Through interventions in the inland fisheries sector, SAIL should contribute to maintaining or improving biodiversity and persevering local species, supporting local initiatives, awareness on environmental protection and refining traditions. SAIL should also work toward positively contributing to climate and the environment by introducing climate smart aquaculture techniques and promoting alternatives to plastic (micro plastic in the fish food chain) and the use of non-chemical fertiliser and pesticides.

Market constraints

8. Lack of support to the development of local community-led Environment Conservation Committee and Environmental Management Fund.

Myanmar Sustainable Development Plan

The Myanmar Sustainable Development Plan (2018-2030) has been implemented since August 2019. Aquaculture is mentioned one in the plan under Pillar 2: Prosperity & Partnership, Goal 3: Job creation & Private Sector Led Growth, Strategy 3.1. Create an enabling environment which supports a diverse and productive economy through inclusive agricultural, aquacultural and polycultural practices as a foundation for poverty reduction in rural areas.

1. 3.1.1. Revise and develop education and training in the agriculture, aquaculture and food sectors, responding to the evolving needs of farmers and the rural private sector

2. 3.1.3. Create market conditions to enable greater investment in agriculture, aquaculture and polyculture, and mechanization

3. 3.1.7. Improve investment regulations for agri-investors, including through facilitating foreign investor access to the agriculture, aquaculture and polyculture sectors

Market constraints

4. The Myanmar Sustainable Development Plan does not sufficiently address the link between inland fisheries and sustainability.

Myanmar Agricultural Development Strategy

The Myanmar Agricultural Development Strategy (ADS) provides strategic directions for the Myanmar Agriculture Sector for 2018–2023. In relation to fisheries, the ADS includes the following outputs on fisheries and aquaculture under the productivity ‘pillar’.

5. 2.7.14. Aquaculture seedling infrastructure (hatcheries and breeding ponds) for production and distribution of fish and shrimp seeds reorganized, including privatization where appropriate.

6. 2.7.15. Identification, inventory, and fishery resource conservation of adaptable fish species established.

7. 2.7.16. Network of Aquaculture Technology Centers (Koica Research Center - Marine Biology Departments of Universities of Mawlamaine, Pathein, Meik, and Yangon), with supporting laboratory facilities established.

8. 2.7.17. Provision and availability of fishing infrastructure facilitated and aquaculture initiatives including land development and cage and pen technology integrated with existing ponds or reservoirs under appropriate legal frameworks.

9. 2.7.18. Preparation of a new Fisheries Law.

In addition, Myanmar has several national plans that would need to be analysed to better understand their coherence and relevance to SSA. Some of these documents are presented here but are not being analysed in details. These are the DoF National Plan 2018, and the National Aquaculture Development Plan (NADP). It is important to note that none of these plans, including the NAS, were mentioned by any of the market players or DoF offices during the scoping study.

Market constraints

10. The ADS does not include a road map, resourcing and monitoring plan to implement aquaculture related outputs;

11. Lack of awareness of strategies and plans at the state/region and township level.

Myanmar National Climate Change Policy

The Myanmar National Climate Change Strategy and Action Plan 2016-2030 (MCCSAP) presents a roadmap to guide Myanmar's strategic responses and actions to climate-related risks and opportunities over the next 15 years and beyond. The MCCSAP builds on the principles of:

1. Inclusive development that allows poor, landless, marginalized and vulnerable women, men and geographic regions to shape and benefit from opportunities provided by climate-resilient and low-carbon development;
2. Driving action to deliver resource-efficient development that will incentivize investment in a green economy to achieve growth targets with minimal environmental harm and carbon emissions;
3. Integrated development to direct government, development partners, civil society, private sector entities and communities to align, harmonize and coordinate policies and programmes to support the strategy's overall objectives; and Supporting results-oriented development through a time-bound goal and objectives to achieve this vision and strategic priorities to help the key sectors implement the strategy. Six action areas are policy, institutions, finance, capacity and technology, awareness building and partnership buildings. Six sectoral outcomes are expected through the implementation of MCCSAP.

Aquaculture is specifically mentioned in the objective for action area 4: Increase access to climate-resilient and low-carbon technologies and practices to provide trainings to farmers and fisher folk on climate-smart agriculture technologies and practices — such as improved soil and nutrient management, improved cropping and community aquaculture — with gender considerations based on gender analysis. The expected output is that farmer and fisher folk climate-smart technology capacity is enhanced. However, there is a number of activity in the MCCSAP that can be linked to aquaculture as most actions are concerned with improving climate resilience and mitigation in rural areas.

Market constraints

4. No example of and research on climate-smart aquaculture technology and system in Myanmar and how these systems can help farmer adapt to and mitigate climate change.

Tax

The DoF's budget has grown from less than US$2million to over US$6million per year in recent years but is still a fraction of the total management budgets for other natural resources management agencies. According to official data, central government fisheries revenues from license fees and taxes capture less than 1 percent of fisheries' GDP contribution and around the same amount that is spent on the DOF's budget.

Under Myanmar's 2008 Constitution and 2015 Constitutional Amendment, revenue collection and legislative power for freshwater and inshore fisheries were decentralized to states/regions. With this policy shift, many states/regions have been active in drafting their own legislation. However, none of the states/regions were SAIL will operate seem to have started drafting their own legislation.

The devolution of tax management has led to a great variety of tax and license fees in the five States/Regions where SAIL will operate. For example, the licensing of ponds greater than 25 feet by 50 feet by DOF appears to vary across States/Regions. The SAIL scoping study conducted from November 2019 to January 2020 could not identify any consistent pattern regarding pond licensing fees that appear to vary from Kyatt 900 to 2,200 per acre or a flat rate of Kyatt 700 (Magway). This is no longer the case and farmers that do not have a license are worried because they cannot prove the ownership/legality of their ponds.

Market constraints

5. Lack of clarity on revenue associated with licensing of inns, ponds and sale of seeds
6. Lack of clarity regarding the type of land converted to ponds, the actual conversion rate of farm land to aquaculture ponds and the net value of these conversions
7. Lack of innovation from the DoF to collect revenue without disrupting the market
8. Limited regularization of the status of illegally constructed ponds, if their operators are in possession of legal agricultural use rights and land is not the subject of land restitution claims.

Informal rules and norms

The Rakhine Fisheries Partnership (RFP) brought together community- and state- level positive interests for change in fisheries management. These inclusive processes challenged vested interests in the previous system leading to positive changes in legislation and informal behaviors. The RFP model has now been replicated in other coastal regions; (Ayeyarwady, Bago, Mon, and Tanintharyi) and are contributing to the broader resource governance reform and peace. The close involvement of NGOs in supporting the development of fisheries legislation in states/regions such as Rakhine and Ayeyarwaddy may have left some in the DoF feeling circumvented54.

Market constraints

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9. Innovative mechanism pioneered by the DFID-funded Pyo Pin that provide an opportunity for communities to create more inclusive and resilience resource management and governance system is not being adapted for replication in the intervention area

10. Local norms on fish quality hinders promotion of food safety

11. Development projects do not understand the link between production systems, social and spiritual obligations

Market System Performance

Mapping of market players and performance

The major players in the inland fisheries market are mapped in Table 14 below. Players are grouped by their function / role in the market, the incentives for how they act in the market, as well as their capacity to perform their role, are described.

Table 14: Mapping of market players and performance

Type of Player	Player	Incentive	Performance
Core Value Chain Players			
Suppliers	Ingredient suppliers	Limited incentive to develop and process specific/innovative/low cost fish feed as current demand is mostly for unprocessed by-products from peanut and sesame oil production (cakes), rice barns and chicken drops from poultry farm. Linkages with feed processors needs to be assessed. Brewery waste not assessed.	Performance of ingredient suppliers need to be assessed to understand their incentives to develop fish-feed to improve the nutritional value, hence the conversion ratio, of oil-cakes, rice barns, chicken drops and brewery waste.
	Feed companies (sinking pellets and floating pellets)	To provide affordable feed to large aquaculture farmers and, possibly, to SSA farmers using local products, and by products and reaching out to more customers using a cost effective last mile distribution system (e.g. De Heus). The adoption of pellets feeding practice by farmers seem to be driven by price but also by perception (farmers prefer floating pellets as they can see the fish feeding).	Feed company from Myanmar not assessed yet. Small local pilot feed mill supported by MYSAP and My Cultures seem to face social and economic barriers to scale. Demand for overseas feed companies (e.g. Vietnam & Thailand) and some farmers are prepared to pay a premium for high-protein content. There seems to be general lack of understanding of the cost/benefit ratio of using different feed formulation at different growth stage of the fish (fingerlings, fries, growth).
	Fish Health product company	Not assessed	Not assessed
	Department of Fisheries (DoF)	Meet their production and revenue targets, maintain their offices and facilities in working conditions, award licenses for ins. The incentives for DOF	Varies according to region/state but overall technical and managerial capacity seems to be limited. The alignment of DoF with the Myanmar

Type of Player	Player	Incentive	Performance
		to support SSA and larger aquaculture farms are not clear. Collect license fees from ponds of more than 50 feet by 25 feet.	Agriculture Development Strategy does not seem obvious. Most DoF staff, except Magwe may be, seem to be struggling with the licensing of existing and new ponds. This is due to the lengthy process involved for farmers. Lack of capacity to license ponds and provide training to farmers.
	DoF Hatcheries	Produce seeds to cover their production and revenue targets. Provide seeds to farmers, and in some instances (Magwe where JICA has supported DOF and farmers' hatcheries) provide hatchery training and extension to farmers. Focus seems to be on renovating or building new outdated tanks and office facilities rather than modernizing production techniques.	Outdated hatchery technology and generally ineffective production systems.
	Private Hatcheries	Modernise their hatcheries, expand their customer based to improve their performance. Generally keen to work with DoF. Capacity to invest ranges from high to low. Do not seem to technically benefit from being members of MFF.	Outdated hatchery technology, limited access to quality brood stock, inbreeding (sometimes), no quality control, potential cross contamination (poultry and other domesticated animals near tanks), poor book and record keeping, including list of customers (except in Kachin), vulnerability to climate change (e.g. Kengtung). Business seems generally viable but fragile unless they are vertically or horizontally integrated to other businesses.
	Backyard Hatcheries	We did not come across any backyard hatcheries during the scoping mission	NA
	Nursery (Vertically integrated nursery ponds & Specialised nursery ponds)	Provide fingerlings to local farmers at an affordable cost and improve return on ponds investment (compare to grow out ponds)	Nurseries outperformed financial performance of grow out ponds but could be further improved through better feeding and management practices and record/book keeping. Market demand seems high (Mandalay region)
	Mechanical excavator hire	We did not engage with any mechanical excavator hire. However, the new law on the conversion of 15%, and may be up to 30%, or land into pond could open a new market for mechanical excavator hire. Difficulties to obtain Form 7 (ownership of land) and Form 37 (conversion of aquaculture land for other utilization) is currently undermining the expansion of licensed aquaculture. However, the market for backyard ponds seems to remain open for mechanical excavator	Performance of mechanical excavator hire not assessed. They may lack an understanding of the opportunity to dig small backyard ponds (that do not require licenses) and may not market their services for this, or provide loan payment options. There might be a market for small mechanical excavator hire service providers.

Type of Player	Player	Incentive	Performance
		hire.	
	Equipment suppliers (net, pump, etc.)	No particular incentives to support SSA or to provide loans or other payment options. It can be assumed that they fulfil the current demand and limited capacity for innovation.	Not assessed.
Producers	'Invisible' Homestead ponds	These ponds are hard to track using sat imagery or data provided by the General Administration Department	Unknown
	Small <10 acres 10-50 acres	Varies according to regions but generally provide main, additional or new (Pekon Southern Shan) source of income for the Household. Most farmers understand the benefit of quality seeds but have no means to control the quality (e.g. seeds from China) and cannot afford fish feed beyond rice barns and/or oil cakes and or chicken drops. Limited incentives to take up aquaculture due to issues associated with licensing, the lack of capacity to market fish – meaning traders get the greatest benefits. Access to nets (Eastern Shan) makes farmers reliant on traders.	Generally poor, except when there has been a long history of aquaculture (Sagaing farmers) and water availability is not an issue. Lack of modern production techniques, microcredit (Mandalay), pond management, nets, cold chain and transportation/cooperative for fish transportation. Generally, price takers at farm gate/in village and at the local market.
	Medium 50-100 acres	Vertical integration through the creating of hatcheries, nurseries, feed meal and through trial and errors. Incentives to fulfil the gap in the market demand we encounter in most States/Regions (e.g. Southern Shan import 5-10,000 viss of fish from Yangon every day)	Performance seems to be ok but can surely be improved through better management practices, exposure to new production techniques, market linkages and innovation.
	Large 100-500 acres >500 acres	As above	As above
Traders	Seed trader	Provide farmers in remote areas/poor farmers with seeds from larger hatcheries. No incentive to check quality as demand seems to outstrip supply.	No assessed.
	Pelleted feed trader	Not met	Not assessed
	Rice bran/oil cake trader	Not met	Not assessed
	Fish traders & retailers	Respond to the market demand for consumers that are generally not aware of food safety and fish quality. Local demand often met by fish exported from other regions except in Shan East. Most marine and fresh water fish in Mandalay, Kachin, Southern Shan, Magway and Sagaing come from Yangon.	Limited cold chain and utilization of ice (except in Mandalay and Sagaing where ice is used by a number of retailer/wholesalers), poor fish handling practices, limited book keeping and handling.
	Ice factory	Not met	Not assessed
Fish Traders	In local markets	To understand market demand in neighbouring townships and	Limited understanding of food safety issues and fish quality leading to a

Type of Player	Player	Incentive	Performance
		regions/states and to understand local demand. Largest trade volumes are between traders/wholesalers to traders/wholesalers (business to business). Fresh fish from fresh water source or aquaculture is often transported on/in ice and cool boxes.	lack of incentives for traders and retailers to improve handling and hygiene practices (except in Magway where most fish are on ice and not traded directly on the floor in the main market. This practice could well have been introduced by the largest and most innovative wholesaler of the market and then copied by others)
	In villages	Buy fish from aquaculture farmers at the best price. Buy fish from farmers who do not own a cast net (est. 60-80% of farmers visited) and rely on the nets owned by the traders, and from those who own a cast net. Traders come and harvest the fish as and when needed during the harvesting time. Small traders buy small quantities of fish and go from village to village on motorbikes to sell fish and other food items (e.g. snacks and vegetables)	Not assessed. However, it is important to note that small traders are going into the "hard to reach" areas and therefore might be an interesting target group for SAIL (re nutrition but also fish seeds).
Transporters	Truck for hire	Not met	Not assessed
	Express bus	Not met	Not assessed
Consumers	Restaurants	Buy specific size and type of fish to match their menu. No incentive to provide quality or live fish to customers whom expectations are overall very low.	Fish dishes are popular in all five States/Regions visited and the health benefit of fish seem to be well understood. Food safety is a big issue for most restaurants and cold chains for fresh animal proteins are almost non-existent.
	Home consumption	Buy fish protein for health benefit in line with the Government and NGO campaigns to promote fish intake. Generally prepared to pay a price premium of up to Kyatt 1,000 viss to access fish protein directly in their villages (from ambulant vendors or local aquaculture farmers)	Fish related human-disease might be well documented (check) but does not seem to be well communicated by the Ministry of Health and Sports or DoF. Lack of understanding of the nutritional benefits of different species of fish and different parts of the fish (head, filet, etc.). Food safety concern over bones for babies eating fish and general lack of understanding of the importance of nutrition in the 1,000 first days.
Supporting Actors			
Government of Myanmar	Ministry of Agriculture Irrigation and Livestock, Department of Fishery	The DoF is the primary agency responsible for fisheries management and collection of fish production- related statistics. The DoF is one of the 11 departments within the MOALI that was created in 2016 by merging the Ministry of Livestock, Fisheries and Rural Development with the MOALI. The DOF is administered by 365 officers and	Mostly involved in brood production (limited to Mandalay) and seed production. Handling of procurement for ins and restocking of natural bodies of water in line with central government instruction. Poor data recording, limited capacity to collect aquaculture data, poor quality and outdated extension services. Lack of

Type of Player	Player	Incentive	Performance
		2,104 staff- a total number of 2,469 people working at the central, regional, district, and township levels. The DoF is organized into four divisions dealing with (a) capture fisheries, (b) aquaculture, (c) research and development, and (d) administration. Aquaculture is part of the 7 prioritized National Value Chain Programs in the ADS. Interested in promoting aquaculture. SSA. Agreed to conversion of up to 15- 30% of land to aquaculture. Limited incentives to issues form 7 and form 37 to avoid a decrease in rice production. Limited incentives and capacity to resource the DOF properly. Limited incentives to develop SSA aquaculture due to licensing issue and limited resourcing of DOF by MoALI.	awareness of the GAqP and more generally lack of awareness of the content of the ADS on aquaculture.
	Ministry of Labour, Employment and Social Security	Increased employment, better worker conditions and stronger realization of social security - which has minimal existence	Working actively on minimum wage. Collaborates with the ILO. Technically has the mandate to inspect fish farm (?) to check if workers are properly treated (good working conditions) but have no capacity in terms of technical expertise or staffing to conduct such inspections.
Commercial body	Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI) and regional chambers	Increased FDI into the country is good for the UMFCCI. Joint ventures and partnerships with members are considered positive.	Fishery and Aquaculture interests are represented at the UMFCCI through various sister organization under the former.
Industry bodies	Myanmar Fisheries Federation (MFF)	The most active and influential members are owners of very large fishing and farming operations, and it is the interests of this segment of the industry that the MFF generally seeks to promote rather than small-scale activities. The MFF was established under the auspices of the former military government. Senior MFF members continue to enjoy close relationships with senior-level military or ex-military officials. These relationships give the MFF a high degree of influence over policy initiatives in the fisheries sector giving it, reputedly, the power to block or water down reforms that do not to favor members' interests such as the implementation of more stringent	MFF performance seem weak as they keep limited records of aquaculture activities, and can hardly articulate a vision and mission at the Union or State/region level, save from Kachin that could clearly articulate their three objectives and seem rather organized, dynamic and proactive (comparatively).

Type of Player	Player	Incentive	Performance
		fisheries management initiatives55. MFF incentives are not clear but seem to vary from one region to another. Their members meet one a year. The benefit businesses and producers get from being part of MFF do not seem obvious. MFF members pay a life-long member ship fee. SAIL plans to conduct a detailed institutional analysis of MFF is planned. The role of the different association seating under MFF is not clear either.	
Research Bodies	UN-FAO	Not met	Not assessed
	International Water Management Institute (IWMI)	Part of SAIL consortium of partners.	High technical capability globally.
	International Food Policy Research Institute (IFPRI)	Not met yet	Not assessed yet
Donor programmes	MYSAP Inland	EU and GIZ funded project implemented by GIZ with WorldFish as an implementing partner. Increase affordable nutritious aquaculture products supplied by small-scale farmers to provide food and income for the poor and vulnerable households in the Shan State, Sagaing Region and Mandalay Region. Theoretically operates in five townships Kengtung (Shan East), Pinlaung, Shan South e, Kale and Shwebo (Sagaing Region), Amarapura (Mandalay Region)	Currently operating in two townships. Project run until the end of 2021. Project in Kengtung will be implemented directly by Malteser International from 2020. Need to capture learning/lessons learned into a capitalization report/presentation
	The World Bank	Not sure they are still working in fisheries	NA
	Livelihood and Food Security Trust Fund (LIFT)	Funded MyCulture an aquaculture programme implemented by WorldFish	Should have lots of learning for SAIL. Need to capture learning/lessons learned into a capitalization report/presentation
Regulatory bodies	ILO	International organization focused on the development of improved labour standards globally through support to governments and other organizations.	Not reviewed.

Cross Cutting Issue

Ethnic states have suffered the most from long-term conflicts and entrenched poverty. Recent freshwater fisheries laws, however, over some promise that at least at the state/region level, conservation and co-management are gaining traction. Explicit recognition of co-management at the

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state/region level is particularly important as experience from forestry co-management has shown that a lack of a comprehensive and complete legal framework can be used as reason to delay implementation changes, especially when these changes are perceived to be against vested interests56.

Other development activities in the aquaculture sector

The aquaculture sector in Myanmar is currently experiencing a growing level of interest from donor programmes. A summary of the activities of other programmes is provided in **Error! Reference source not found.** below. Analysis of these activities shows that no programme is taking a market systems approach yet in the market. As requested by the DOF during the SAIL Township Selection Workshop in Yangon on 21st January 2020, the SAIL programme is committed to working alongside other programme to share and collaborate as well as to ensure no duplication of efforts. The presence of other actors in the market can serve to enhance the overall impacts on the sector and benefits for the poor.

Table 15: Summary of other on-going initiatives in the aquaculture sector in Myanmar

Initiative	Main activities
Myanmar Sustainable Aquaculture Program (MYSAP) Implemented by WorldFish	Objective: To support sustainable intensification of the aquaculture sector, thereby, realizing its potential for food security, nutrition, and livelihoods Activities: 1. Policy development and reform, including elaboration of the NADP 2. Improvement of the quality of service provision in the aquaculture value chain through development of higher education curricula and relevant job profiles 3. Sustainable intensification of small-scale freshwater aquaculture through improvement of seed and feed quality, strengthening of hatchery and nursery facilities, and enhanced biosecurity and disease management and control 4. Improvement of coastal aquaculture value chains through establishment and strengthening of hatcheries and rehabilitation of mangrove forests Geographic focus: Ayeyarwady, Mandalay, Sagaing, Shan, Rakhine, Yangon
Managing Aquatic Agricultural Systems to Improve Nutrition and Livelihoods in Rural Myanmar (MYNutrition) Implemented by WorldFish	Objective: To improve the nutrition and livelihoods of poor, rural households in aquatic agricultural systems in Myanmar Activities: 1. Improving production and productivity of household ponds and dykes, using innovative technologies that include small fish and carp in ponds 2. Increasing total and small fish production and fish species diversity in wetlands through sustainable management and enhanced stocking of small fish Geographic focus: Ayeyarwady Delta and CDZ

1. End -

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Shan South					Shan East				
Related underperforming market functions and rules	**Root causes addressed**	**Intervention area**	**Activities**	**Key constraint(s) impacted**	**Related underperforming market functions and rules**	**Root causes addressed**	**Intervention area**	**Activities**	**Key constraint(s) impacted**
Inputs (seeds)	Limited access to state of the art hatcheries to stimulate innovation and competition		Select hatcheries in Shan State and support to upgrading of hatchery technologies including on broodstock selection using MYSAP Inland research and recommendations on management of inbreeding.	Limited technical capacity of hatcheries to improve productivity and quality, diversify to other species, scale up to meet local demand, and innovate	Water	Limited depth and breadth of DOF extension services due to resource constraints		· Organise 'water quality matter' day(s) during which intensive and semi intensive farmers as well as retailers of fish inputs and fishing gears are shown water quality tools and equipment, text the water of different ponds and agree on the importance (or not) of water quality and water quality testing. Fish inputs and/or fishing gear retailers can then commit to buy water testing kit and promote water testing in their shops. SAIL can help them develop marketing material based on pictures and learning from the 'water quality matter' day and possible organise other 'water quality matter' demo days. MFF should be associated with this activity as they are currently advocating for the government to ban poultry farms over ponds.	· Lack of access to and availability of water
Access to Knowledge/ Training/ Extension	Limited capacity among growers to pay upfront for bigger sized fingerlings		Promote the use of bigger sized fingerlings through the design, piloting and refining of a "Grow Now, Pay Later" scheme with selected hatchery (ies) through revolving fund. Disseminate the model once it has been tested and refined for other hatcheries to adopt and adapt this model. Consider partnership with MFIs and banks during the scaling-up phase.	Weak effective demand for bigger size fingerlings		Farmers are not equipped to organise their own trainings	Intervention F: Improve water quality for intensive and semi-intensive ponds	· Organise 'water quality matter' day(s) during which intensive and semi intensive farmers as well as retailers of fish inputs and fishing gears are shown water quality tools and equipment, text the water of different ponds and agree on the importance (or not) of water quality and water quality testing. Fish inputs and/or fishing gear retailers can then commit to buy water testing kit and promote water testing in their shops. SAIL can help them develop marketing material based on pictures and learning from the 'water quality matter' day and possible organise other 'water quality matter' demo days. MFF should be associated with this activity as they are currently advocating for the government to ban poultry farms over ponds.	· Surface water and ground water pollution due to the utilisation of chemical fertilisers and pesticides, integrated chicken/pig and fish farms, and widespread utilisation of single use plastics

	Risk aversion among growers; limited capacity among existing hatcheries - nurseries to design and implement marketing campaign	Intervention A: Strengthen capacity and capability of private hatcheries-nurseries to produce more, better quality fries and fingerlings of diverse species as well as provide advisory services to customers	Set-up of model grow-out ponds to demonstrate benefits of using nursery reared bigger sized fingerlings and train nursery operators on how to conduct promotional campaign					· Engage with IWMI to brainstorm possible interventions to address the lack of water testing and water advisory services to improve water efficiency	· Surface water and ground water pollution due to the utilisation of chemical fertilisers and pesticides, integrated chicken/pig and fish farms, and widespread utilisation of single use plastics
	limited know-how, skills, and resources to implement resiliency measures in responding, coping and adapting to climate change particularly water shortage and lower amount of rainfall		Support upgrading of nursery ponds especially ability to produce "ready for stocking" fingerlings at a time when ponds have access to water	Limited capacity among nurseries to serve farmers at the time that they needed the seeds or that would allow farmers to make judicious use of their ponds				· Better understand soil fertility implications on water quality and pond productivity and create a simple and accessible mechanism for farmers to identify soil types, level of fertility and make the necessary adjustment. Test the improvement system and mechanism with small group of progressive farmers where soil fertility has been identified has an issue and set up an 'action learning' demo plot with them to work on soil fertility – and water quality	
	Limited outreach of DOF due to resource constraints		· Develop capacity of all hatcheries to provide technical advice to customers	Limited technical capacity of farmers operating vertically integrated nursery - grow-out ponds resulting to high mortality rate during the nursery phase.	Inputs (seeds)	Private sector has no incentive to promote safe and nutritious food		Engage with hatchery owner selected for support, agree on a plan to upgrade the hatchery and on financial and non-financial contribution of each party	Limited technical capacity of hatcheries to improve productivity and quality, diversify to other species, scale up to meet local demand, and innovate

			· Study tour in Myanmar or in South East Asia for hatchery owners to discover state of the art hatcheries	· Limited availability and access to knowledge, training and extension	Access to Knowledge/Training/Extension	Private sector has no incentive to provide information and technical skills	Intervention A: Upgrade hatchery technology to produce more and diversified seeds	Negotiate conditionalities with hatchery for them to become more inclusive as a result of SAIL contribution and to contribute to SAIL's objectives. For example, the hatchery can commit to disseminate and promote nutrition or take part nutrition campaign created by SAIL. They can also disseminate technical fact sheets on pond management, benefit of feed and other learning from other producer pioneering change in Shan East. These fact sheets could be sponsored by feed suppliers, other suppliers of inputs to present and promote their products using a three-tier sponsorship system (e.g. gold, silver, bronze). The hatchery can also commit to trial a last mile distribution system (initially partly funded by SAIL but with a clear exit strategy). That is, for example, an employee of the hatchery going on a motorbike to the most remote villages to sell seeds to farmers, at hatchery-gate price, that would otherwise not be able to afford seeds to stock their pond at the recommended density. This staff could also recommend stocking density ad provide some technical advice to farmers in remote areas. Another option can be to create a CSR type programme with the hatchery.	Limited diversity of fish seeds available leading to a lack of diversity and limited availability of high-nutritious fish on markets
Inputs (seeds)	Aquaculture systems are too focused on production of a limited number of species and do not value SIS		Identify demand and possible barriers to adoption of SIS and SRS, most in-demand high-nutritious species of SIS, and SRS and identify ways to address these barriers to stimulate demand for all year-round SIS.	No or limited access and availability a of Small Indigenous Species (SIS, e.g. Mola) and Self Recruiting Species (SRS), eels, prawns and non-exotic species seeds (e.g. Mrigal)	Consumers are not aware of the nutritional benefit of the different species of fish				Limited technical know-how and skills to improve survival rate
Access to Knowledge/ Training/ Extension			Identify farmers that are interested to set up SIS Broodstock (e.g. Mola) and sale seeds to other farmers	Limited diversity of fish seeds available leading to a lack of diversity and limited availability of high-nutritious fish on markets	· Under five years old and children do not benefit from regular consumption of fish and diverse food				Limited availability and access to knowledge, training and extension

		Intervention B: Create and promote SIS and SRS supply chains and stimulate demand for all year-round consumption of SIS and SRS	Identify farmers interested to set-up demo farms (of different types – ponds, paddy fields, reservoirs, etc.) cum training venues of Mola polyculture. Owners of the demo farms will serve as local facilitators, initial pool of Mola seeds suppliers, and farms as training venues. Support can include: (i) initial Mola seeds; (ii) trainers' training on Mola culture and basic GAqP; (iii) harvesting net for Mola; and (iv) demand-led technical assistance. Ensure that there are women-owned demo farms.	Limited availability and access to knowledge, training and extension	Inputs (seeds)	No incentive from the market to produce different species	Intervention B: Stimulate the market supply and demand for SIS and SRS	Identify demand and possible barriers to adoption to the creation of SIS and SRS broodponds, and based on this analysis identify champions willing to pilot SIS and SRS broodponds	Limited diversity of fish seeds available leading to a lack of diversity and limited availability of high-nutritious fish on markets
			Support to initial conduct of community—based Mola learning events (technical, business case, nutrition) anchored on demo farms		Access to Knowledge/Training/Extension			Provide technical assistance to SIS and SRS broodpond champions to establish broodstock ponds, create an economically viable and demand-driven business model than can become sustainable.	Limited availability and access to high quality and diverse broodstock
			Foster linkages with suppliers of nets appropriate for Mola harvesting and use by women.					Stimulate the demand for good quality SIS and SRS broods	
			Conduct farmed Mola and other SIS and SRS recipe competitions: (i) households/ women; and (ii) eateries; small food establishments		Inputs (seeds)	Production of existing hatcheries not sufficient to meet demand and/or availability of fries dependent on rainfall; supply gap of about 500,000 fries in Kengtung alone	Intervention C: Facilitate expansion of supply base of	Support establishment of small scale hatcheries in strategic areas with year round water availability	Absence of small and large scale nursery operators
			Conduct of promotional campaigns (see Food Safety & Nutrition-WASH)		Access to knowledge/ training/ extension	No specialised nursery enterprises		Support establishment of demo plots of nurseries of local species, tilapia, and SIS (e.g., Mola)	Limited technical know-how and skills to improve survival rate

Input (feeds)	Local feed suppliers do not have last mile distribution systems that can incentivise farmers to buy feed	Intervention C: Create business case on the link between feed, income and nutrition and promote use of more nutritious feeds and adoption of good feed management practices	Set up demonstration ponds to create the business case on the link between feed, income and nutrition	Limited availability, accessibility and affordability of feed in rural areas		Limited appreciation of benefits of using bigger sized fingerlings to cope with water availability problems and promote judicious utilization of ponds	Intervention D: Assess feasibility of creating local feed supply chains	Develop capacity of project supported nursery operators and hatcheries to design and implement effective marketing and promotion campaigns to drive use of bigger fingerlings and better farming practices.	
Access to Knowledge/ Training/ Extension	No local/regional feed supplier that can produce affordable feed for farmers		Engage with feed suppliers to discuss last mile distribution system and how they can use the business case demonstration the link between feed, income and nutrition to stimulate the demand for feed	Low use of commercial feeds/nutritious feeds		Majority of grow-out ponds use 1-inch (and sometimes smaller) fingerlings resulting to suboptimal survival rate and extended culture period		Support establishment of demo grow-out ponds using bigger fingerlings and GAqP aligned practices parallel to building capacity of operators to provide advisory services to peers. And/or organize learning events.	
	Limited appreciation among growers of the benefits of using improved feeds; limited technical know-how on how to monitor feed efficiency		Set up demonstration ponds (different feeding regimes and culture systems) cum venues for learning events on feed management	Poor feed management practices	Input (feeds)	· No local/regional feed supplier that can produce affordable feed for farmers		Identify barriers to the adoption of improved feed (beyond cost) for example sinking vs. floating pellets.	· Limited availability, accessibility and affordability of feed in rural areas
	Limited capacity among growers to pay upfront for feeds; weak effective demand for commercial feeds/better and more nutritious feeds		Develop and support implementation of business models that can facilitate access of nurseries and growers to feed. Possible schemes may include: (i) Grow now , pay later scheme for a seed and feed package provided by hatcheries through a revolving fund mechanism as entry point and eventually in collaboration with MFIs, banks, and commercial feed companies. This will also include advisory services from hatcheries; (ii) development of capacity of growers to undertake collective procurement of commercial feeds for retail selling to members and delivery of advisory services/training services in collaboration with local facilitators. Collective procurement of feed could reduce financial risk associated with fingerlings credit from the hatcheries by allowing shorter and more production cycles; (iii) collective feed mills/processing of feeds (scaling up of MySAP and MyCULTURE feed formulation and business models)	Low use of commercial feeds/nutritious feeds	Access to knowledge/training/extension			Analyse and learn from the feed mills projects set up by MYSAP and MyCulture, understand its successes and failures, and try to improve the activity with the aim to make it sustainable and scalable. For example, producing floating pellets instead of sinking pellets, aggregation of feed mills, buying different types of ingredients, source locally, get several quotes from traders before buying ingredients, trying different feed formulation, mutualising risks	Lack of market research on feeds

	Limited appreciation among growers of the benefits of using improved feeds; limited technical know-how on how to monitor feed efficiency; weak effective demand for commercial feeds		Documentation and dissemination of emerging good practices, business models, and lessons learned through exchange visits, tri-media, social media, etc.	No commercial feed retailer in South Shan				Identify availability and quality of fodder for grass carp and consider options to stimulate the production of low cost, low manpower, high quality feed for grass carp using innovative systems (e.g. hydroponics, better quality fodder seeds). Create feedback loops with champions and constantly adjust the activity based on feedback.	Increasing lack of feed ingredients and lack of innovation to find alternative ingredients for feed
Input (feeds)	No local/regional feed supplier that can produce affordable feed for farmers	Intervention D: Assess feasibility of creating/upgrading a local feed mill production unit using locally available ingredients to provide affordable feed to farmers in the South Shan and possible in the entire Zone of Influence	Identify partner (e.g. oil miller in dry zone, and Nyaungshwe; existing corn mill producing for own feeds; farmer groups) that is interested in diversifying into fish feed using by-products. This may also include delivery of basic advisory services on fish farming to farmer clients.	Limited availability, accessibility and affordability of feed in rural areas				Identify alternative sources of protein/feed formulation that can be produced by household at low cost to increase the availability of home-made feed from fish (e.g. insects). Create feedback loop with champions and constantly adjust the activity based on feedback.	Inconsistent quality of feed ingredients and vulnerability to food safety risks
			Work with partner identify above to conduct a feasibility study to create a medium size feed mill using local ingredients	Lack of market research on feed				Work with partner identified above to conduct a feasibility study to create a medium size feed mill using local ingredients to reduce risk associate with import bans and change in export rules (e.g. reduced availability of rice barn due to possibility to now expert paddy from Myanmar) that could impact the feed business. This activity would stimulate local economic development	
				Increasing lack of feed ingredients and lack of innovation to find alternative ingredients for feed	Inputs (feeds)	No retailers of feeds outside of Kengtung (except for Thai feeds at the border which are more expensive)	Intervention E: Strengthen commercial feeds (pellets) distribution to reach smallholder farmers especially those outside of Kengtung parallel to increasing uptake of better quality feeds and basic GAqP	Support commercial feed companies in designing and operationalizing a rural retailer and dealer network that would connect directly with target groups (hatcheries, nurseries, and grow-out ponds). The network may consist of existing agro input retailers, progressive grow-out pond operators, farmer groups, etc. Capacity building support will also be needed to input retailer and dealer network in: (i) sales and promotion strategies; (ii) customer service; and (iii) delivery of product and technical information to customers.	Limited availability, accessibility and affordability of feed in rural area
				Inconsistent quality of feed ingredients and vulnerability to food safety risks	Access to knowledge/ training/ extension	Limited appreciation among growers of the benefits of using improved feeds; limited technical know-how on how to monitor feed efficiency		Organize aqua input festivals, with training and demonstration components and, perhaps, promotional discount packages in collaboration with commercial feed companies (e.g., Htoo Thit, De Heuss, etc.) to promote use of pellet feeds and initiate relationship building.	Weak effective demand for commercial feeds

Access to Knowledge/Training/Extension	Limited outreach of DOF due to resource constraints		Develop pool of service providers consisting of hatchery owners, demo farm operators, farmer groups, and local providers NGOs + local aquaculture facilitators (to be identified within the communities) to complement government extension services.	Limited technical know-how and weak adoption of GAqP across all functions in the chain.				Establishment of demo plots to showcase good feed management practices and efficacy of feeds This may also be complemented with monthly learning events in which farmers and other players within the area meet and discuss emerging good practices and common issues	Limited knowledge and access to knowledge about fish and pond management including climate smart technologies
			Review and analyse past training conducted by MFF and consider the possibility of creating an trainer accreditation scheme within MFF and a system for regional MFF to collect and collate farmers training needs and a financial plan to deliver trainings (e.g. how many days of trainer, how many farmers/hatchery or nursery technicians, training fees, etc.). Selected trainers can go through a training of trainers and become accredited MFF trainers. These accredited trainers can also be paired with technical experts/consultants deployed by WorldFish to learn on the job. Training should be conducted in demo-plots, hatcheries, nurseries etc.	Limited availability and access to knowledge, training and extension	Processing	Local norm that only capture fisheries are used for processing and farmed fish consume fresh		Organize product development competition to jumpstart the development of nutritious processed farmed fish products	Lack of knowledge, productive assets and market linkages to process nutritious and healthy products and/or prevent nutritional degradation
		Intervention E: Facilitate access of farmers to services that will enable them to improve farm productivity, diversify species and adapt to climate change	Develop low cost training delivery approaches (e.g.: peer-based learning with some inputs from facilitators, farmer-led mediated video, etc.) including adaptation of existing modules to learning aptitude of target groups.			Limited access to information on product and market opportunities	Intervention F: Promote improved storage, preservation and	Assess commercial viability of processed farmed fish products through market testing and consumer research.	Lack of knowledge, productive assets and market linkages to process nutritious and healthy products and/or prevent nutritional degradation
			Support the establishment of community-based system for monitoring water, regular fish sampling, etc. including financial viability schemes. Pond owners may be willing to pay small fees for these services.					Assess viability of common service facility for fish storage (left-over stocks of vendors) which vendors can use for a fee	

			Develop financial sustainability and delivery schemes. Embedded services anchored on trading structure may be the most viable rather than fee-based system (upfront payment of services). For example, when a group engages in collective marketing, part of their profit will go to training services; if they engage in collective procurement of inputs, part of profit will be allocated for training. Intervention I will be a critical prerequisite to lay the groundwork for embedded training services.				preservation and processing of farmed fish	If viable, support the establishment of low cost GMP aligned village level storage and processing facility	
			Conduct of GaqP competitions to motivate adoption, stimulate innovation, and facilitate identification of emerging good practices for regular updating of modules. The theme of the competitions may be based on module and, at the end of the full training --- highest yield, most GAqP aligned farm, most cost-effective. Project can have many themes depending on the practice they want to promote at a certain time.					Develop capacity of operators to design and implement innovative marketing strategies.	
Markets	Limited space in Nyaungshwe market	Intervention F: Support diversification of marketing channels for fish products in parallel to demonstrating the benefits of food safety compliance	Support establishment of model food safe mobile/ village level fish collection and retail outlets owned and managed by farmer groups	Lack of facilities in the market to facilitate safe fish handling				· Link facility operators with vendors who may want to avail of toll processing and storage facilities to extend shelf life of their products and expand merchandise	
Food Safety	Local norms on quality; limited access to resources and skills to engage in processing; limited access to information on product and market opportunities		Support establishment of village level low cost Good Manufacturing Practices (GMP) compliant processing center owned and managed by farmer groups/farmer networks	Lack of knowledge and assets to process healthy and nutritious food and prevent nutritional degradation	Informal rules	Lack of research on balancing social and spiritual needs and obligations with improving livelihoods	Intervention H: Research into	Conduct research on prioritisation decision making process for resource allocation and prioritisation at the material, social and spiritual levels, and how this differ from the capitalistic/accumulation and productivity improvement model promoted by development organisations. This research probably needs to involve/be conducted with actors that are not traditionally part of development studies (e.g. monasteries, churches and other influencers)	Development projects do not understand the link between production systems, social and spiritual obligations

Processing	Weak implementation of consumer law			Lack of hygiene in processing/ weak compliance to food safety standards			balancing social and spiritual needs and obligations with improving livelihoods		
Interfirm relationships	Unorganized farmers, vendors, etc.	Intervention G: Development of capacity of farmers and vendors to incrementally associate, collaborate, and coordinate to achieve economies of scale in their transactions, improve bargaining power, and access to resources	· Facilitate the formation of farmers and vendors networks and/or strengthen existing groups as base for collective procurement of inputs and marketing as well as delivery of training. This will involve organizational development support complemented with entrepreneurial skills development.	Weak bargaining power of farmers					
			· Support to groups (farmers network, vendors network) to start low risk collective activities that provide quick wins and tangible benefits (e.g., reliable and timely access to inputs of the right quality and quantity è increase in profits)	High transaction costs	Access to knowledge/training/extension	DoF performance objectives are not based on extension	Intervention I: Support to DoF	Engage with DoF to confirm root cause identified, identified additional root cause and propose intervention/activities to address the root causes	Limited capacity and prioritisation of DoF and MFF to provide training to fish farmers in general and to SSA in particular
Resource Conservation	No business model for community-led environment conservation committee to generate income to finance activities such as lake patrols to prevent electro fishing	Intervention H: Create a sustainable, representative and gender-balanced environment conservation committee that can be replicated in other parts of the country	· Selected implementing partner in Pekon	· Lack of support to the development of local community-led Environment Conservation Committee and Environmental Management Fund					Limited technical know-how and weak adoption of GAqP across all functions in the chain.
			· Support the development and implementation of practical measures on environmental management and promotion such as access of fishers to more efficient and selective types of fishing gears						
	No women representative involved in the conservation committee as it was originally set up to prevent electro fishing		· Build on the existing 5-year strategy of the Pekon Lake Conservation to create a longer term resource management plan						
	No women representative involved in the conservation committee as it was originally set up to prevent electro fishing		· Assistance to MFIs and fishing gear suppliers in the development of financing schemes to facilitate access to eco-friendly and efficient fishing gears through an easy payment low cost scheme						

			· Explore the possibility of setting up a village-based enterprise managed by women which will specialize in the retail selling of fishing gear materials, fabrication and repair of nets.	
			· Support social and behaviour change campaign on use of eco-friendly efficient gears to prove the benefits of eco-friendly gears over electro-fishing.	

Sagaing					Magway				
Related underperforming market functions and rules	**Root causes addressed**	**Intervention area**	**Activities**	**Key constraint(s) impacted**	**Related underperforming market functions and rules**	**Root causes addressed**	**Intervention area**	**Activities**	**Key constraint(s) impacted**
Inputs (seeds)	Limited technical capacity of hatcheries to improve productivity and quality, diversify to other species, scale up to meet local demand, and innovate	Intervention A: Upgrade hatchery technology to produce more and diversified seeds and provide advisory services.	Engage with hatcheries owners selected for support, agree on a plan to upgrade the hatchery and on financial and non-financial contribution of each party.	Local hatcheries cannot meet the local demand for seeds	Water	Limited water availability between January and May	Intervention A: Promote technologies that can enhance water and overall pond efficency and productivity	Consider introduction/development of species that use less water	Limited data on and understanding of water availability and water/landscape dynamics
Access to Knowledge/ Training/ Extension	· Hatcheries does not promote local species of seeds		Support PM hatchery to deliver the 2022 vision they laid out during the intervention design workshop with a focus on servicing the market in Sagaing and Magway.	Limited diversity of fish seeds available leading to a lack of diversity and limited availability of high-nutritious fish on markets		Limited technical and science-based knowledge on water and overall pond management		(i) Participatory development with progressive farmers of species-wise system specific feeding standards, feed management, and farm monitoring systems to improve FCRs and reduce water footprint in aquaculture. This can be done through establishment of demo cum R and D farms; (ii) Build capacity of owners of demo cum R and D farms to provide training to peers; and (iii) Document and disseminate emerging good practices through various media.	Limited knowledge and access to knowledge about fish and pond management including climate smart technologies
	· Hatchery has no incentive to promote safe and nutritious food		Build on existing initiatives from PM hatchery (e.g. credit system for 30% of the purchase, 5% discount for traders/bulk purchase) to create an even more inclusive business model (i.e. that can service poor people who would otherwise not but seeds from hatcheries, or stock at a lower than optimal density).	Limited technical know-how and skills to improve survival rate		Sub-optimal utilization of grow-out ponds/Low productivity and insufficent production volume to meet fish demand		Explore the viability of introducing a simple and low-cost recirculating aquaculture system especially for fry and fingerling production.	
	· Hatcheries have not incentive to provide advisory services		Incentivise 2nd private hatchery in Kale to adopt/adapt some of the initiatives piloted by PM hatchery and off set the risk of adapting these initiatives.	Limited availability and access to knowledge, training and extension				(i) Explore the viability of supporting ponds (especially those with better access to good quality water) to focus on nursery operations with grow-out only as secondary; and (ii) Focus promotion of grow-out production in inns, lakes, and similar water bodies.	
	· Farmers have limited options to access knowledge, training and extension		Create the business case on the link between hatcheries, feed, advisory services and nutrition.					(i) Explore introduction of GIFT tilapia - carp - SIS and other species with culture period aligned to water availability; (ii) if viable, facilitate access to seeds and knowledge that will enable farmers to engage in the production of these species	

			Incrementally build the capacity of the hatchery to provide advisory services.					Consider the association of fish and pond vegetal cover such was water lentils and compare the water needs for different type of systems such as ponds, ponds as part of an aqua-agro-forestry systems, fish and vegetal pond	
			Negotiate conditionalities with hatchery for them to become more inclusive as a result of SAIL contribution and to contribute to SAIL's objectives such as the dissemination of nutrition material, fact sheets on pond management, benefit of feed and other learning from other producer pioneering change in Sagaing and other states/regions. These fact sheets could also be partially paid fro by the hatchery and be part of a seeds catalogue The hatchery can also commit to trial a last mile distribution system. That is, for example, an employee of the hatchery going on a motorbike to the most remote villages to sale seeds to farmers, at hatchery gate price, that would otherwise not be able to afford seeds to stock their pond at the recommended density. This staff could also recommend stocking density and provide some technical advice to farmers in remote areas.		Inputs (feeds)	Limited appreciation among growers on the benefits of using commercial/nutritious feeds; weak effective demand for commercial feeds/nutritious feeds	Build local capacity to produce low-cost nutritious feed parallel to developing distribution channel for commercial feeds	(i) Support establishment of village level feed processing facility (scaled up/upgraded versions of MySAP and MyCulture business models) operated by farmer groups or toll processing under the Village Development Committee (VDC); (ii) Development of capacity of farmer groups or VDCs to undertake collective procurement of commercial feeds for retail selling to growers at affordable scheme; (iii) Set-up of demo plots to showcase efficacy of feeds and venues for learning events; and (iv) Development of capacity of operators (village level feed processing facility and collective procurement of feeds) to provide extension services as well as design and implement campaigns to promote their services and products	No retailers of commercial feeds; Low use of nutritious and/or commercial feeds
					Inputs (fingerlings)	Unexplored potential to create inns and lakes fingerlings supply chains	Intervention C: Increase availability of good quality seeds produced in Magway	Consider piloting support to leasehold fisheries to nurse and market fingerlings to farmers currently using a seeds-grow out pond system to reduce attrition and increase the availability of high quality fingerlings	Limited availability and access to knowledge, training and extension
					Leasehold fisheries	Poor quality of seeds available in the local market		Engage with community to consider potential to introduce small lake management techniques to increase the availability of fingerlings in Magway	Limited diversity of fish seeds available leading to a lack of diversity and limited availability of high-nutritious fish on markets
					Access to Knowledge/ Training/ Extension	No fingerlings available			No innovation in leasehold fisheries management e.g. production of seeds and fingerlings

· Input (feeds)	No local/regional feed supplier that can produce affordable feed for farmers	Intervention F: Assess feasibility of creating/upgrading a local feed mill production unit using locally available ingredients to provide affordable feed to farmers and possibly in the entire Zone of Influence	· Identify partner (e.g. oil miller in Magway; existing corn mill producing for own feeds; farmer groups) that is interested in diversifying into fish feed using by-products. This may also include delivery of basic advisory services on fish farming to farmer clients.	· Limited availability, accessibility and affordability of feed in rural areas
	NB: Intervention to be developed in coordination with Shan South		· Work with partner identify above to conduct a feasibility study to create a medium size feed mill using local ingredients	· Lack of market research on feed
				· Increasing lack of feed ingredients and lack of innovation to find alternative ingredients for feed
				· Inconsistent quality of feed ingredients and vulnerability to food safety risks
Interfirm relationships	Poor networking capacity of farmers	Intervention B: Facilitate the formation of aquaculture farmers groups	Engage with aquaculture farmers to understand their incentives to create aquaculture farmers groups and explain to them the benefits they could get (access to quality seeds, bargaining power for purchase of inputs and sell of fish etc.), and the commitment they need to make.	Weak bargaining power o
Access to Knowledge/ Training/ Extension	Private sector has no incentive to provide information and technical skills		Nurture the emergence of farm leaders and understand their incentives to become leaders in their communities. Align their incentives with the incentives of SAIL and aquaculture farmer groups.	High transaction costs
			Set up demonstration plots to demonstrate innovative way to manage water efficiently, create nurseries and create aqua-agro-forestry systems to increase the resilience of these systems. Document demonstration for future dissemination in Magway	
			Introduce and gradually improve organisational development of farmers' association by introducing communication principles, more sophisticated purchasing and selling techniques as well as mechanisms for creation of embedded services such as training	

			Equip farmers who cannot afford it with smart phones, create a plan for them to be able to afford airtime for their mobile phone, and create a Viber group of aquaculture farmers to facilitate information flow between farmers and between farmers and private sectors (e.g. hatcheries in Mandalay), introduce Greenovator app and aquaculture content.	

Mandalay					Kachin				
Related underperforming market functions and rules	**Root causes addressed**	**Intervention area**	**Activities**	**Key constraint(s) impacted**	**Related underperforming market functions and rules**	**Root causes addressed**	**Intervention area**	**Activities**	**Key constraint(s) impacted**
· Water	Limited data on and understanding of water availability and water/ landscape dynamics	Intervention A: Promote technologies that can enhance water and everall pond efficency and productivity	Engage with IMWI and the Department of Irrigation and the Department of fisheries to facilitate an action research pilot on cross-departmental engagement to consider a water need-based approach to irrigating fields and ponds by considering the integration of aquaculture in irrigation planning. This could be done through analysing water availability in a specific area(s), providing recommendations on crop water needs and aquaculture water needs to improve irrigation water efficiency, inform local rules for farmers and aqua farmers to access water when it is most needed, and foster coordination and cooperation between irrigation farmers and aquaculture farmers	Limited data on and understanding of water availability and water/landscape dynamics	Water	No information and guidelines from the Government on importance of water quality and how to maintain/improve water quality	Intervention A: Improve knowledge about water and water management	Draft and disseminate guidelines on what type of species grow in what type of water, how to understand and test water quality and how to improve water quality. These guidelines can be developed by WorldFish with MFF and DoF and the retailers of water equipment/agri and aqua inputs. Agri and aqua input provider can be incentive to do this if WorldFish help them develop their business (e.g.: through staff training) or help them introduce and sell innovative products (e.g. aerators), help them develop 'how to' guide for some of their products, train a member of staff to become a aqua equipment technician or any other type of support that can both contribute to the objectives of the business and that of SAIL.	Limited data on and understanding of water availability and water/landscape dynamics
	Limited water availability between January and May; limited technical and science-based knowledge on water management		(i) Participatory development with progressive farmers of species-wise system specific feeding standards, feed management, and farm monitoring systems to improve FCRs and reduce water footprint in aquaculture. This can be done through establishment of demo cum R and D farms; (ii) Build capacity of owners of demo cum R and D farms to provide training to peers; and (iii) Document and disseminate emerging good practices through various media.			Limited knowledge about the typology of water management systems including source, availability, demand, quality, seasonality, utilisation (e.g. irrigation vs. ponds), cost, interfirm arrangement, pollution in selected townships		Engage with IWMI to do a situation assessment and provide recommendation for improving water management systems including designing improved pond water management system to increase water efficiency	Lack of advisory services on water use efficiency/water saving technologies for hatchery, nurseries and Small Scale Aquaculture (SSA)
			Explore the viability of introducing a simple and low-cost recirculating aquaculture system especially for fry and fingerling production.					Identify groups leaders that are facing water management and support them to improve their water management systems. Collaborate with group leaders to organise farmers water school day during which participants can participate to the work and installation of improved water management systems and equipment, possibly in collaboration with machinery sales center technicians and/or staff.	

Water	Governement prioritise irrigation water for agriculture over aquaculture	Intervention B: Action research on cross-departmental engagement between DoF and DoI to balance irrigation of crops and ponds	Using the e case study (ies) and lessons learned from the above pilot explore the possibilities to create local rules to balance the need for irrigation water and aquaculture water and eventually create policy to irrigate fish ponds	Lack of access to and availability of water	· Inputs (seeds)	Limited access to state of the art hatcheries to stimulate innovation and competition	Intervention B: Strengthen capacity and capability of private hatcheries-nurseries to produce more, better quality fries and fingerlings of diverse species as well as provide advisory services to customers	Select hatcheries in Kachin and support upgrading of hatcheries including on broodstock selection using MYSAP Inland research and recommendations on management of inbreeding.	Limited technical capacity of hatcheries to improve productivity and quality, diversify to other species, scale up to meet local demand, and
			Promote integrated/rice-fish farming by setting up demonstration plots for farmers, organising study tours for lead farmers to understand different options and techniques and hear from farmers practicing rice-fish. Adapt the infographic created by WorldFish on rice-fish to suit a farmers' audience, translate the infographic in the Myanmar and ethnic languages and disseminate the infographics through hatcheries, feed suppliers, ingredients suppliers, aqua input suppliers , Viber farmers groups, Greenovator, radio, and create a short TV programme on rice fish that can be broadcasted on TV and disseminated on social media		· Access to Knowledge/ Training/ Extension	Farmers do not understand the benefits of fingerlings		· Develop capacity of all hatcheries to provide technical advice to customers	Limited diversity of fish seeds available leading to a lack of diversity and limited availability of high-nutritious fish on markets
Water	Limited water availability between January and May; limited science-based knowledge on water management and breeding	Intervention C: Promote tilapia - carp - SIS polyculture and faciliate access to improved seed quality	(i) Develop capacity of hatcheries to produce resilient and fast growing tilapia and carp strains through participatory R&D in collaboration with MFF and DOF; (ii) Strengthen capacity of hatcheries to reduce risk of in-breeding through participatory harmonization of breeding protocols and its implementation measures in collaboration with MFF and DOF; (iii) Strengthen capacity of hatcheries to promote improved tilapia and carp strains; (iv) Support existing nurseries (either integrated with hatcheries or grow-out ponds) to engage in fingerlings production of new strains and SIS for own use in their own grow-out ponds and for commercial selling to peers; (v) Develop capacities of hatcheries and nurseries to provide advisory services to their customers.	Sub-optimal utilization of grow-out ponds; insufficent production volume to meet fish demand; limited diversity of farmed fish species		No experts providing knowledge on hatchery management and improvement		Promote the use of bigger sized fingerlings through the design, piloting and refining of a "Grow Now, Pay Later" scheme with selected hatchery (ies) through revolving fund. Consider partnership with MFIs and banks. Disseminate the model once it has been tested and refined for other hatcheries to adopt and adapt this model.	Limited availability and access to high quality and diverse broodstock

Inputs (seeds)							Engage with MFF to help them develop a network of national and regional (ASEAN) hatchery and nursery experts/consultants that can be deployed to provide fee-based group training and advisory services to MFF hatcheries and nurseries (e.g. several hatcheries pool resources to hire a technical expert to help their hatcheries) Initially this can be done on a cost-sharing basis with WorldFish. Through this process MFF will learn to identify their needs and work together toward a common objective using their own resources.	Limited technical know-how and skills to improve survival rate
Inputs (feeds)	Limited appreciation among growers of the benefits of using improved feeds; weak effective demand for commercial and/or nutritious feeds	Intervention D: Develop capacity of commercialfeed suppliers to engage in education-based and extension-focused marketing campaign as a means of penetrating the market especially among carp growers	(i) Deliver capacity building on tilapia-carp polyculture to sales team of commercial feed companies to enable them to effectively promote this to growers. Tilapia-carp polyculture can potentially improve financial viability of using commercial feeds.; (ii) Support companies in coming up with marketing strategies and tactics such as trial packs, contests, referral program, loyalty club, and promotional discounts to establish on-farm demonstrations where they could generate authentic positive testimonials from farmers which they could use for word of mouth advertising opportunities; and (iii) support companies in coming up with retail distribution models aligned to purchasing behaviour of growers.	Low use of commercial feeds/nutritious feeds			Study tour in Myanmar or in South East Asia for hatchery owners to discover modern and state of the art hatcheries	Limited availability and access to knowledge, training and extension
Inputs (seeds)	Limited availability and access to high quality and diverse broodstocks	Intervention E: Strengthen capacity and capability of private hatcheries-nurseries to produce more, better quality fries and fingerlings of diverse species as well as provide advisory services to customers	Select hatcheries in Mandalay region and support to upgrading of hatchery technologies including on broodstock selection using MYSAP Inland research and recommendations on management of inbreeding.	Limited availability and access to high quality and diverse broodstocks leading to inbreeding and limited diversity			Set-up of model grow-out ponds to demonstrate benefits of using nursery reared bigger sized fingerlings	Absence of small and large scale nursery operators
Access to Knowledge/ Training/ Extension			Develop capacity of all hatcheries to provide technical advice to customers	Limited capacity and prioritisation of DoF and MFF to provide training to fish farmers in general and to SSA in particular			Support upgrading and/or creation of nursery farms	Limited technical know-how and skills to improve survival rate

Access to Knowledge/ Training/ Extension	DOF and MFF have limited resources to invest in upgrading; limited depth and breadth of outreach of DOF and MFF due to resource constraints	Intervention F: Upgrade extension and training services of DOF and MFF and support expansion of outreach	(i) Review and updating of DOF and MFF training materials including development of low-cost delivery approaches and financial sustainability schemes; (ii) Capacity building of core group of DOF and MFF on updated aquaculture technologies including exposure and benchmarking visits; (iii) support to initial roll-out of training; (v) foster linkages between MFF and suppliers/local fabricators of small equipment (e.g., aerators, solar panels, solar powered ice makers etc.) that can help improve productivity and profitability of farms/MFF members. Explore business models that can facilitate easy access to these equipment and possibility of embedding some of the training costs.	Limited knowledge and exposure to modern aquaculture production and postharvest technologies	· Inputs (seeds)	Poor cooperation between DoF and MFF hatcheries	Intervention C: Foster cooperation between DoF and MFF hatcheries through common projects and plans	Provide strategic and operational planning support to MFF Kachin to identify areas where they can cooperate with MFF on a common projects that can contribute to the development of hatcheries in particular and the objectives of both organisations in particular while taking a farmer-centric approach	MFF is not reaching its potential to support SSA development as well as financial and technical support from third parties, or to act as the main focal point for coordination, planning, information sharing, and investment
Input (feeds)	Local feed suppliers do not have last mile distribution systems that can incentivise farmers to buy feed	Intervention G: Create business case on the link between feed, income and nutrition, and promote use of more nutritious feeds and adoption of good feed management practices	Set up demonstration ponds to create the business case on the link between feed, income and nutrition	Limited availability, accessibility and affordability of feed in rural areas	· Industry bodies			Provide technical assistance to MFF Kachin to create a 5-year plan in line with their vision, help them articulate operational plan to deliver this vision, assess and address the risks associated with this vision. Support the transitional development of MFF Kachin, including Governance, to deliver their 2025 vision. Link their vision and plan to the national level strategy and policies such as the ADS or the Myanmar National Climate Change Policy. Where relevant emphasis cooperation with DoF during activity planning and delivery.	
Access to Knowledge/Training/Extension	Lack of demonstration on the benefit of feed (ponds, hapa, aquarium)		Set up demonstration ponds (different feeding options and culture systems) which can also serve as venue for on-site training/learning events, to create the business case on the link between feed, income and nutrition	Lack of market research on feeds	· Inputs (seeds)	Aquaculture systems are too focused on production of a limited number of species and do not value SIS	Intervention D: Create and promote SIS supply chains and stimulate demand for all year-round consumption of SIS	Identify demand and possible barriers to adoption of SIS, most in-demand high-nutritious species of SIS and SRS, and identify ways to address these barriers to stimulate demand for all year-round SIS.	No or limited access and availability a of Small Indigenous Species (e.g. Snakehead, Featherback, Small barb, Mola, Flying barb, Climbing Perch and Loaches), eels,
	No local/regional feed supplier that can produce affordable feed for farmers		· Engage with feed suppliers to discuss last mile distribution system and how they can use the business case demonstration the link between feed, income and nutrition to stimulate the demand for feed	Limited availability and access to knowledge, training and extension	· Access to Knowledge/Training/Extension			Identify farmers that are interested to set up SIS and SRS Broodstock ((e.g. Snakehead, Featherback, Small barb, Mola, Flying barb, Climbing Perch and Loaches) and sale seeds to other farmers	Limited diversity of fish seeds available leading to a lack of diversity and limited availability of high-nutritious fish on markets

	Weak effective demand to warrant establishment of distribution channels		Foster linkages between commercial feed suppliers and potential low-cost distribution channels (hatcheries, collective groups, etc.)	Limited availability, accessibility and affordability of feeds in rural areas				Identify farmers interested to set-up of demo farms (of different types – ponds, paddy fields, reservoirs, etc.) cum training venues of SIS and SRS polyculture. Owners of the demo farms will serve as local facilitators, initial pool of Mola seeds suppliers, and farms as training venues. Support can include: (i) initial SIS and SRS seeds; (ii) trainors' training on Mola culture and basic GAqP; (iii) harvesting net for SIS and SRS ; and (iv) demand-led technical assistance.	Limited availability and access to knowledge, training and extension
	Limited appreciation among growers of the benefits of using improved feeds		Creation and dissemination of success stories and learning (exchange visits, tri-media, etc.)	Low use of commercial feeds/nutritious feeds				Support to initial conduct of community-based SIS and SRS learning events (technical, business case, nutrition) anchored in demo farms	
				Poor feed management practices				Engage with MFF to help them develop a network of national and regional (ASEAN) hatchery and nursery experts/consultants that can be deployed to provide fee-based group training and advisory services to MFF hatcheries and nurseries (e.g. several hatcheries pool resources to hire a technical expert to help their hatcheries) Initially this can be done on a cost-sharing basis with WorldFish. Through this process MFF will learn to identify their needs and work together toward a common objective using their own resources.	Limited technical know-how and skills to improve survival rate
Access to finance	Farmers do not have land title to provide collateral and long processing time from the Government to get a license	Intervention H: Process analysis and improvement for Government to issue fish pond license	Engage with MFF and DoF in Mandalay to explore the possibility of jointly analysing the current licensing process, challenges, bottlenecks and opportunities and pilot process improvements to reduce lead time to issuing licenses, provide farmers with a clear process and timeline (based on different cases e.g. conversion of paddy land, flooded land, community ponds, etc.)	MFF is not reaching its potential to support SSA development as well as financial and technical support from third parties, or to act as the main focal point for coordination, planning, information sharing, and investment	Inputs (feeds)	Farmer do not understand the benefits of improved and/or commercial feed	Intervention E: Create business case on the link between feed, income and nutrition; and promote use of more nutritious feeds and adoption of good feed management practices	Set up demonstration ponds/pilot on the utilisation of nappier grass as feed for grass carp and silver barb vs. other type of grass	Limited availability, accessibility and affordability of feed in rural areas
				Limited lobbying for small-scale fisher registration	Production-Grow-out ponds	Local feed suppliers do not have last mile distribution systems that can incentivise farmers to buy feed		Set up demonstration ponds to create the business case on the link between different types of feeds (e.g. local, nappier grass, imported commercial, local commercial), production, income and nutrition	Limited availability and access to knowledge, training and extension

	Lack of demonstration on the benefit of feeds (ponds, hapa, aquarium)		Set up demonstration ponds (different feeding options and culture systems) which can also serve as venue for on-site training/learning events, to create the business case on the link between feed, income and nutrition	Low use of commercial feeds/nutritious feeds
	Limited appreciation among growers of the benefits of using improved feeds		Support MFF to develop a social media platform (e.g. Facebook, Viber) that can be used to disseminate knowledge products, stories, training announcements, pictures of study tours, innovations, and commercial offers by seeds and feeds suppliers. Deploy a social media specialist that can help MFF to push information on farmers and analysis trends and customers feed back (e.g. when farmers look at content most, how long they spend on content, rate of download, etc.) to refine content offer. Revenue stream generated through advertisement by companies can be used to hire a part time/full time content moderator. if successful this model can be developed with MFF in Mandalay and Shan South.	Poor feed management practices
			· Engage with feed suppliers and suppliers of equipment to understand their willingness and incentives to use and take part in the dissemination of the business case demonstration the link between feed, income and nutrition to stimulate the demand for feed	
			· Develop and support implementation of business models that can facilitate access of nurseries and growers to feed. Possible schemes may include: (i) Grow now , pay later scheme for a seed and feed package provided by hatcheries through a revolving fund mechanism as entry point and eventually in collaboration with MFIs, banks, and commercial feed companies. This will also include advisory services from hatcheries; (ii) development of capacity of growers to undertake collective procurement of commercial feeds for retail selling to members and delivery of advisory services/training services in collaboration with local facilitators. Collective procurement of feed could reduce financial risk associated with fingerlings credit for the hatcheries by allowing faster and additional production cycles.	

			Foster linkages between traditional feed suppliers (e.g. rice barn and nappier grass), and commercial feed suppliers and potential low-cost distribution channels (hatcheries, collective groups, etc.)	
			Creation and dissemination of success stories and failures and how these were addressed/what was the learning (exchange visits, tri-media, etc.)	
Production-Grow-out ponds	Unorganized farmers, vendors, etc.	Intervention F: Development of capacity of farmers and vendors to incrementally associate, collaborate, and coordinate to achieve economies of scale in their transactions, improve bargaining power, and access to resources	Facilitate the formation of farmers and vendors networks and/or strengthen existing groups as base for collective procurement of inputs and marketing as well as delivery of training. This will involve organizational development support complemented with entrepreneurial skills development.	High transaction costs
Interfirm relationship			Develop and support implementation of business models that can facilitate access of nurseries and growers to feed. Possible schemes may include: (i) Grow now , pay later scheme for a seed and feed package provided by hatcheries through a revolving fund mechanism as entry point and eventually in collaboration with MFIs, banks, and commercial feed companies. This will also include advisory services from hatcheries; (ii) development of capacity of growers to undertake collective procurement of commercial feeds for retail selling to members and delivery of advisory services/training services in collaboration with local facilitators. Collective procurement of feed could reduce financial risk associated with fingerlings credit for the hatcheries by allowing faster and additional production cycles.	Weak bargaining power of farmers
			Support to groups (farmers network, vendors network) to start low risk collective activities that provide quick wins and tangible benefits (e.g., reliable and timely access to inputs of the right quality and quantity è increase in profits)	
			Organise aquafairs sponsored by machinery sales centers (i.e. suppliers of water pumps, pipes, motors, tube wells), feed vendors, rice mills and oil mills for farmers to create and access network and information and be inspired by farm leaders and businesses, and possibly create market linkages for their products.	

Access to finance	Farmers do not have land title to provide collateral and long processing time from the Government to get a license	Intervention G: Process analysis and improvement for Government to issue fish pond license	Engage with MFF and DoF in Kachin to explore the possibility of jointly analysing the current licensing process, challenges, bottlenecks and opportunities and pilot process improvements to reduce lead time to issuing licenses, provide farmers with a clear process and timeline (based on different cases e.g. conversion of paddy land, flooded land, community ponds, etc.)	MFF is not reaching its potential to support SSA development as well as financial and technical support from third parties, or to act as the main focal point for coordination, planning, information sharing, and investment
				Limited lobbying for small-scale fisher registration
Markets	Local norms on quality	Intervention H: Support diversification of marketing channels for fish products in parallel to demonstrating the benefits of food safety compliance	Support establishment of model food safe mobile/ village level fish collection and retail outlets owned and managed by farmer groups	Lack of facilities in the market to facilitate safe fish handling
Food Safety			Support establishment of village level low cost Good Manufacturing Practices (GMP) compliant processing center owned and managed by farmer groups/farmer networks	Lack of hygiene in processing/ weak compliance to food safety standards
				Lack of knowledge and assets to process healthy and nutritious food and prevent nutritional degradation

Food Safety and nutrition/WASH for all six project areas: Shan South, Shan East, Sagaing, Magway, Mandalay and Kachin				
Related underperforming market functions and rules	Root causes addressed	Intervention area	Activities	Key constraint(s) impacted
Markets Food safety Access to Knowledge/ Training/ Extension	Consumers do not perceive food safety as an issue of fundamental importance No incentive among vendors to invest in upgrading especially compliance to food safety Weak enforcement of consumer law Weak communication between the public sector, industry, and consumers is weak in the area of food safety control	Intervention A: Strengthen implementation of consumer law/food safety and consumer involvement in promoting food safety especially in fish markets	(i) Facilitate the formation and/or strengthening multi-sectoral working group that can support the Township Development Council (TDC) and DOF in promoting compliance to consumer law. The multi-sectoral working group may consist of representatives from consumer groups, vendors, growers, and relevant NGOs. (ii) Support the working group and Township Development Council in the elaboration of low-cost and practical implementation measures of the standards (relevant to fish markets) as embodied in the consumer law. (iii) Support working group (in collaboration with TDC and DOF) in the conduct of sensitization/orientation of vendors and workers on the benefits (economic, social, and health) of upgrading and compliance to food safety. This will also include getting a consensus and commitment on the implementation measures including sequencing of implementation (start with easy but tangible measures --- waste segregation and disposal, designated garbage cans with covers, personal hygiene, tippy taps, etc.). It is vital that all stakeholders are properly consulted with regards to any proposed upgrades and efforts must be exerted to enhance ownership of the change process. (iv) Conduct a jingle (short song) competition on fish food safety which can be played regularly in the market. Jingle should cater to both vendors and consumers. The competition can be linked to events such as the Nutrition Month, World Food Day, etc. (v) Conduct of consumer feedback survey (may be quarterly) aligned to food safety implementation measures being promoted. The consumer feedback survey can serve a two-fold purpose: i) as basis for iterative planning; and ii) provide motivation for fish vendors to pursue and sustain upgrading. This may be done via a Dot Survey. It is simple but effective data collection method in which a limited number of questions (maximum 3) are posted on an easel or board and consumers indicate their responses using colorful dots. Results should be analysed together with the vendors and the multi-sectoral Working Group. Positive results may be disseminated to the media to encourage other industry players to enroll in the upgrading initiative.	Lack of public awareness and lack of hygiene across all functions in the value chain
Food safety Informal rules	· Limited understanding on routes of contamination and quality deterioration among consumers and vendors; vendors believe ice is not necessary as fish will be sold quickly · Lack of messages tailored to address local norms and beliefs (fish breathing = fresh and good quality) · Weak effective demand for ice; frequent power interruptions or brownout; high cost of electricity	Intervention B: Promote incremental use of ice and/or technologies that can decelerate fish quality deterioration	(i) Development of short videos or posters that demonstrate how fish quality deteriorates and the benefits of using ice to be posted in strategic location in the market. Alternatively, on-site (in the market) demonstration on fish shelf life (with and without ice) that can be witnessed by both consumers and vendors. (ii) Explore other low-cost technologies that can substitute the use of ice especially for areas far from ice plants. (iii) Explore solar powered small scale ice maker machine that can be collectively owned and operated by vendors.	Local norms on fish quality hinders promotion of food safety Ice is not always available and is expensive when ice factories are not located around harvesting point and markets

Markets Food Safety	· Township Development Council has limited resources; budget constraints	Intervention C: Facilitate upgrading of stalls and basic sanitation facilities in fish markets.	(i) Explore willingness of local businesses especially those who use tents/umbrellas for advertisements to provide hygienic stalls and/or containers with their company name.	Lack of facilities in the market to facilitate safe fish handling
			(ii) Work with local fabricator to develop low-cost hygienic stalls and/or containers for fish vendors. Develop easy payment or rental schemes together with TDC, DOF, and working group. Explore possibility of embedding rental fee or instalment payments in fees charged by TDC to the vendors. Another option is to explore collaboration with MFIs.	
			(iii) Support set-up of model low-cost tippy taps and waste containers in major fish markets.	
Access to Knowledge/ Training/ Extension Food safety Nutrition	Limited outreach of FDA, TDC, and DOF due to resource constraints. Vendors most unlikely not willing to pay for training Low incentives to adopt food safety practices	Intervention D: Improve access of vendors to services that will enable them to reduce food safety risks and nutritional degradation	(i) Strengthen capacity of FDA, TDC, DOF, MFF, and local facilitators to provide training on food safety and nutrition to progressive vendors that can potentially become learning facilitators.	Limited knowledge on food safety, product quality, and nutrition among vendors
			(ii) Facilitate the formation of learning groups among vendors. Build capacity to organize learning sessions supported by vendor-mediated videos of the modules.. Vendors trained by FDA, TDC, DOF, MFF, and local facilitators can potentially facilitate the learning process and discussion of common issues and challenges. Vendors can take turns in hosting the sessions.	
			(iii) Conduct competitions (e.g., Cleanest Stall, Model Vendor voted by peers and consumers) involving consumers to maintain momentum and spread interest among the “resistant” group. Interest from the media may also provide the incentives to adopt good practices and help keep activities from stalling.	
Consumption Nutrition	Weak information dissemination Fear of choking (bones) Limited SIS recipes which requires extensive preparation No ready-to-eat/ processed SIS for sale	Intervention E: Promote increased consumption of fish especially SIS especially among young children and enhance awareness of nutritive value of fish especially SIS	(i) Conduct nutrition campaign among school children supported by activities such as poster making contest.	Consumers are not aware of the nutritional benefit of the different species of fish Under five years old and children do not benefit from regular consumption of fishing and diverse food
			(ii) Tri-media/social media nutrition campaign including videos in public markets with tailored messages targeted to grandmothers, mothers, fathers, and kids. If possible, feature role models (e.g., popular athlete, TV personality, actor, actress, etc. --- explore corporate social responsibility as a means of getting their endorsement).Make use of vaccination or pre-natal check up days at health clinics, Village Development Committee meetings for information dissemination. Explore mobile-based competitions using app popular with vendors and consumers	
			(iii) Conduct fish especially Mola/SIS recipe competitions: (i) SSA and non-SSA households; (ii) small eateries; and (iii) restaurant. Compile winning recipes and can be provided as point-of-purchase material in the markets together with basic nutritional facts.	
			(iv) Work with established food processors in the development of processed SIS/Mola (e.g., fish powder, cured SIS, fermented/crushed SIS, etc.) that will address fear of choking from bones. Support marketing campaign of developed products.	

Data collection Format

Township: **Banmaw**

State/Region: **Kachin**

Data Collector's name:

Partner's name :MFF Kachin

Sr	Village Tract	Village Name	Famer Name	Phone Number	Father's Name	Number of women between 15-49	Number of children under 5 years	Household size			Pond size			Pond ownership (rent/ own)
								M	F	Total	L(ft)	W(ft)	Acre	
1	Banmaw	Nam Phar	Ko Lin	09 887409200	U Kyi Tun			4	1	5	320′	110′	0.8	owner
2	Banmaw	Yo Gyi	U Myo Nyunt Aung	09 444541448	U Thaung Tin	1		4	3	7	120	120	0.5	owner
3	Banmaw	Nam Phar	U Zaw Lwin	09 455430018	U WinMying	1	2	3	2	5	300′	200'	1	owner
4	Banmaw	Nam Phar	Daw Khin Thein	09 257542130	U Thein			2	3	5	200′	200'	1	owner
5	Banmaw	Nam Phar	U Zaw Htet Ning	09 783187814	U Tin Mg Htay	1	1	2	4	6	200′	115′	0.5	owner
6	Banmaw	East Thar Si	U Nang Zing Tu Ja	09 896422245	U Nang Zing Yaw	2	2	3	3	6	300′	210	1	owner
7	Banmaw	East Thar Si	U Dwe La	09 891642416	U Dwe Li			2	3	5	320	240	1.3	owner
8	Banmaw	Sink Kin	U Nyunt Aung	09 256227864	U Khin Mg	1	2	2	2	4	200′	180'	0.8	owner
9	Banmaw	Sink Kin	U Tun Ya	09 257109910	U Paw	1	1	1	4	5	300′	200	1.4	owner
10	Banmaw	Mo Phein	Daw Hla Khin	09 772187842	U Paw Mi Khwng		1	4	1	5	320′	110′	0.8	owner

11	Banmaw	Sink Kin	Daw Hla Khin	09 786146676	U Tin Aung	3	1	3	3	6	300′	180	0.9	owner

Data collection Format

Township: Man Si

State/Region: Kachin

Data Collector's name:

Partner's name :MFF Kachin

Sr	Village Tract	Village Name	Famer Name	Phone Number	Father's Name	Number of women between 15-49	Number of children under 5 years	Household size			Pond size			Pond ownership (rent/ own)
								M	F	Total	L(ft)	W(ft)	Acre	
1	Man Si	Man Ya	U Hla Ngwe	09 440288421	U Mg Ngwe	3		2	3	5	320′	110′	0.8	owner
2	Man Si	Man Ya	Ko Kyaw Thu lin	09 68711678	U Tin Aye	1		2	1	3	300′	75′	0.5	owner
3	Man Si	Man Thar	U Myint Mg	09 407260400	U Tun Lin	1	2	3	2	5	300′	100′	0.65	owner
4	Man Si	Nman Thar	U Kyi Myint	09 256821268	U Shan			2	3	5	200′	117′	0.5	owner

Sr	Village Tract	Village Name	Famer Name	Phone Number	Father's Name	Number of women between 15-49	Number of children under 5 years	Household size			Pond size			Pond ownership (rent/ own)
								M	F	Total	L(ft)	W(ft)	Acre	
1	Momouk	Stone Village	U CC Bran Nan	09 400066613	U CC Bran Sai	1	2	1	3	4	320′	110′	1.2	owner
2	Momouk	Stone Village	U Gum Aung	09 253354132	U Lasi Gan	1	1	1	2	3	180	168	0.7	owner
3	Momouk	Stone Village	U CC Bran Sai	09 257848232	U Fellish	2	2	2	3	5	210'	200	1	owner
4	Momouk	Nam Sai	U Der Shi Tu Lume	09 400025629	U Der Shi Gam	1	2	2	4	6	310'	220'	1.5	owner

5	Momouk	Nam Sai	U Khar Li	09 257535186	U Der Shi Gam			1		1	210'	200	1.1	owner

Data collection Format

Township: **Banmaw**

State/Region: **Kachin**

Data Collector's name:

Partner's name :MFF Kachin

Sr	Village Tract	Village Name	Famer Name	Phone Number	Father's Name	Number of women between 15-49	Number of children under 5 years	Household size			Pond size			Pond ownership (rent/ own)
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2	Banmaw	Yo Gyi	U Myo Nyunt Aung	09 444541448	U Thaung Tin	1		4	3	7	120	120	0.5	owner
3	Banmaw	Nam Phar	U Zaw Lwin	09 455430018	U Win Myaing	1	2	3	2	5	300′	200'	1	owner
4	Banmaw	Nam Phar	Daw Khin Thein	09 257542130	U Thein			2	3	5	200′	200'	1	owner
5	Banmaw	Nam Phar	U Zaw Htet Ning	09 783187814	U Tin Mg Htay	1	1	2	4	6	200′	115′	0.5	owner
6	Banmaw	East Thar Si	U Nang Zing Tu Ja	09 896422245	U Nang Zing Yaw	2	2	3	3	6	300′	210	1	owner
7	Banmaw	East Thar Si	U Dwe La	09 891642416	U Dwe Li			2	3	5	320	240	1.3	owner
8	Banmaw	Sink Kin	U Nyunt Aung	09 256227864	U Khin Mg	1	2	2	2	4	200′	180'	0.8	owner
9	Banmaw	Sink Kin	U Tun Ya	09 257109910	U Paw	1	1	1	4	5	300′	200	1.4	owner
10	Banmaw	Mo Phein	Daw Hla Khin	09 772187842	U Paw Mi Khwng		1	4	1	5	320′	110′	0.8	owner

11	Banmaw	Sink Kin	Daw Hla Khin	09 786146676	U Tin Aung	3	1	3	3	6	300′	180	0.9	owner

Data collection Format

Township: Man Si

State/Region: Kachin

Data Collector's name:

Partner's name :MFF Kachin

Sr	Village Tract	Village Name	Famer Name	Phone Number	Father's Name	Number of women between 15-49	Number of children under 5 years	Household size			Pond size			Pond ownership (rent/ own)
								M	F	Total	L(ft)	W(ft)	Acre	
1	Man Si	Man Ya	U Hla Ngwe	09 440288421	U Mg Ngwe	3		2	3	5	320′	110′	0.8	owner
2	Man Si	Man Ya	Ko Kyaw Thu lin	09 68711678	U Tin Aye	1		2	1	3	300′	75′	0.5	owner
3	Man Si	Man Thar	U Myint Mg	09 407260400	U Tun Lin	1	2	3	2	5	300′	100′	0.65	owner
4	Man Si	Nman Thar	U Kyi Myint	09 256821268	U Shan			2	3	5	200′	117′	0.5	owner

Sr	Village Tract	Village Name	Famer Name	Phone Number	Father's Name	Number of women between 15-49	Number of children under 5 years	Household size			Pond size			Pond ownership (rent/ own)
								M	F	Total	L(ft)	W(ft)	Acre	
1	Momouk	Stone Village	U CC Bran Nan	09 400066613	U CC Bran Sai	1	2	1	3	4	320′	110′	1.2	owner
2	Momouk	Stone Village	U Gum Aung	09 253354132	U Lasi Gan	1	1	1	2	3	180	168	0.7	owner
3	Momouk	Stone Village	U CC Bran Sai	09 257848232	U Fellish	2	2	2	3	5	210'	200	1	owner
4	Momouk	Nam Sai	U Der Shi Tu Lume	09 400025629	U Der Shi Gam	1	2	2	4	6	310'	220'	1.5	owner

5	Momouk	Nam Sai	U Khar Li	09 257535186	U Der Shi Gam			1		1	210'	200	1.1	owner

DATA COLLECTION FORMAT

Township: : Myitkyina **State/Region: : Kachin** **Data Collactor's Name: : .....** **Partner's Name: : MFF Kachin**

No	Village Tract	Village Name2	Farmer Name	Phone Number	Father's Name	Number of Women between 15-49	Number of children under 5 yrs	House hold Size - M	House hold Size - F	House hold Size Total	Pond size L (Ft)	Pond size W (Ft)2	Pond size Acre	Pond ownership (rent/ own)
1	Nan Kwe	Nan Kwe	U Mung Myit	09-777393171	U Bawk Naw	1	-	1	4	5	750	90'	1.8	Own
2	Nan Kwe	Nan Kwe	U Hpauyu Tu Myat	09-43120321	U Hpauyu La			2	2	4			2	Own
3	Pa La Na	Pa La Na	U Maung Chin	09-2400940		1	-	3	2	5			2	Own
4	Maw Hpaung	Sha Dau	U Bau Ying	09-400020561	U Ying Bau	3	-	6	3	9	200	100	0.45	Own
5	Maw Hpaung	Sha Dau	U Ya Ku	09-689719399	U Hpau Sin Naw	5	2	10	7	17			1.24	Own
6	Myitkyina	Myo Tit Kyi	U Win Myint Aung	09-790618386	U Thein Nyut	2	-	3	4	7			1.55	Own
7	Myitkyina	Myo Tit Kyi	U Khun Aung	09-894147499	U Aung Hkam	3	-	4	3	7			0.8	Own
8	Pa La Na	Ngwi Pyaw Sanpya	U Lum Jung	09-260697044	U. Jung Lam	1	-	2	3	5			1	Own
9	Nawng Nang	Nawng Nang	U Gum Hpan	09-774062449	U. Hkum Ja	2	-	2	3	5			0.5	Own
10	Nawng Nang	Rosana	U Lagyi Naw	09-256788687	U. Lagyi La	4	-	3	5	8			1.3	Own
11	Nawng Nang	8 Miles	U Lagum Naw Sam	09-73227747	U. N'hkum Tang	7	-	6	7	13			1	Own
12	Nawng Nang	8 Miles	U Lakum Naw Sam	09-49274827	U. Lakum Gam	5	1	8	5	13			0.86	Own

13	Nawng Nang	8 Miles	U Lum Ze	09-772468470	U. Dai Lum	2	3	7	5	12	100	50	0.11	Own
14	Man Hkring	Man Hkring	U Micheal Moon Aung	09-43022441	U Gawlu Bu Gam	1	1	4	3	7			1	Own
15	PaLaNa - 2	Kant Kaw Myaing	U La Myo	09-400023321	U. Tin Myint	1	-	4	1	5	100	50	0.11	Own

DATA COLLECTION FORMAT

Township: : Myitkyina **State/Region: : Kachin** **Data Collactor's Name: : .....** **Partner's Name: : MFF Kachin**

No	Village Tract	Village Name2	Farmer Name	Phone Number	Father's Name	Number of Women between 15-49	Number of children under 5 yrs	House hold Size - M	House hold Size - F	House hold Size Total	Pond size L (Ft)	Pond size W (Ft)2	Pond size Acre	Pond ownership (rent/ own)
16	PaLaNa - 4	Ngwi Pyaw San Pya	U Brang Sam	09-44000655	U Tu Ja	1	1	4	1	5	300	35	0.24	Own
17	Myitkyina	Loi Hkaw	U Moe Khan Thu	09-971035377									1	Own
18	Myitkyina	Loi Hkaw	U Nyan Win	09-971035377	U Phu Lar Shwe	-	-	4	2	6			1	Own
19	Arr lam	Dum Gan	U Sut Ring	09-780286818	U Tang Gun	4	-	2	4	6	100	80	0.18	Own
20	Arr lam	Dum Gan	U kyaw Tawng	09-777091527									1	Rent
21	Pa La Na	Pa La Na	U Brang Mai	09-786767555	U La Mai	1	1	4	1	5	250	100	0.8	Own
22	Pa La Na	Pa La Na	U Zawng Hkawng	09-440002532	U Hkawng Zawng	2	-	2	2	4			0.5	Own
23	Pa La Na	Pa La Na	U Dashi Ja Jum	09-2402263	U Dashi La	2	-	3	2	5	150	60	0.2	Own
24	Pa La Na	Ngwi Pyaw San Pya	U La Seng	09-250083851	U Phi Nan			2	1	3			0.89	Own

25	Muk Lwoi	Muk Lwoi	U Thein Han	09-791044346	U Khin Maung								1	Own
26	Pyi Tawng	Pyi Tawng	U Zau Li Gam	09-400024666	U Ting Ba Gam Aung	8	-	6	9	15			1	Own
27	Man Hkring	Man Hkring	U Micheal Moon Aung	09-43022441	U Gawlu Bu Gam			4	3	7			1	Own
28	Nan Kwe	Nan Kwe	Daw Nang Ram	09 785516902	U Mana Hpe Ram	5		3	6	9	200	200	1	Rent

DATA COLLECTION FORMAT

Township: : Myitkyina **State/Region: : Kachin** **Data Collactor's Name: : .....** **Partner's Name: : MFF Kachin**

No	Village Tract	Village Name2	Farmer Name	Phone Number	Father's Name	Number of Women between 15-49	Number of children under 5 yrs	House hold Size - M	House hold Size - F	House hold Size Total	Pond size L (Ft)	Pond size W (Ft)2	Pond size Acre	Pond ownership (rent/ own)

DATA COLLECTION FORMAT

Township: : Wai Maw **State/Region: : Kachin** **Data Collactor's Name: : .....** **Partner's Name: : MFF Kachin**

No	Village Tract	Village Name2	Farmer Name	Phone Number	Father's Name	Number of Women between 15-49	Number of children under 5 yrs	House hold Size - M	House hold Size - F	House hold Size Total	Pond size L (Ft)	Pond size W (Ft)2	Pond size Acre	Pond ownership (rent/ own)
1	Khat Cho	Wu-yan	U B-Lum Hkawng	09-792759125	U B Hkawng Lum	6	-	2	8	16			0.8	own
2	Khat Cho	Nawng Hee	U Lashau Dau Lum	09-455070974	U Lashau Jung Dau	1	-	2	2	4			1.5	own
3	Khat Cho	Muk Lwoi	U Soe Aung	09-400052665	U Li Phu	1	-	3	2	5			1.2	own
4	Khat Cho	Na Pyaw	U Lungbang Ying Sau	09-793326924	U Hkaw Ying	5	-	2	5	7			2	own
5	Khat Cho	San Kha	U Hkawng Dau	09-698245667	U Zee Hkawng	3	-	2	5	7			1.5	own
6	Khat Cho	Wu-yan	U Naw Lawt	09 456308737	U Naw Ja	1	2	2	4	6			1	own
7	Khat Cho	Wu-yan	U Nhkum Gam	09 959436090	U Nhkum Yaw	3	1	2	4	6			1.5	Rent
8	Khat Cho	Mai-Nar	U Sumlut Gam	09 256349203	U Sumlut La	3	-	4	4	8			0.8	Rent
9	Nawng Chying	Htoi San Yan	U Hpauchyang La	09-266042024	U Hpauchyang Naw	2	2	4	3	7			1	own
10	Nawng Chying	Htoi San Yan	U Nhkai La	09-424708058	U Nhkai Gam	2	1	2	2	4			1.5	own
11	Nawng Chying	Nyau Pin Tar	U Bya Lay	09-459455692	U Byu Tar	2	-	1	3	4			1	own
12	Nawng Chying	Htoi San Yang	U Lama Tu Shan	09-255880914	U Lama La Nan	1	2	5	2	7	10	80	0.5	own

13	Nawng Chying	Nawng Chaing	U Ying Bawm		U Sau Ying	6	1	6	6	12			1.5	own
14	Nawng Chying	Htoi San Yang	U Tin Myo Thet	09-424368484	U. Kyaw Aye	-	2	1	4	5			0.5	own
15	Nawng Chying	Nawng Chying	U Sama Seng Maw	09-256352738	U. Sama Sinwa Naw	1	2	2	2	4			0.9	Rent

DATA COLLECTION FORMAT

Township: : Wai Maw **State/Region: : Kachin** **Data Collactor's Name: : .....** **Partner's Name: : MFF Kachin**

No	Village Tract	Village Name2	Farmer Name	Phone Number	Father's Name	Number of Women between 15-49	Number of children under 5 yrs	House hold Size - M	House hold Size - F	House hold Size Total	Pond size L (Ft)	Pond size W (Ft) 2	Pond size Acre	Pond ownership (rent/ own)
16	Wa Shawng	Wa Shawng	U Sinwa Naw	09-784367152	U Lum Hkawng	1	-	7	2	9			1	own
17	Wa Shawng	Wa Shawng	U Lalam Htaw Hkaung			4	2	3	4	7			0.4	Rent
18	San Kha	San Kha	U Hkawng Zee	09-258077562	U Zee Hkawng	1	-	1	2	3			1	own
19	San Kha	San Kha	U Tsain Yey	09-774050729	U Daung Tsain	4	1	3	4	7			1.5	own
20	San Kha	San Kha	U Bawm Hkaw	09-974212706	U Luk Bawm	5	1	3	2	5			1	own
21	San Kha	San Kha	U Lasaw Hawng Hkawng	09-698387749	U Lum Hawng	7	1	3	5	8			0.5	own
22	San Kha	San Kha	U Zehe Hawng Hkawng	09-790648756	U Hkawng Hawng	1	2	2	4	6			1	own
23	San Kha	San Kha	U Dau Zawng	09-266229628	U Lum Dau	2	-	5	3	8			1	own
24	San Kha	Muk Lwoi	U Myint Naing	09-896144008	U Maung Myint	1	-	3	3	6			1	own

25	San Kha	San Kha	U Hkawng Ze	09-761373450	U Hawng Hkawng	-	-	1	4	5			1.5	Rent
26	San Kha	San Kha	U Naw Awn	09-671467554	U Naw Mai	3	3	5	3	8			0.5	own
27	San Kha	San Kha	U Ze Hawng		U Ze Hawng	4	-	3	5	8			0.5	own
28	San Kha	San Kha	U Gam Awng	09-798237605	U Brang Doi	3	-	2	3	5			0.5	own
29	San Kha	Aok Su 4	U Lacham Ze Dau	09-400024968	U Hawng Ze	4	-	4	4	8			1.5	own
30	San Kha	Aok Su 4	U Ze Hkawng	09-897322506	U Dau Ze	2	-	3	4	7			1	own

DATA COLLECTION FORMAT

Township: : Wai Maw **State/Region: : Kachin** **Data Collactor's Name: : .....** **Partner's Name: : MFF Kachin**

No	Village Tract	Village Name2	Farmer Name	Phone Number	Father's Name	Number of Women between 15-49	Number of children under 5 yrs	House hold Size - M	House hold Size - F	House hold Size Total	Pond size L (Ft)	Pond size W (Ft) 2	Pond size Acre	Pond ownership (rent/ own)
31	San Kha	San Kha	Daw Hkawng Nan	09-408586421	U Hkawng Dau	2	-	1	3	4			0.5	own
32	Nawng Chying	Nawng Chying	U Aung Kyi	09-973178036	U Yaw San	3		3	3	6			2.1	own
33	PerPaung Chyauk	NaungSi Paw	U Bawk Naw	09-692817756	U Mishi Gam	3	1	4	4	8	180	120	1.5	own
34	Khat Cho	Nawng Hee	U Dau Hawng	09-458432958	U Hkawng Dau	2	-	2	2	4			1	own
35	Mai Nar	Mai Nar	U Seng Jat	09-790719247	U Dumhpya Tang	-	-	2	-	2			1.5	own
36	Man Wing	Karut Yang	U. Ting Yaw	09-971911198	U Hkaw Ting	2	-	3	2	5			0.5	own

37	Man Wing	Karut Yang	U Lalam Lum Dau	09-447690122	U Za Lum	3	1	7	3	10			1.25	own
38	Man Wing	Karut Yang	U Lanaw Lum Hkawng	09-409361112	U Lum Gyung	1	1	4	1	5			0.5	own
39	Wu Yan	Wu Yan	U Bawm Chyang	09-795010975	U Ying Bawm	-	-	-	-	-			1.45	own
40	Mading	Tang Bau	Daw Zawng Yung	09-404479830	U Zawng Jung	3	1	2	5	7			1.5	own
41	Khat Cho	Nawng Si Paw	Daw Roi Ja	09-400044458	U Zaw Ring	2	1	2	3	5	200	200	1	own
42	Khat Cho	San Kha	U Mung Ra	09-793843980	U Hkawng Lum	3	-	3	3	6			0.5	own
43	Khat Cho	San Kha	U Gam Aung	09-798237605	U Brang Doi	3	-	2	3	5			0.5	own
44	Mai Nar	La Bang	U Hkun Myat	09-440002901	U La Aung	3	2	3	8	11			0.5	own
45	Nawng Chying	Nawng Chying	U Hawng Hkawng	09-267361681	U Hkawng Hawng	4	-	4	4	8			1.8	own

DATA COLLECTION FORMAT

Township: : Wai Maw **State/Region: : Kachin** **Data Collactor's Name: : .....** **Partner's Name: : MFF Kachin**

No	Village Tract	Village Name2	Farmer Name	Phone Number	Father's Name	Number of Women between 15-49	Number of children under 5 yrs	House hold Size - M	House hold Size - F	House hold Size Total	Pond size L (Ft)	Pond size W (Ft)2	Pond size Acre	Pond ownership (rent/own)
46	Khat Cho	Nawng Hee	U Hkaw Chyan	09-70352780	U Ying Hkaw	5	2	4	5	9			1.4	own
47	Khat Cho	Nawng Hee	U Lashaw Dau Hkawng	09-978436440	U lashaw Gyung Dau	3	-	3	3	6			1.7	own
48	Khat Cho	Nawng Hee	U Lagi Ha Lum	09-259199550	U Hkawng Lum	2	1	5	3	8			2	own

49	Khat Cho	San Kha	U Se Yawng	09-448349734									1.47	own
50	Per Paung Chyauk	Naung Si Paw	U Hkawng Dau	09-259404941	U Lum Hkawng	1	1	3	1	4			1.8	own
51	Wu-Yan	Hpung Tang Kawng	U Maru Gam	09-978397463	U Maru Naw	3	-	2	4	6			1.2	own

Township: Pinlaung **State/Region: Southern Shan** **Data collector's name:** **Partner's name: KMSS-Pekhon**

Sr.	Village Tract	Village Name	Farmer Name	Phone number	Father's name	Number of women between 15-49 years	Number of children under 5 years	Household size			Pond size			Pond ownership	Licensed/ non-licensed	Latitude	Longitude
								M	F	T	L (ft)	W (ft)	Acre	Own/ rent	Yes/ No		
1	Nang Toke	Yae Oo	U Moe		U Ke		1	2	3	5	60	30	0.04	Own	No		
2	Nang Toke	Yae Oo	U Tun Hlaing	09-251678867	U Phoe Mi	2		6	2	8	180	90	0.4	Own	No		
3	Nang Toke	Yae Oo	U Mg Nge	09-454613056	U Hmat			1	1	2	180	90	0.4	Own	No		
4	Nang Toke	Ho Hpei	U Tun Tin		U Soe	1	1	1	2	3	25	25	0.01	Own	No		
5	Nang Toke	Ho Hpei	Ko Soe Pae		U Hla Myint	2	1	1	4	5	70	25	0.12	Own	No		
6	Nang Toke	Ho Hpei	Daw Aye		U Soe	1	2	3	1	4	30	25	0.02	Own	No		
7	Nang Toke	Ho Hpei	Daw Hla Yee		U Hla Myint	2			2	2	30	25	0.02	Own	No		
8	Nang Toke	Ho Hpei	U Mg Aye		U Nuu	1	2	2	4	6	30	25	0.02	Own	No		
9	Nang Toke	Ho Hpei	Nang Kyi Kyi		U Bu	1		1	1	2	30	25	0.02	Own	No		
10	Nang Toke	Ho Hpei	U Tun		U Yone	2	1	4	3	7	25	25	0.01	Own	No		
11	Nang Toke	Ho Hpei	U Sai Aung		U Mg Law	1		1	1	2	40	25	0.02	Own	No		
12	Nang Toke	Ho Hpei	U Sor		U Phyar Lel	1		1	1	2	25	15	0.01	Own	No		
13	Nang Toke	Saung Lan	U Hla Phwel	09-252105655	U Moe	2		3	2	5			7	Own	No		
14	Nang Toke	Saung Lan	U Law Reh	09-452339603	U Swa	4	2	4	7	11			7	Own	No		
15	Nang Toke	Saung Lan	U Aye reh		U Nyar Reh	2	1	3	2	5			7	Own	No		
16	Nang Toke	Saung Lan	U Soe Reh		U Nu Reh	1	1	3	4	7	60	30	0.04	Own	No		
17	Nang Toke	Saung Lan	U Chel		U Su	4		5	5	10	105	30	0.07	Own	No		
18	Nang Toke	Saung Lan	U Soe		U Moe			2	1	3	30	30	0.02	Own	No		
19	Nang Toke	Saung Lan	U Tun Kyi		U			5	1	6	120	50	0.1	Own	No		

20	Nang Toke	Saung Lan	U Khar		U Bu Reh	2	1	1	3	4	40	60	0.06	Own	No		
21	Nang Toke	Saung Lan	U Mg Shar		U Nyar Reh	2		3	3	6	60	40	0.06	Own	No		
22	Nang Toke	LWE Phwee	Khun Mg	09-448057789	U Tote	2	1	3	3	6	80	25	0.05	Own	No		
23	Nang Toke	LWE Phwee	Ko Kyaw	09-890878902	U Kyaw	3	1	2	4	6	70	25	0.04	Own	No		
24	Nang Toke	LWE Phwee	Ko Mg Saw	09-698449779	U Tee Pel	1	1	2	1	3	60	20	0.03	Own	No		
25	Nang Toke	LWE Phwee	Ko Myo Mg		U Kote	2		2	2	4	20	25	0.01	Own	No		
26	Nang Toke	LWE Phwee	Ko Kan Gyi		U Thein	2	1	2	3	5	40	20	0.02	Own	No		
27	Nang Toke	LWE Phwee	U Pwint		U Lon	1		1	1	2	20	20	0.01	Own	No		
28	Nang Toke	LWE Phwee	Ko Oo		U Sein	2		2	3	5	20	40	0.02	Own	No		
29	Nang Toke	LWE Phwee	U Aung Kyi		U Htar	3	1	4	3	7	25	40	0.02	Own	No		
30	Nang Toke	LWE Phwee	U Tee Lote		U Kyi	3		1	4	5	25	40	0.02	Own	No		
31	Nang Toke	LWE Phwee	U Mg Ngwe		U Mann	1	1	2	1	3	25	40	0.02	Own	No		
32	Nang Toke	LWE Phwee	Daw Myar		U Naung	3		2	4	6	20	30	0.01	Own	No		
33	Nang Toke	LWE Phwee	U Mg Pet		U Kyaw	3		1	3	4	20	20	0.01	Own	No		
34	Nang Toke	LWE Phwee	U Mg		U Kyaw	3		4	3	7	30	45	0.03	Own	No		
35	Nang Toke	LWE Phwee	U Mg Nyunt		U Lint	2	1	2	2	4	30	30	0.02	Own	No		
36	Nang Toke	LWE Phwee	U Ko Tee		U Mont	1	2	2	2	4	20	40	0.02	Own	No		
37	Nang Toke	LWE Phwee	U Phyu		U Cho	1		2	2	4	30	30	0.02	Own	No		
38	Nang Toke	LWE Phwee	U Mg Tee		U Kywel	2		3	2	5	20	25	0.01	Own	No		
39	Nang Toke	LWE Phwee	U Tin Aung		U Kywel	1		4	1	5	25	25	0.01	Own	No		
40	Nang Toke	Dau Por Klel	U Mg Win	09-458386825	U Tu	2		1	4	5	50	30	0.03	Own	No		
41	Nang Toke	Dau Por Klel	U Mg		U Po			3	1	4	60	60	0.1	Own	No		
42	Nang Toke	Dau Por Klel	U Toe Reh		U Ku Reh	1		2	2	4	60	60	0.1	Own	No		
		Total				**70**	**22**	**99**	**104**	**203**			**23**				

Data collection Format

Township: Pekhon, Pin Laung and Nya State/Region: Southern Shan Data collector's name: KMSS-Pekhon

Sr	Village Tract	Village Name	Farmer Name	Phone number	Father's name	Number of women between 15-49 years	Number of children under 5 years	Household size			Boat Lincence Numbber
								M	F	Total	
1	Pekhon	Nyaung Pin Thar	U Thein Mg	9250489332	U Phe	1	1	2	2	4	
2	Pekhon	Nyaung Pin Thar	U Soe Myint		U Kyar	1	0	2	2	4	
3	Pekhon	Nyaung Pin Thar	U Htun Lin		U Yong	1	0	1	3	4	
4	Pekhon	Nyaung Pin Thar	Ko Win Kyaw		U Son	1	1	3	2	5	
5	Pekhon	Nyaung Pin Thar	Sai Pan Kyaw	9262884350	U Kaung	1	1	2	2	4	
6	Pekhon	Nyaung Pin Thar	Ko Phyu	9252192939	U Kyar	1	0	3	3	6	
7	Pekhon	Nyaung Pin Thar	Ko Myint Zaw	9408756854	U Kan Gyi	1	0	4	2	6	
8	Pekhon	Nyaung Pin Thar	Ko Win Khaing		U Than Maung	3	1	2	4	6	
9	Pekhon	Nyaung Pin Thar	Sai Chit Win		U San Kyaw	1	1	1	2	3	
10	Pekhon	Nyaung Pin Thar	Sai Chit Oo		U Than Ut	1	1	2	1	3	
11	Pekhon	Nyaung Pin Thar	Ko Nay Win		U San Kyaw	1	0	1	2	3	
12	Pekhon	Nyaung Pin Thar	U Aung Pann	9253654287	U Rone	2	0	1	3	4	
13	Pekhon	Nyaung Pin Thar	Ko Te Pot		U Pain	1	0	2	2	4	
14	Pekhon	Nyaung Pin Thar	Ko Myint Naing		U Kan Gyi	1	0	1	1	2	
15	Pekhon	Nyaung Pin Thar	U Hla Oo		U Shwe Ba	1		4	3	7	
16	Pekhon	Nyaung Pin Thar	Ko Htun Win		U Mg	1	1	3	2	5	
17	Pekhon	Nyaung Pin Thar	U Htun Ngwe	9664409144	U Mg	1	0	2	2	4	
18	Pekhon	Nyaung Pin Thar	U Mg Mine		U Gyi	1	1	3	4	7	
19	Pekhon	Nyaung Pin Thar	U Hla Phey	9687127373	U Phyu	3	1	4	3	7	
20	Pekhon	Nyaung Pin Thar	Ko Lin Aung	9442770256	U Mg Lone	1	1	2	2	4	
21	Pekhon	Nyaung Pin Thar	Naung Sain	9253418569	U Pan	1	1	2	1	3	
22	Pekhon	Nyaung Pin Thar	Mg Htun Tin	9780692507	U Soe Tint	4	0	2	5	7	
23	Pekhon	Nyaung Pin Thar	U Kyaw Yin		U Shune	0	0	3	2	5	
24	Pekhon	Nyaung Pin Thar	U Kyaw Tin		U Phyat	0	0	2	3	5	
25	Pekhon	Nyaung Pin Thar	U San Yut	9778805968	U Kywe	0	0	4	2	6	
26	Pekhon	Nyaung Pin Thar	U Mg Tin		U Own Khaing	1	0	5	3	8	
27	Pekhon	Nyaung Pin Thar	Ko Nyo Lynn		U Htun Mak	2	1	5	3	8	
28	Pekhon	Nyaung Pin Thar	Ko Than Soe		U Soe Win	0	0	3	2	5	
29	Pekhon	Nyaung Pin Thar	U Chit Aung	9770574286	U Myin	4	0	1	7	8	
30	Pekhon	Nyaung Pin Thar	Sai Ni		U Aung	1	0	4	1	5	
31	Pekhon	Nyaung Pin Thar	U Soe Tint		U Phyu	1	0	2	3	5	

32	Pekhon	Nyaung Pin Thar	U Htun Naing		U Kyaing	1	0	2	3	5	
33	Pekhon	Nyaung Pin Thar	Mg Moe Kyaw		U Soe Myint	1	0	1	2	3	
34	Pekhon	Nyaung Pin Thar	Ko Htun Kyi		U Mg	1	1	2	2	4	
35	Pekhon	Nyaung Pin Thar	U Mg Tu		U Tin Shwe	4	0	2	2	4	
36	Pekhon	Nyaung Pin Thar	U Htun Sar		U Mak	1	0	1	2	3	
37	Pekhon	Nyaung Pin Thar	Mg Myat Moe		U Wrong Pout	1	1	2	1	3	
38	Pekhon	Nyaung Pin Thar	Ko Kyaw Aye		U Tun Kyi	1	1	3	1	4	
39	Pekhon	Nyaung Pin Thar	U Khin Mg Aye		U Yel Hla	0	0	2	1	3	
40	Pekhon	Nyaung Pin Thar	Ko Tin Moe Lwin		U San Ba	2	1	4	2	6	
41	Pekhon	Nyaung Pin Thar	Ko Moe Nyo		U Phay	1	2	2	4	6	
42	Pekhon	Nyaung Pin Thar	U Nyut Win (2)	9257874917	U Kyah	0	0	4	2	6	
43	Pekhon	Nyaung Pin Thar	U Tun Hla		U Lwere	1	1	4	2	6	
44	Pekhon	Nyaung Pin Thar	U Eite Sai		U Moe Nyo	1	0	3	2	5	
45	Pekhon	Nyaung Pin Thar	U Tin Aung		U San	1	0	2	3	5	
46	Pekhon	Nyaung Pin Thar	Mg Moon		U Hlaing	1	1	2	2	4	
47	Pekhon	Nyaung Pin Thar	Mg Nge	9250890773	U Tan Maung	2	2	4	5	9	
48	Pekhon	Nyaung Pin Thar	Ko Aung Zaw Oo		U San kyaw	1	1	3	4	7	
49	Pekhon	Nyaung Pin Thar	U Maung		U Ohh	1	0	2	3	5	
50	Pekhon	Nyaung Pin Thar	Ko Myat Mg		U Aung	1	0	2	2	4	
51	Pekhon	Nyaung Pin Thar	U Pan Seint		U Aung	1	0	4	2	6	
52	Pekhon	Nyaung Pin Thar	Ko Thike Tun		U Ba maung	0	0	3	1	4	
53	Pekhon	Nyaung Pin Thar	U Aung Win		U Tun	1	3	4	1	5	
54	Pekhon	Nyaung Pin Thar	Mg Nyine Kyang		U Win Hlaing	0	0	3	1	4	
55	Pekhon	Nyaung Pin Thar	Ko Soe Lwin		U Tun Maung	1	0	4	1	5	
56	Pekhon	Nyaung Pin Thar	Ko Tin Lin	9262665427	U Mg Lone	1	1	2	2	4	
57	Pekhon	Nyaung Pin Thar	Ko Kyaw Lwin	9255513402	U Wa Na	1	0	2	2	4	
58	Pekhon	Nyaung Pin Thar	Ko Moe Lwin		U Own	1	0	1	2	3	
59	Pekhon	Nyaung Pin Thar	Ko Aung Kyin		U Own	0	0	1	1	2	
60	Pekhon	Nyaung Pin Thar	Ko El To		U Own	1	0	1	3	4	
61	Pekhon	Nyaung Pin Thar	Ko Hla Oo	9456224252	U Wa Na	1	0	1	2	3	
62	Pekhon	Nyaung Pin Thar	Ko Moe Kyaw		U Kyaing	2	0	2	2	4	
63	Pekhon	Nyaung Pin Thar	Ko Soe Zayar	9250253946	U Tun Maung	0	0	3	1	4	
64	Pekhon	Nyaung Pin Thar	Ko Tin Tun		U Phoe Kin	0	0	1	0	1	
65	Pekhon	Nyaung Pin Thar	Ko Aung Myo		U Than Htoo	0	0	1	0	1	
66	Pekhon	Nyaung Pin Thar	Ko Win Kyaw	9685579266	U Nel	1	1	3	1	4	
67	Pekhon	Nyaung Pin Thar	U Mg Lwin		U Tin Ngwai	4	0	3	4	7	
68	Pekhon	Nyaung Pin Thar	Ko Aung Lwin		U Kyaw Yin	0	0	2	1	3	
69	Pekhon	Nyaung Pin Thar	Ko Kyaw Moe	9899652105	U Tun Kyaw	1	1	2	2	4	
70	Pekhon	Nyaung Pin Thar	U Kyaw Nyine(2)	9428340732	U Kwere	0	0	3	1	4	
71	Pekhon	Nyaung Pin Thar	U Tun Kyaw	9250340540	U Ma	2	0	1	2	3	

72	Pekhon	Nyaung Pin Thar	Ko Zaw Min	9250340542	U Tun Kyaw	1	0	1	3	4	
73	Pekhon	Nyaung Pin Thar	U Thine Aung	9421259769	U Phay	1	0	2	4	6	
74	Pekhon	Nyaung Pin Thar	U Kyaw Soe			4	0	3	5	8	
75	Pekhon	Nyaung Pin Thar	U Tun		U Kyar Sue	0	0	3	2	5	
76	Pekhon	Nyaung Pin Thar	Ko Moe Kyaw	9257057550	U Ba Nyine	0	0	4	2	6	
77	Pekhon	Nyaung Pin Thar	Ko Thar Aye	9423927385	U Ba Nyine	1	1	1	4	5	
78	Pekhon	Nyaung Pin Thar	U Tin Oo	9409901258	U Tun Yin	1	0	1	2	3	
79	Pekhon	Nyaung Pin Thar	Ko Nay Zin Hla		U Khin Mg Soe	1	1	3	1	4	
80	Pekhon	Nyaung Pin Thar	Ko Nay Win		U Myat Mg	1	2	2	3	5	
81	Pekhon	Nyaung Pin Thar	U Tun		U Tin	1	0	3	2	5	
82	Pekhon	Nyaung Pin Thar	U Tun Yee(2)		U Phyu	1	0	2	4	6	
83	Pekhon	Nyaung Pin Thar	Ko Nay Myo Thu		U Myat Mg	1	1	1	2	3	
84	Pekhon	Nyaung Pin Thar	Ko Eite Thu		U Nyar	1	1	3	1	4	
85	Pekhon	Nyaung Pin Thar	Ko Soe Naing		U San	0	0	3	1	4	
86	Pekhon	Nyaung Pin Thar	Ko Kayah Mg		U Kyaw Win	0	0	4	1	5	
87	Pekhon	Nyaung Pin Thar	Ko Zaw Min	9683775305	U Tun Kyin	1	0	2	2	4	
88	Pekhon	Nyaung Pin Thar	Ko Tun Lin	9769781273	U Mg Mg Lwin	2	0	3	4	7	
89	Pekhon	Nyaung Pin Thar	Ko Tun Lay		U Tun Shwe	1	0	3	3	6	
90	Pekhon	Nyaung Pin Thar	U Sai Kyin		U Aung	1	0	1	2	3	
91	Pekhon	Nyaung Pin Thar	U San Lin		U Yon	2	0	1	2	3	
92	Pekhon	Nyaung Pin Thar	Ko Eite Chit		U Tun Hla	1	1	1	4	5	
93	Pekhon	Nyaung Pin Thar	Ko Shwe Htoo		U Maung	1	0	3	1	4	
94	Pekhon	Nyaung Pin Thar	U Tun Oo		U Nel	1	0	3	2	5	
95	Pekhon	Nyaung Pin Thar	U The Oo		U Ka Law	2	0	3	4	7	
96	Pekhon	Nyaung Pin Thar	U Hla Phu		U Shwe Ba	1	0	3	1	4	
97	Pekhon	Nyaung Pin Thar	Mg Moe Oo	9408756845	U Than Mg	1	1	1	2	3	
98	Pekhon	Nyaung Pin Thar	U Kyaw Than	9440179872	U Htun Kyi	2	0	3	3	6	
99	Pekhon	Nyaung Pin Thar	U Shwe Mg		U Htun Kyaw	1	0	3	2	5	
100	Pekhon	Nyaung Pin Thar	U Thein Zaw		U Myat Thein	1	0	2	2	4	
101	Pekhon	Nyaung Pin Thar	U San Win		U Aye	1	0	2	1	3	
102	Pekhon	Nyaung Pin Thar	Ko Zayar Htoo		U Tin Myaing	1	0	2	2	4	
103	Pekhon	Nyaung Pin Thar	U Shwe	9253598302	U Phyu	3	2	4	5	9	
104	Pekhon	Nyaung Pin Thar	Mg Than Zaw	9662285946	U Shwe	1	1	4	1	5	
105	Pekhon	Nyaung Pin Thar	U Own Ngwe		U Nge	1	0	2	2	4	
106	Pekhon	Nyaung Pin Thar	Ko Pe Long		U Aye	0	0	1	2	3	
107	Pekhon	Nyaung Pin Thar	Ko San Lin		U Aye	1	1	1	2	3	
108	Pekhon	Nyaung Pin Thar	Ko San Naing		U Aye	1	1	3	1	4	
109	Pekhon	Nyaung Pin Thar	Ko Lay Nge	9692139310	U Hla Htun	1	1	2	2	4	
110	Pekhon	Nyaung Pin Thar	Ko Moe Nyo		U Nit	0	0	1	1	2	
111	Pekhon	Nyaung Pin Thar	U Than Htun		U Nit	1	1	2	2	4	

112	Pekhon	Nyaung Pin Thar	U Pyit Toe		U Htun Hlaing	1	0	2	1	3	
113	Pekhon	Nyaung Pin Thar	U Htun Hlaing		U Han	1	0	2	2	4	
114	Pekhon	Nyaung Pin Thar	U Soe Lwin		U Phyu	1	0	3	1	4	
115	Pekhon	Toe Chet Qtr.	U Thaung Nyut		U Kyaw	0	0	4	1	5	
116	Pekhon	Toe Chet Qtr.	Ko Than Phey		U Thaung Nyut	0	0	2	2	4	
117	Pekhon	Toe Chet Qtr.	Ko Kyaw Swa		U Hlat Paw	1	0	3	1	4	
118	Pekhon	Toe Chet Qtr.	U Kyaw Thein		U Htu	1	0	3	1	4	
119	Pekhon	Toe Chet Qtr.	U Win Mg		U Khan	2	0	4	2	6	
120	Pekhon	Toe Chet Qtr.	U Kyaw Htay		U Aye	1	0	2	3	5	
121	Pekhon	Nyaung Kone Qtr.	U Kyaw Oo	9769975410	U Lynn	1	1	3	1	4	
122	Pekhon	Nyaung Kone Qtr.	U Htun Myint		U Maung	1	0	2	2	4	
123	Pekhon	Nyaung Kone Qtr.	U Than Win		U Mg	1	0	1	2	3	
124	Pekhon	Nyaung Kone Qtr.	U Aung Si Thu		U Thein Shwe	2	0	1	3	4	
125	Pekhon	Nyaung Kone Qtr.	U Kyaw Naing		U Lynn	1	2	2	3	5	
126	Pekhon	Nyaung Kone Qtr.	Mg Nge		U Kan Gyi	2	1	2	4	6	
127	Pekhon	Nyaung Kone Qtr.	Mg Myo Win		U Aye Da	1	1	4	1	5	
128	Pekhon	Nyaung Kone Qtr.	U Win Naing		U Han	0	1	2	2	4	
129	Pekhon	Nyaung Kone Qtr.	Mg Pyone		U Ba Phyu	0	0	1	0	1	
130	Pekhon	Nyaung Kone Qtr.	Mg Kyi		U Hla	2	0	2	2	4	
131	Pekhon	Nyaung Kone Qtr.	Mg Yan Lynn		U Htun Lynn	1	1	2	2	4	
132	Pekhon	Nyaung Kone Qtr.	Mg Aung San Oo		U Htun Myint	0	0	1	0	1	
133	Pekhon	Nyaung Kone Qtr.	U Myo Naing		U Maung	2	0	3	3	6	
134	Pekhon	Nyaung Kone Qtr.	Mg Nay Aung		U Maung	0	0	1	0	1	
135	Pekhon	Nyaung Kone Qtr.	Mg Ag Win		U Maung	1	0	3	1	4	
136	Pekhon	Nyaung Kone Qtr.	Mg Khin Mg Win		U Maung	1	1	3	2	5	
137	Pekhon	Nyaung Kone Qtr.	Mg Phoe Lone		U Myo Hlaing	0	0	1	0	1	
138	Pekhon	Nyaung Kone Qtr.	U Kayah Mg		U Tin	1	0	3	2	5	
139	Pekhon	Nyaung Kone Qtr.	U San Win		U Mee	1	1	4	1	5	
140	Pekhon	Nyaung Kone Qtr.	U Net			0	0	2	1	3	
141	Pekhon	Nyaung Kone Qtr.	U Ba Than		U Phone	3	0	1	5	6	
142	Pekhon	Nyaung Kone Qtr.	U Ai Tu		U Hla Tun	1	1	3	3	6	
143	Pekhon	Nyaung Kone Qtr.	U Htay Aung		U Pho Ci	2	0	2	2	4	
144	Pekhon	Nyaung Kone Qtr.	U Mg Tu		U Sein	0	0	1	0	1	
145	Pekhon	Nyaung Kone Qtr.	U Nyaunt			1	0	3	2	5	
146	Pekhon	Nyaung Kone Qtr.	U Antonio		U Kyaw Zaw	0	0	3	1	4	
147	Pekhon	Zay Tan Qtr.	U Tun Wai		U Tote	0	0	3	1	4	
148	Pekhon	Zay Tan Qtr.	U Than Aung		U San	0	0	1	0	1	
149	Pekhon	Myo Kone Qtr.	U Sai Lon		U Tun Yee	1	0	4	2	6	
150	Pekhon	Myo Kone Qtr.	U Naung Sain		U Chit Mg	1	1	2	2	4	
151	Pekhon	Myo Kone Qtr.	U Eite Myoe		U Phae Myint	1	0	2	2	4	

152	Pekhon	Myo Kone Qtr.	U Than Lwin		U Hein	1	1	2	2	4	
153	Pekhon	Myo Kone Qtr.	U Eite Htoo		U Tin Hla	1	0	4	1	5	
154	Pekhon	Myo Kone Qtr.	U Thein Win		U Tone	1	0	2	2	4	
155	Pekhon	Myo Kone Qtr.	U Pan Soe		U Sai Lin	1	1	1	2	3	
156	Pekhon	Myo Kone Qtr.	U Mg		U Pho Sein Ku	0	0	1	1	2	
157	Pekhon	Myo Kone Qtr.	U Eite Nge		U Thu PanNyar	0	0	4	2	6	
158	Pekhon	Myo Kone Qtr.	U Eite Thein		U Lin	0	0	1	1	2	
159	Pekhon	Heindama Qtr.	U Mg Lay		U Yone	1		5	4	9	
160	Pekhon	Heindama Qtr.	U Mg Kyar		U Yone	1		2	1	3	
161	Pekhon	Heindama Qtr.	U Paulu		U May	0		1	1	2	
162	Pekhon	Heindama Qtr.	U Jowani		U Paulu	1	1	2	3	5	
163	Pekhon	Heindama Qtr.	U Mg Sho		U lel	1	1	1	2	3	
164	Pekhon	Heindama Qtr.	U Peter Paul		U Zowani	1		2	3	5	
165	Pekhon	Heindama Qtr.	U Nge Breh		U Than Pel	1		4	1	5	
166	Pekhon	Heindama Qtr.	U Than Swan	9253631385	U Than Pel	1	1	4	2	6	
167	Pekhon	Heindama Qtr.	U Khin Mg Aye		U Aye Shwe	1		2	2	4	
168	Ku Yin	Shwe San	U Re	9262461042	U Kaw Re	1	2	2	2	4	
169	Ku Yin	Shwe San	U Robert	9890609211	U Nay Htoo	1	1	1	4	5	
170	Ku Yin	Shwe San	U Yaw Han		U Ngar Re			1		1	
171	Ku Yin	Sin Phyu	U Han Nyut	9796818852	U Ngan		1	1	3	4	
172	Ku Yin	Sin Phyu	U Mg Oo	9769234447	U Phyan	1		3	2	5	
173	Ku Yin	Sin Phyu	U Than Win	9697937191	U Ngan	1	2	2	3	5	
174	Ku Yin	Sin Phyu	U Mg Hoe		U Lar	1	1	4	2	6	
175	Ku Yin	Sin Phyu	U Kalaw Ri		U Mg Da	1	2	2	2	4	
176	Ku Yin	Sin Phyu	U Toe Win		U Aye Mg	1	1	1	2	3	
177	Ku Yin	Kone Paw	U Mg Ko	09-773741781	U Khu Lay	0	0	1	1	2	
178	Ku Yin	Taung Poet Gyi	U Than Mg	09-428341087	U Pe	2	1	3	3	6	
179	Ku Yin	Taung Poet Gyi	U Kyi		U Say	0	0	2	1	3	
180	Ku Yin	Taung Poet Gyi	U Sain Ngae		U Tun Khin	1	0	5	2	7	
181	Ku Yin	Taung Poet Gyi	U Sain Kyaw	09-261552915	U Che	2	0	2	3	5	
182	Ku Yin	Taung Poet Gyi	U Alphoshio		U Mg Kham	3	0	2	3	5	
183	Ku Yin	Taung Poet Gyi	U Tun Aye		U Own	2	0	3	4	7	
184	Ku Yin	Taung Poet Gyi	U Sain Aung	09-262590411	U Say	2	0	2	3	5	
185	Ku Yin	Taung Poet Gyi	U Sain Than		U Sein Win	1	1	2	3	5	
186	Ku Yin	Taung Poet Gyi	U Sain Phay	09-771341568	U Boor	5	1	2	6	8	
187	Ku Yin	Taung Poet Gyi	U Chit Win	09-254248141	U Myint Maw	0	1	2	1	3	
188	Ku Yin	Taung Poet Gyi	U Htwe	09-688064233	U Lay	0	0	3	2	5	
189	Ku Yin	Taung Poet Gyi	U Sain Ngwe		U San Hla	0	1	1	2	3	
190	Ku Yin	Taung Poet Gyi	U Htun Aye	09-428341059	U Tun Lin	0	0	2	1	3	
191	Ku Yin	Taung Poet Gyi	U Nyut Mg		U Tun Aye	1	1	1	2	3	

192	Ku Yin	Taung Poet Gyi	U Khin Mg Win	09-250488494	U Than Mg	1	1	2	1	3	
193	Ku Yin	Taung Poet Gyi	U Sain Lon	09-428341088	U Hein	2	0	2	2	4	
194	Ku Yin	Taung Poet Gyi	U Tun Lin	09-253399371	U Than Mg	1	1	3	1	4	
195	Ku Yin	Taung Poet Gyi	U Khu Myint	09-423437655	U Than Mg	1	0	2	1	3	
196	Ku Yin	Taung Poet Gyi	U Hein		U Bay	0	0	1	1	2	
197	Ku Yin	Taung Poet Gyi	U Kyaw Myint	09-254337188	U San Ba	1	0	3	2	5	
198	Ku Yin	Taung Poet Gyi	U Myint Aung		U San Ba	1	1	2	1	3	
199	Ku Yin	Taung Poet Gyi	U Sain Htain Lin	09-428006772	U Khin Mg	2	0	1	2	3	
200	Ku Yin	Taung Poet Gyi	U Kyaw Win		U Khin Mg	1	1	2	1	3	
201	Ku Yin	Taung Poet Gyi	U Sain Kwet	09-774993278	U Say	1	1	2	1	3	
202	Ku Yin	Taung Poet Gyi	U Nay Win Soe	09-266046336	U Htun Win	0	0	3	2	5	
203	Ku Yin	Taung Poet Gyi	Daw Khin Soung		U Pho Su	0	0	0	1	1	
204	Ku Yin	Taung Poet Gyi	Mg Win Phyu	09-444878507	U Htun Kyi	1	1	2	2	4	
205	Ku Yin	Taung Poet Gyi	U Soe Lin	09-268804768	U Than Mg	1	1	1	3	4	
206	Ku Yin	Taung Poet Gyi	Ma Pyoen Cho		U Than Mg	2	0	2	2	4	
207	Ku Yin	Taung Poet Gyi	U Kyaw Win Tun	09-452612562	U Than Mg	1	0	1	1	2	
208	Ku Yin	Taung Poet Gyi	U Aung Kham	09-441705918	U Htun Khin	1	0	2	2	4	
209	Ku Yin	Taung Poet Gyi	U Ko Win	09-675776815	U Kine	1	0	1	1	2	
210	Ku Yin	Taung Poet Gyi	U Aung Ko Hla		U Kyaw Phay	1	0	3	1	4	
211	Ku Yin	Taung Poet Gyi	U Sain Nay Aung		U Tun Kyi	1	0	2	1	3	
212	Ku Yin	Taung Poet Gyi	U Sain Nyi		U Pho Ri	0	0	2	1	3	
213	Ku Yin	Taung Poet Gyi	U Sain Youn		U RaSein	1	0	1	2	3	
214	Ku Yin	Taung Poet Gyi	U Tun Aung		U Lone Aye	1	0	2	1	3	
215	Loi Paw	Loi Ho Thaing	U Now Sai		U Lay Myint	1	1	2	2	4	
216	Loi Paw	Loi Ho Thaing	U Win Bo		U Htwe	1	1	2	4	6	
217	Loi Paw	Loi Ho Thaing	U Mg Myint		U Own	0	0	2	2	4	
218	Loi Paw	Loi Ho Thaing	U Ku Mar		U Mee	4	0	2	5	7	
219	Loi Paw	Loi Ho Thaing	U Phoe		U Than Mg	1	0	2	1	3	
220	Loi Paw	Loi Ho Thaing	U Phyoe Wai		U Soe Naing	2	0	3	2	5	
221	Loi Paw	Loi Ho Thaing	U Kham Ohn		U Kan Gyi	4	0	1	5	6	
222	Loi Paw	Loi Ho Thaing	U Zaw Naing Oo		U Paul	1	0	2	3	5	
223	Loi Paw	Loi Ho Thaing	U Nge		U Tun Aung	1	0	3	1	4	
224	Loi Paw	Loi Ho Thaing	U Hla Tun		U Mg Hla	1	0	4	1	5	
225	Loi Paw	Loi Ho Thaing	U Hla Moe		U Mg Hla	1	1	2	4	6	
226	Loi Paw	Loi Ho Thaing	U Tun Lwin		U Mg Hla	1	0	2	2	4	
227	Loi Paw	Loi Ho Thaing	U Mg Oo		U Mee	1	0	6	1	7	
228	Loi Paw	Loi Ho Thaing	U Sai Lon		U Tun	2	0	2	2	4	
229	Loi Paw	Loi Ho Thaing	U Kyar		U Ball Reh	1	1	1	3	4	
230	Loi Paw	Loi Ho Thaing	U Kyaw Min		U Hwa Hlaing	0	0	2	0	2	
231	Loi Paw	Loi Ho Thaing	U Mg Lay		U Shareh	1	0	2	3	5	

232	Loi Paw	Loi Ho Thaing	U Bo Lay	9427864761	U Phay	1	0	1	2	3	
233	Loi Paw	Loi Ho Thaing	U Mine Khan		U Mg Saung	1	1	3	2	5	
234	Loi Paw	Loi Ho Thaing	U Phu		U Byaing	2	0	2	2	4	
235	Loi Paw	Loi Ho Thaing	U Pan Seint		U Mine	6	1	3	6	9	
236	Loi Paw	Loi Ho Thaing	U Mg Oo		U Tun Seint	2	0	1	2	3	
237	Loi Paw	Loi Ho Thaing	U Nay Lin Aung		U Tun Ngwai	2	0	2	2	4	
238	Loi Paw	Loi Ho Thaing	U Aung Myo		U Tun Ngwai	1	2	3	1	4	
239	Loi Paw	Loi Ho Thaing	U Tun Kyaing		U Myah	1	0	1	1	2	
240	Loi Paw	Loi Ho Thaing	U Pan Seint		U Paw	1	1	1	3	4	
241	Loi Paw	Loi Ho Thaing	U Seint Kyin		U El Tin Nyut	1	1	5	1	6	
242	Loi Paw	Loi Ho Thaing	U Zaw Oo		U Tun Yin	1	1	1	3	4	
243	Loi Paw	Loi Ho Thaing	U Aung Thu		U Tin Aung	1	1	1	2	3	
244	Loi Paw	Loi Ho Thaing	U Ye Lel Oo		U Tin Aung	1	0	2	1	3	
245	Loi Paw	Loi Ho Thaing	U Noun		U Own Phay	2	0	3	2	5	
246	Loi Paw	Loi Ho Thaing	U Aung Thine		U Than Mg	1	0	3	2	5	
247	Loi Paw	Loi Ho Thaing	U Own Kyaw		U Than Mg	1	0	2	2	4	
248	Loi Paw	Loi Ho Thaing	U Win Mg		U San Lin	3	1	4	3	7	
249	Loi Paw	Loi Ho Thaing	U Tun Seint		U Tun	1	0	5	1	6	
250	Loi Paw	Loi Ho Thaing	U Eite Mg		U Thone	1	0	3	1	4	
251	Loi Paw	Loi Ho Thaing	U Than Lwin		U Mg Win	2	0	3	2	5	
252	Loi Paw	Loi Ho Thaing	U Kyaw Lwin		U Kyaw Seint	1	0	4	2	6	
253	Loi Paw	Loi Ho Thaing	U Aung Thu		U Mine	1	0	1	1	2	
254	Loi Paw	Loi Ho Thaing	U Bo Htoo		U Phay	3	0	4	4	8	
255	Loi Paw	Loi Ho Thaing	U Than Aung		U Myat Thaung	1	2	2	2	4	
256	Loi Paw	Loi Ho Thaing	U Aung Than		U Nyone	1	0	2	1	3	
257	Loi Paw	Loi Ho Thaing	U Saw Mue		U Phyah	1	0	2	3	5	
258	Loi Paw	Loi Ho Thaing	U Aung Lay		U Moe Aung	1	0	2	4	6	
259	Loi Paw	Loi Ho Thaing	U Ba Than		U Jetpu	1	0	2	2	4	
260	Loi Paw	Loi Ho Thaing	U Kyaw Than		U Jetpu	1	1	1	4	5	
261	Loi Paw	Loi Ho Thaing	U San Thine		U Jetpu	0	0	2	1	3	
262	Loi Paw	Loi Ho Thaing	U Aung Naing		U Paw	1	0	2	3	5	
263	Loi Paw	Loi Ho Thaing	U Phyoe Min		U Pwar	2	0	2	2	4	
264	Loi Paw	Loi Ho Thaing	U Naing Lin		U Pwar	1	1	3	2	5	
265	Loi Paw	Loi Ho Thaing	U Chit Htoo		U Kyin Nyar	1	1	3	2	5	
266	Loi Paw	Loi Ho Thaing	U Tun Win		U Bu	0	0	2	1	3	
267	Loi Paw	Loi Ho Thaing	U Than Aung	09-454085224	U Htout	4	0	2	4	6	
268	Loi Paw	Loi Ho Thaing	U Tun Kyin		U Lwon	2	1	3	4	7	
269	Loi Paw	Loi Ho Thaing	U Moe Kyaw		U Lay Myaung	1	0	2	3	5	
270	Loi Paw	Loi Ho Thaing	U Sane		U Lay Myaung	1	1	2	2	4	
271	Loi Paw	Loi Ho Thaing	U Bar		U Kyi Maung	2	0	1	2	3	

272	Loi Paw	Loi Ho Thaing	U Nyein Chan		U Kyaw Lynn	2	0	2	2	4	
273	Loi Paw	Loi Ho Thaing	U Moe Tin Aung		U Htun	0	0	1	1	2	
274	Loi Paw	Loi Ho Thaing	U Naing Hlin		U Htun Shwe	4	0	2	5	7	
275	Loi Paw	Loi Ho Thaing	U Htun Htun		U Moe Ag	0	0	3	2	5	
276	Loi Paw	Loi Ho Thaing	U Thein Shwe		U Taw Hla	2	0	2	2	4	
277	Loi Paw	Loi Ho Thaing	U Than Shwe Oo		U Thein Shwe	2	0	2	2	4	
278	Loi Paw	Loi Ho Thaing	U Min Thein		U Htun	1	1	2	2	4	
279	Loi Paw	Loi Ho Thaing	U Nyein Ko Hla		U Lwin Htay	5	1	3	5	8	
280	Loi Paw	Loi Ho Thaing	U Htun Hla		U Htun	2	0	5	2	7	
281	Loi Paw	Loi Ho Thaing	U Than Paw		U Pyar	2	1	5	2	7	
282	Loi Paw	Loi Ho Thaing	U Tun Tin		U Htun	2	0	5	2	7	
283	Loi Paw	Loi Ho Thaing	U Nay San Aung		U Htun Tin	2	0	5	2	7	
284	Loi Paw	Loi Ho Thaing	U Ngar Reh		U Phe Bu	1	0	4	1	5	
285	Loi Paw	Loi Ho Thaing	U Myat Naing		U Myaung	3	0	2	3	5	
286	Loi Paw	Loi Ho Thaing	Ag Phyu Tu		U Htun Khin	1	0	2	1	3	
287	Loi Paw	Loi Ho Thaing	Daw Thaw		U Myaung	1	0	0	1	1	
288	Loi Paw	Loi Ho Thaing	U Thin Zin Htoo		U Nyunt Mg	1	1	3	2	5	
289	Loi Paw	Loi Ho Thaing	U Htou		U Kyan	1	0	4	3	7	
290	Loi Paw	Loi Ho Thaing	U Than Kyaw		U Sein	1	1	3	3	6	
291	Loi Paw	Loi Ho Thaing	U Than Sein		U Lin	2	0	3	3	6	
292	Loi Paw	Loi Ho Thaing	U Moe De	09-257235880	U Sai Mone	0	0	3	3	6	
293	Loi Paw	Loi Ho Thaing	U Phyoe Lwin		U Tun Khin	1	2	3	1	4	
294	Loi Paw	Loi Ho Thaing	U San Thine		U Pyar (Kyaw Oo)	3	0	1	3	4	
295	Loi Paw	Loi Pan Son	U Shwe Toe		U Tun Tin	3	0	2	3	5	NT-093
296	Loi Paw	Loi Pan Son	U Aung Lwin Oo		U Ba	1	1	1	2	3	
297	Loi Paw	Loi Pan Son	U Ko Aung Zaw		U Myint Aung	0	0	3	1	4	
298	Loi Paw	Loi Pan Son	U Ba		U Nge	1	1	2	3	5	
299	Loi Paw	Loi Pan Son	U Saw Aung		U Saw Mu Shine	1	1	3	2	5	
300	Loi Paw	Loi Pan Son	U Aung Oo		U Thein Mg	1	1	2	3	5	
301	Loi Paw	Loi Pan Son	U Akar Hein		U Kyaw Khin	2	1	2	3	5	
302	Loi Paw	Loi Pan Son	U Pyi Myoe Hein		U Kyaw Khin	1	0	1	1	2	
303	Loi Paw	Loi Pan Son	U Ku Ri		U Chwe	1	0	3	2	5	
304	Loi Paw	Loi Pan Son	U Chit Tin		U Pay	1	0	1	2	3	
305	Loi Paw	Loi Pan Son	U Hla Win		U Thein Phae	1	1	2	1	3	
306	Loi Paw	Loi Pan Son	U Aung Naing		U Tun Aung	2	0	1	3	4	
307	Loi Paw	Loi Pan Son	U Phae		U Nge	1	0	2	2	4	
308	Loi Paw	Loi Pan Son	U Tun Mya		U Zar	1	0	1	2	3	
309	Loi Paw	Loi Pan Son	U Tun Tun Win		U Yin	1	0	2	2	4	
310	Loi Paw	Loi Pan Son	U Tun Win		U Hla Phae	3	0	1	3	4	
311	Loi Paw	Loi Pan Son	Daw Zaw Kyi		U Lon	2	1	4	3	7	

312	Loi Paw	Loi Pan Son	U Zaw Oo		U Tin	0	0	1	0	1	
313	Loi Paw	Loi Pan Son	U Aye Mg		U Phae	1	0	2	2	4	
314	Loi Paw	Loi Pan Son	U Kyaw Win Tun		U Thein Phae	1	1	1	2	3	
315	Loi Paw	Loi Pan Son	U Soe Aung		U Ra Sein	2	0	2	3	5	KT-001
316	Loi Paw	Loi Pan Son	U Myoe Aung		U Khin Mg	1	1	3	2	5	KT-002
317	Loi Paw	Loi Pan Son	U Bo Htwe		U Kyaw Shaing	0	0	1	3	4	KT-003
318	Loi Paw	Loi Pan Son	U Ye Htet		U Bo Htwe	1	1	2	1	3	KT-004
319	Loi Paw	Loi Pan Son	U Sain Kwan		U Mya Mg	2	0	3	2	5	KT-005
320	Loi Paw	Loi Pan Son	U Tun Myean		U Yan	1	0	2	1	3	KT-006
321	Loi Paw	Loi Pan Son	U Zaw Moe Mya		U Tun Myain	1	1	1	2	3	KT-007
322	Loi Paw	Loi Pan Son	U Mg Khone		U San	1	0	3	2	5	KT-008
323	Loi Paw	Loi Pan Son	Ma Hla Chaw		U Kyein	1	0	1	4	5	KT-009
324	Loi Paw	Loi Pan Son	U Mg Win		U Kyein	2	1	3	2	5	KT-010
325	Loi Paw	Loi Pan Son	U Myoe Zaw		U Than Aung	1	0	2	1	3	KT-011
326	Loi Paw	Loi Pan Son	U Nge Hla Oo		U Mg Win	1	1	1	3	4	KT-012
327	Loi Paw	Loi Pan Son	Daw Htwe		U Chit Tin	1	1	2	1	3	KT-013
328	Loi Paw	Loi Pan Son	U Kyaw Naing		U Mg Ra	1	1	2	2	4	KT-014
329	Loi Paw	Loi Pan Son	U Soe Aung		U Chet Phyu	3	0	1	3	4	KT-015
330	Loi Paw	Loi Pan Son	Daw Mi Nge		U Tun Ra	2	1	2	2	4	KT-016
331	Loi Paw	Loi Pan Son	U Min Zaw		U Kan Kyi	1	1	2	3	5	KT-017
332	Loi Paw	Loi Pan Son	U Moe Hein		U Tun Sar	1	0	3	1	4	KT-018
333	Loi Paw	Loi Pan Son	U Tun Hla		U Tun Ra	1	1	3	1	4	KT-019
334	Loi Paw	Loi Pan Son	U Tun Oo		U Ri	2	0	5	2	7	KT-020
335	Loi Paw	Loi Pan Son	U Tue Tu		U Tun Lwe	0	0	3	1	4	KT-021
336	Loi Paw	Loi Pan Son	U Thein Tun		U Tun Paw	0	0	2	1	3	KT-022
337	Loi Paw	Loi Pan Son	U San Kyaw		U Tun Paw	1	0	3	2	5	KT-023
338	Loi Paw	Loi Pan Son	U Mg Yae		U Tun Paw	2	0	2	3	5	KT-024
339	Loi Paw	Loi Pan Son	U Ha Kae		U Nge	1	0	2	1	3	KT-025
340	Loi Paw	Loi Pan Son	Daw Ei Pee		U Hla Phae	3	0	0	4	4	KT-026
341	Loi Paw	Loi Pan Son	U Tun Kyaw		U Yaung	1	0	2	2	4	KT-027
342	Loi Paw	Loi Pan Son	U Myoe Ko Ko		U Mg Shwe	2	1	5	3	8	KT-028
343	Loi Paw	Loi Pan Son	U Than Phae		U Mwoe	1	0	1	2	3	KT-029
344	Loi Paw	Loi Pan Son	U Mg Tauk		U San	2	0	2	2	4	KT-030
345	Loi Paw	Loi Pan Son	U Tue		U Tee	1	1	3	1	4	KT-031
346	Loi Paw	Loi Pan Son	U Tun Hlaing		U Yan	2	0	3	2	5	KT-032
347	Loi Paw	Loi Pan Son	U Chit Mg		U Phyu	1	2	4	3	7	KT-033
348	Loi Paw	Loi Pan Son	U Mg Khain		U Ka	2	0	3	3	6	KT-034
349	Loi Paw	Loi Pan Son	U Tun Tin		U Than Mg	2	0	2	2	4	KT-035
350	Loi Paw	Loi Pan Son	Daw Hnie Phyu		U Tun Shwe	1	0	3	2	5	KT-036
351	Loi Paw	Loi Pan Son	Daw Nyo Nyo		U Ba Ri	1	0	2	1	3	KT-037

352	Loi Paw	Loi Pan Son	U Shwe Moe		U Tun Tin	1	0	4	3	7	KT-038
353	Loi Paw	Loi Pan Son	U Mg Oo		U Pho Ri	2	0	2	3	5	KT-039
354	Loi Paw	Loi Pan Son	U Mya Htoo		U Hla Tun	1	1	1	2	3	KT-040
355	Loi Paw	Loi Pan Son	U Tun Mya		U Tun Lwe	1	1	1	2	3	KT-041
356	Loi Paw	Loi Pan Son	U Tun Hla		U Sar	1	0	2	1	3	KT-042
357	Loi Paw	Loi Pan Son	U Phyoe Wai		U Ba Htay	1	0	2	3	5	KT-043
358	Loi Paw	Loi Pan Son	Daw Pyi Phyoe		U Ba Htay	2	1	2	4	6	KT-044
359	Loi Paw	Loi Pan Son	U Min Naing		U Kan Kyi	1	0	3	1	4	KT-045
360	Loi Paw	Loi Pan Son	U Ba Aye		U Tun Paw	2	0	3	4	7	KT-046
361	Loi Paw	Loi Pan Son	U Soe Mg		U Bo Ri	2	0	2	2	4	KT-047
362	Loi Paw	Loi Pan Son	U Ba Kyi		U Thein Mg	1	1	2	2	4	KT-048
363	Loi Paw	Loi Pan Son	U Kyaw		U Phyu	2	0	1	3	4	KT-049
364	Loi Paw	Loi Pan Son	U Min Oo		U Kyaw	1	1	2	1	3	KT-050
365	Loi Paw	Loi Pan Son	U Soe Htait		U Win Aung	3	0	3	4	7	KT-051
366	Loi Paw	Loi Pan Son	U Ba Win		U Tun Ra	2	0	2	2	4	KT-052
367	Loi Paw	Loi Pan Son	Daw Khin Than		U Soe Mg Yin	2	2	4	3	7	KT-053
368	Loi Paw	Loi Pan Son	U Tin Htoo		U Thein Phae	1	0	1	1	2	KT-054
369	Loi Paw	Loi Pan Son	U Win Zaw Oo		U Tun Tin	0	0	1	0	1	KT-055
370	Loi Paw	Loi Pan Son	U Moe Lwin		U Khon	1	0	1	2	3	KT-056
371	Loi Paw	Ma Hkay Hkam	U Sai Lin		U Sai Youm	1	0	4	3	7	
372	Loi Paw	Ma Hkay Hkam	U Sai Hein		U Kyaw Lone	0	0	6	2	8	
373	Loi Paw	Ma Hkay Hkam	U Sai Oo		U Kay Lar	1	0	2	1	3	
374	Loi Paw	Ma Hkay Hkam	U Sai Nyut		U Sai Pain	0	0	3	4	7	
375	Loi Paw	Ma Hkay Hkam	U Sai Min		U Phaw	1	1	3	3	6	
376	Loi Paw	Nang Hsut	U Kyaw	9424072901	U No	3	1	3	4	7	LP-092
377	Loi Paw	Nang Hsut	Sai Non		U Pone	1	1	2	1	3	LP-100
378	Loi Paw	Nang Hsut	Sai Win	9408757759	U Pwint	1	0	1	1	2	LP-101
379	Loi Paw	Nang Hsut	Sai SaDrimar		U Tar	1	0	1	1	2	
380	Loi Paw	Nang Hsut	U Ku	9428360228	U Nyar	1	0	4	1	5	LP-106
381	Loi Paw	Nang Hsut	U Aung Hla		U Twom	1	1	2	3	5	
382	Loi Paw	Nang Hsut	Sai Lay	9447162720	U Tun Paw	1	0	2	2	4	
383	Loi Paw	Nang Hsut	Sai All		U Nyar	1	0	3	1	4	LP-113
384	Loi Paw	Nang Hsut	Sai Lon Khan	9252356522	U Aye Maung	1	2	2	2	4	LP-107
385	Loi Paw	Nang Hsut	Sai Eite Sone	9454656814	U Cite	1	1	2	2	4	LP-095
386	Loi Paw	Nang Hsut	Sai Own		U Wond	3	0	1	4	5	
387	Loi Paw	Nang Hsut	Sai Hla Phay	9450145349	U Yout	1	0	1	3	4	
388	Loi Paw	Nang Hsut	U Nay	9453156905	U Sadimar	2	0	4	2	6	LP-094
389	Loi Paw	Nang Hsut	U Sai Pyah	9447931858	U Be	1	0	2	3	5	LP-112

390	Loi Paw	Nang Hsut	Sai Chaw		U Ku	1	1	3	2	5	
391	Loi Paw	Nang Hsut	U Sai Nyar	9442329584	U Te Shond	2	0	2	2	4	LP-109
392	Loi Paw	Nang Hsut	U Maung		U Tu	1	2	3	3	6	
393	Loi Paw	Nang Hsut	U Bee		U Tun	1	0	1	2	3	LP-103
394	Loi Paw	Nang Hsut	Sai Einn Taw		U Chat	1	1	3	3	6	LP--097
395	Loi Paw	Nang Hsut	Sai Aye		U Chat	1	1	2	3	5	
396	Loi Paw	Nang Hsut	Sai One		U Chat	1	1	1	2	3	
397	Loi Paw	Nang Hsut	Sai Khay		U Phone	3	2	2	5	7	
398	Loi Paw	Nang Hsut	Sai Kyaw		U Nyar	3	2	2	5	7	LP-108
399	Loi Paw	Nang Hsut	Mg Ni		U Sai Nyar	2	1	2	3	5	LP-099
400	Loi Paw	Nang Paw Long	U Emanule Nang		U Foe Aung	0	0	2	2	4	LP-124
401	Loi Paw	Nang Paw Long	U Nay Lin		U Htan Paul	1	1	3	3	6	
402	Loi Paw	Nang Paw Long	U Aung Lin	9783503977	U Lae	1	1	2	5	7	LP-132
403	Loi Paw	Nang Paw Long	U John Paul		U Htan Kalan	1	2	5	3	8	LP-125
404	Loi Paw	Nang Paw Long	U Aung		U Kyan	4	0	6	5	11	
405	Loi Paw	Nang Paw Long	U Kawla		U Joseph	3	0	4	3	7	LP-127
406	Loi Paw	Nang Paw Long	U Bell		U Lar	4	0	3	5	8	
407	Loi Paw	Nang Paw Long	U Yel Maung		U Santo	1	2	3	5	8	
408	Loi Paw	Loi Paw	U Sai San	9766703754	U Kyan	3	1	4	4	8	LP-058
409	Loi Paw	Loi Paw	U Hla	9254937094	U Maung	0	0	2	1	3	LP-015
410	Loi Paw	Loi Paw	U San Phyoe		U Too	0	0	2	2	4	LP-090
411	Loi Paw	Loi Paw	U Ku Mar	9791256166	U Phyu	1	0	1	2	3	LP-062
412	Loi Paw	Loi Paw	U Sai Htay	9661663504	U Myin	1	0	2	2	4	LP-073
413	Loi Paw	Loi Paw	U Sai Lon	9887908254	U Saint	1	2	1	5	6	LP-011
414	Loi Paw	Loi Paw	U Kyaw Nwai	9893401988	U Nyine	3	1	2	3	5	LP-081
415	Loi Paw	Loi Paw	U Sai Sen Lone	9254404970	U Sir	3	0	2	3	5	LP-064
416	Loi Paw	Loi Paw	U Sai Maung	9263049683	U Khain	2	0	1	3	4	LP-072
417	Loi Paw	Loi Paw	U Sai Too	9250714789	U Pi Nyar	1	0	2	2	4	LP-018
418	Loi Paw	Loi Paw	U Sai Moon	9769778518	U Shwe	2	0	5	4	9	LP-080
419	Loi Paw	Loi Paw	U Sai Nge	9250859838	U So	2	1	3	4	7	LP-006
420	Loi Paw	Loi Paw	U Sai Myint		U Thine Lwin	1	0	1	3	4	LP-079
421	Loi Paw	Loi Paw	U Kyaw Hla		U Shwe	1	2	2	4	6	LP-026
422	Loi Paw	Loi Paw	U Kyaw Win		U Paw	0	0	2	3	5	LP-045
423	Loi Paw	Loi Paw	U Sai Late		U Tin	2	0	4	3	7	LP-084
424	Loi Paw	Loi Paw	U Sai Tit		U Late	2	0	4	3	7	LP-085
425	Loi Paw	Loi Paw	U Kyaw Tin	9796430237	U Sein	0	0	2	1	3	LP-086
426	Loi Paw	Loi Paw	U Sai Pel		U Tun Aung	1	0	2	2	4	LP-035

427	Loi Paw	Loi Paw	Mg Nay Myo	9791432724	U Tun Ya	1	0	2	2	4	LP-088
428	Loi Paw	Loi Paw	U Tun Aye		U Pine	1	1	2	2	4	LP-046
429	Loi Paw	Loi Paw	U Sai Shwe Ni	9753476895	U Nu	1	1	2	1	3	LP-078
430	Loi Paw	Loi Paw	U Mg Tin		U Tino	3	1	1	4	5	LP-077
431	Loi Paw	Loi Paw	U Sai Pan Sein		U Phan	2	0	2	3	5	LP-083
432	Loi Paw	Loi Paw	U Sai Tun Lay	9251331705	U Tun San	2	0	3	4	7	LP-031
433	Loi Paw	Loi Paw	U Sai Mine		U Ko Zar	0	0	1	1	2	LP-022
434	Loi Paw	Loi Paw	U Hein	9687374570	U Kel	2	1	3	3	6	LP-023
435	Loi Paw	Loi Paw	U Sai Noun	9480666853	U Einn Dit	4	1	3	5	8	LP-039
436	Loi Paw	Loi Paw	U Soe Tin	9455989579	U Aung	1	1	3	2	5	LP-012
437	Loi Paw	Loi Paw	U Sai Nay Lin	9428356573	U Tar Lon	1	1	2	3	5	LP-030
438	Loi Paw	Loi Paw	U Myo Min		U Aung Nay Lin	1	2	4	5	9	LP-021
439	Loi Paw	Loi Paw	U Sai Tun		U Nge	2	0	4	3	7	LP-063
440	Loi Paw	Loi Paw	U Sai Late		U Tee	3	0	3	4	7	LP-055
441	Loi Paw	Loi Paw	U Soe Naing		U Kumar	1	0	1	3	4	LP-091
442	Loi Paw	Loi Paw	U Sai Pan Sein	9268109700	U So	1	2	3	1	4	LP-070
443	Loi Paw	Loi Paw	U Sai Bee		U Pan	1	0	2	1	3	LP-069
444	Loi Paw	Loi Paw	U Kone		U Nyar	1	0	3	2	5	LP-041
445	Loi Paw	Loi Paw	U Sai Htaung		U Hla	1	0	1	1	2	
446	Loi Paw	Loi Paw	U Wai Lin		U Maung	1	2	3	2	5	LP-017
447	Loi Paw	Loi Paw	Sai Pine		U Pa Na	1	0	2	2	4	LP-019
448	Loi Paw	Loi Paw	U Win Myint		U Ba Zin	2	0	2	3	5	LP-024
449	Loi Paw	Loi Paw	U San Hla		U Pan Myine	2	0	2	2	4	LP-025
450	Loi Paw	Loi Paw	Sai Myint Lwin	9256289174	U Phoe Chit	1	0	3	3	6	LP-032
451	Loi Paw	Loi Paw	Sai Tun		U Saung	2	0	2	3	5	LP-029
452	Loi Paw	Loi Paw	Sai Non Khay		U Sai Bee	1	0	2	1	3	LP-036
453	Loi Paw	Loi Paw	Sai Nge Khan	9259446228	U Einn Dit	3	2	3	6	9	LP-040
454	Loi Paw	Loi Paw	U Tun Myat	9769475456	U Kumar	1	0	2	1	3	LP-043
455	Loi Paw	Loi Paw	Sai Pyah	9259446228	U Einn Dit	3	2	3	6	9	LP-038
456	Loi Paw	Loi Paw	Sai Lone		U Na Lin Ta	2	1	1	2	3	LP-001
457	Loi Paw	Loi Paw	Sai Bee		U Kyar	1	1	2	2	4	LP-008
458	Loi Paw	Loi Paw	U Late		U Say	1	0	2	5	7	LP-028
459	Loi Paw	Loi Paw	U Sai Cho	9253290451	U Sai Moo	1	2	1	4	5	LP-068
460	Loi Paw	Loi Paw	U Sai Lwin	9256291237	U Myin	1	1	3	2	5	LP-061
461	Loi Paw	Loi Paw	U Kyaw Thu		U Narine Dar	1	1	3	2	5	LP-002
462	Loi Paw	Loi Paw	Sai Hla Maung	9453521023	U Tun Sir	4	0	1	6	7	LP-037
463	Loi Paw	Loi Paw	Ko Hla Maung		U Nge	3	2	6	4	10	LP-009
464	Loi Paw	Loi Paw	Sai Moo		U Tun Aung	2	1	1	3	4	LP-034
465	Loi Paw	Loi Paw	Sai Aung Moe		U Sai San	1	1	4	4	8	LP-020
466	Loi Paw	Loi Paw	Sai Lin	9252937434	Sai Oo	0	0	4	2	6	LP-004

467	Loi Paw	Loi Paw	Sai One	9780514737	U Myah	4	1	5	5	10	LP-076
468	Loi Paw	Loi Paw	Sai Two	9259828501	U Pan Tit	1	0	1	2	3	LP-075
469	Loi Paw	Loi Paw	Sai Hla Oo	9440262292	U Aung	0	0	3	1	4	LP-047
470	Loi Paw	Loi Paw	Sai Myat Soe	9762922131	U Maung Hla	1	0	2	3	5	LP-050
471	Loi Paw	Loi Paw	Sai Moe	9447931893	U Cein	1	1	1	2	3	LP-066
472	Loi Paw	Loi Paw	Sai Myint Lay	9787156237	U Kyaw Min	1	0	2	2	4	LP-065
473	Loi Paw	Loi Paw	Sai Non Sen		U Ma	1	2	4	5	9	LP-056
474	Loi Paw	Loi Paw	Sai One Lin	9887709941	U Cine	2	0	3	3	6	LP-049
475	Loi Paw	Loi Paw	Sai Myint Wai	9256474641	U Cine	2	0	3	3	6	LP-067
476	Loi Paw	Loi Paw	U Lin		U Tee	1	1	2	4	6	LP-010
477	Loi Paw	Loi Paw	Sai Non		U Ohh Kyaw	2	1	4	2	6	LP-014
478	Loi Paw	Loi Paw	U Ohh Kyaw		U Ku	2	1	4	2	6	LP-048
479	Loi Paw	Loi Paw	Sai Sai	9254960198	U Khaing	1	1	2	3	5	LP-027
480	Loi Paw	Loi Paw	Sai Tun Phyu	9250861260	U Pan	2	0	3	4	7	LP-053
481	Loi Paw	Loi Paw	Mg Myint Thine		U Tar	1	0	2	1	3	LP-057
482	Loi Paw	Loi Paw	Sai Tun		U Tee	1	1	4	3	7	LP-044
483	Loi Paw	Loi Paw	Mg Lay	9253784878	U Pel	1	2	3	1	4	LP-071
484	Loi Paw	Loi Paw	Mg Yway		U Ohn	2	0	2	2	4	LP-042
485	Loi Paw	Loi Paw	Sai Pyine		U Kumar	1	0	2	1	3	LP-059
486	Loi Paw	Loi Paw	Mg phyu		U Kumar	2	1	4	4	8	
487	Loi Paw	Loi Paw	Sai Lwin Moe	9451172081	U Tun Kyine	3	1	4	5	9	LP-096
488	Loi Paw	Loi Paw	Sai Mywai		U Kyar	1	1	4	2	6	LP-003
489	Loi Paw	Loi Paw	Sai Bu		U Pan Da	1	0	2	2	4	LP-016
490	Loi Paw	Loi Paw	U Ko		U Sar	2	0	3	3	6	LP-007
491	Loi Paw	Loi Paw	U Einn Dee		U Kel	0	0	1	0	1	
492	Loi Paw	Hsaung Nan Khe	U Dawrio		U Long Sue	2	1	4	3	7	LP-131
493	Loi Paw	Hsaung Nan Khe	U Marto	9785487347	U Tino	1	1	3	1	4	LP-121
494	Loi Paw	Hsaung Nan Khe	U Tino		U Souk	1	0	4	2	6	LP-120
495	Loi Paw	Hsaung Nan Khe	U Tia		U Tino	1	1	2	1	3	LP-123
496	Naung	Khoung Mine	Khun Mg Htand	9450860332	U Mg Kown	1	1	2	3	5	
497	Naung	Khoung Mine	U Phere Moe		U Nan	3		3	3	6	
498	Naung	Khoung Mine	U Pan Mg	9789442912	U Mouth	1		2	3	5	
499	Naung	Khoung Mine	U Mg Phan	9252357726	U Yawn	1	1	2	1	3	
500	Naung	Kun Long	U Phe Bu		U Phay Reh	0		4	1	5	
501	Naung	Kun Long	U J Me		U Ko Pit	1	1	1	2	3	
502	Naung	Kun Long	U Shae Reh		U Phay Reh	1	1	1	3	4	
503	Naung	Kun Long	U Sai Aung Too		U Kyi	1	1	1	2	3	
504	Naung	Lar Whe	U Damiano	09-453346912	U Luizi	1	1	1	3	4	
505	Naung	Lar Whe	U Luizi		U kwel	3		1	3	4	
506	Naung	Lar Whe	U Mg Lu		U Thaung	0		2	1	3	

507	Naung	Lar Whe	U Edward		U luizi	1	1	5	1	6	
508	Naung	Lar Whe	U Phyu		U Thaung	1	1	3	1	4	
509	Naung	Lar Whe	U Law Eh		U See Sho	1	1	3	2	5	
510	Naung	Naung Laing	U Poe Re	09-253504033	U Phre Re	1		3	3	6	
511	Naung	Paw Kone	U Kyaw Aung		U Phalo	1		2	2	4	
512	Kone Hson	Long Kar	Mg Tun Tun Zaw		U Hla Phae	1	1	1	4	5	KT-057
513	Kone Hson	Long Kar	U Kham Tun		U ThuWaNa	1	1	2	1	3	KT-058
514	Kone Hson	Long Kar	U Ham Hlaing		U Own Phea	1	0	1	3	4	KT-059
515	Kone Hson	Long Kar	U Pan Aung		U Kar	2	0	2	4	6	KT-060
516	Kone Hson	Long Kar	U Pakure		U Rire	4	0	2	4	6	KT-061
517	Kone Hson	Long Kar	U Aung Win		U Palyar Re	1	1	2	1	3	KT-062
518	Kone Hson	Long Kar	U Than Zaw Oo		U Ko Lin	1	1	2	2	4	KT-063
519	Kone Hson	Long Kar	U San Nyaut		U Mg Ngo	2	0	2	3	5	KT-064
520	Kone Hson	Long Kar	U Soe Naing		U Zar	1	1	2	1	3	KT-065
521	Kone Hson	Long Kar	U Thein Lwin		U Zar	1	1	2	2	4	KT-066
522	Kone Hson	Long Kar	U Nyang Soe		U Win Hlaing	1	1	2	2	4	KT-067
523	Kone Hson	Long Kar	U Than Zaw Oo		U Phae	1	1	2	1	3	KT-068
524	Kone Hson	Long Kar	U Aung Kham		U Sain Kan	1	1	2	1	3	KT-069
525	Kone Hson	Long Kar	U Sein Pan		U Tun Hlaing	1	1	1	2	3	KT-070
526	Kone Hson	Long Kar	U Own Phea		U Hla Mg	1	0	1	3	4	KT-071
527	Kone Hson	Long Kar	U Tun Aye		U Phyu	1	0	2	3	5	
528	Kone Hson	Long Kar	U Tun Myint		U Tun	1	0	2	2	4	KT-072
529	Kone Hson	Maik Hpyet	U WiRe		U Hla	1	1	1	2	3	KT-073
530	Kone Hson	Maik Hpyet	U Tun Win		U Hla	2	0	1	5	6	KT-074
531	Kone Hson	Maik Hpyet	U Soe Mg		U Hla	1	1	3	1	4	KT-075
532	Kone Hson	Maik Hpyet	U Ngar Re		U Phray Re	2	1	3	2	5	KT-076
533	Kone Hson	Maik Hpyet	U Hla Re		U Phray Re	1	0	2	1	3	KT-077
534	Kone Hson	Maik Hpyet	U Own Kyaw		U Myint Kyaw	1	1	2	2	4	KT-078
535	Kone Hson	Maik Hpyet	U Mg Htut		U Mue	2	1	2	5	7	
536	Kone Hson	Maik Hpyet	U Tun Hlaing		U Shar Re	1	1	1	2	3	
537	Kone Hson	Maik Hpyet	U Aung Nay Win		U Tun Myint	1	0	2	3	5	
538	Kone Hson	Maik Hpyet	U Mg Ku		U Win Mg	0	0	3	1	4	
539	Mobye	Kan Oo	Mg Moe Aung	09-452693603	U Than Oo	1		1	2	3	
540	Mobye	Thit Yar Htin Shue	U Myo Thein		U San Min	2	1	4	3	7	
541	Mobye	Thit Yar Htin Shue	U Tin Htun Aung		U Chit Ag			1	3	4	
542	Mobye	Thit Yar Htin Shue	U Lu Pu		U Thein Han	1		3	3	6	
543	Mobye	Thit Yar Htin Shue	U Chit Hlain		U Mart	1	1	2	2	4	
544	Mobye	Thit Yar Htin Shue	U Htun Win	9776644689	U Chit shwe Ba	3	1	2	5	7	
545	Mobye	Thit Yar Htin Shue	U Mg Myint		U Tha Khin	4		4	5	9	
546	Mobye	Thit Yar Htin Shue	U Tu Nge	9799382616	U Thein Han	1	2	4	3	7	

547	Mobye	Thit Yar Htin Shue	U Lone Bo	9884277642	U Lin	4		1	9	10	
548	Mobye	Thit Yar Htin Shue	U Htun Kyaw	9668852268	U Htun Yin	2	2	2	3	5	
549	Mobye	Thit Yar Htin Shue	U Maung Shwe	09-799380995	U Kyaw Yin	2		3	3	6	HSK- 016
550	Mobye	Thit Yar Htin Shue	Daw Shwe Kyi	09-442170644	U Kyaw Yin	3	0	4	4	8	HSK - 076
551	Mobye	Thit Yar Htin Shue	U Htin Htun	9760479398	U Shwe Thwe	1	2	4	1	5	
552	Mobye	Thit Yar Htin Shue	U Than Min	9269168185	U Shwe Thwe	1	1	2	1	3	
553	Mobye	Thit Yar Htin Shue	U Soe Naing		U Tin Lin	1	1	4	2	6	
554	Mobye	Thit Yar Htin Shue	U Saw Htun	9458325780	U Ag Myint	2		3	5	8	
555	Mobye	Thit Yar Htin Shue	U Htay Kyaw	9262682239	U Lin	2		3	3	6	
556	Mobye	Thit Yar Htin Shue	U Myo Naing	9778689705	U Chit Laing	1	1	3	3	6	
557	Mobye	Thit Yar Htin Shue	U Zaw Lwin	9406695411	U Ngwe Maung	4		4	5	9	
558	Mobye	Thit Yar Htin Shue	U Win Ag Gyi	9766526853	U Myat Than	1	2	5	1	6	
559	Mobye	Thit Yar Htin Shue	U Myo Thein		U Mart	1		2	3	5	
560	Mobye	Thit Yar Htin Shue	U Myo Thant		U Kin	1		2	2	4	
561	Mobye	Thit Yar Htin Shue	U Htun Win Ag	9443617618	U Aye Mg	2	1	2	4	6	
562	Mobye	Thit Yar Htin Shue	U Kyaw Htay		U Htin Kyi	1		3	2	5	
563	Mobye	Thit Yar Htin Shue	U Kyaw Naing		U Chit Latt	1	1	4	3	7	
564	Mobye	Thit Yar Htin Shue	U Zaw Myo		U Ag	2		4	3	7	
565	Mobye	Thit Yar Htin Shue	U Khin Mg Htwe		U Phey Aye	2	1	4	3	7	
566	Mobye	Thit Yar Htin Shue	U Ba La Mg		U Phey Aye	1	1	3	2	5	
567	Mobye	Thit Yar Htin Shue	U Ag Htun		U Chit Ag	1	1	2	4	6	
568	Mobye	Thit Yar Htin Shue	U Ba La Ag		U Phey Aye	1	1	4	2	6	
569	Mobye	Thit Yar Htin Shue	U Mg Twa		U Kyaw Yin	3	0	3	3	6	
570	Mobye	Thit Yar Htin Shue	U Than Mine		U Shwe	2	1	3	3	6	
571	Mobye	Thit Yar Htin Shue	U Kan Yin		U Kyaw Shein	5	1	4	5	9	HSK - 060
572	Mobye	Thit Yar Htin Shue	U Chit Htoo		U Tun Zar	3	0	3	4	7	HSK - 022
573	Mobye	Thit Yar Htin Shue	U Nyut Aung		U Baung Mya	3	0	3	3	6	
574	Mobye	Thit Yar Htin Shue	U Thar Sue		U Baung Mya	1	0	4	4	8	HSK -032
575	Mobye	Thit Yar Htin Shue	U Aung Ba		U Tun Yin	1	2	6	3	9	
576	Mobye	Thit Yar Htin Shue	U Zaw Moe		U Hla Mg	2	1	3	3	6	HSK -018
577	Mobye	Thit Yar Htin Shue	U Than Lwin Oo		U Than Ag	1	0	6	1	7	HSK - 071
578	Mobye	Thit Yar Htin Shue	U Ai Pyar		U Htun Latt	1	0	4	1	5	HSK - 075
579	Mobye	Thit Yar Htin Shue	U Aung Zaw lin		U Thoung Myat	1	0	4	2	6	
580	Mobye	Thit Yar Htin Shue	U Kyaw Aye		U Latt Phe	1	0	4	1	5	HSK -013
581	Mobye	Thit Yar Htin Shue	U Win Kyaw		U Latt Htun	1	1	4	1	5	HSK - 021
582	Mobye	Thit Yar Htin Shue	U Myint		U Myat	2	1	3	3	6	HSK -085/034
583	Mobye	Thit Yar Htin Shue	U Shwe Lay		U Kyaw Yin	2		3	2	5	HSK -073
584	Mobye	Thit Yar Htin Shue	U Tin Moe		U Ba Thwe	2		2	3	5	HSK -011/059
585	Mobye	Thit Yar Htin Shue	Daw Ma Win		U Win Mg	2		3	2	5	HSK -026
586	Mobye	Thit Yar Htin Shue	U Kyaw Min		U Latt Htun	1	1	1	3	4	

	Total					**758**	**267**	**1406**	**1362**	**2768**	

Nyaungshwe Township

587	Lin Lan	Taung Poet Kwe	U Tin Oo Lay		U Ra Sein	1	2	3	1	4	
588	Lin Lan	Taung Poet Kwe	U Mg Lay		U Tun	1	0	3	1	4	
589	Lin Lan	Taung Poet Kwe	U Mg Naung		U Phyu	1	1	3	2	5	
590	Lin Lan	Taung Poet Kwe	U Sai Tun Mg		U Ma	0	1	4	1	5	
591	Lin Lan	Taung Poet Kwe	U Sai Pee		U Tun Mya	1	2	1	3	4	
592	Lin Lan	Taung Poet Kwe	U Sai Pee		U Tun	2	1	2	3	5	
593	Lin Lan	Taung Poet Kwe	U Mg Lout		U Yar	0	0	1	0	1	
594	Lin Lan	Taung Poet Kwe	U Tun Lin		U Sein	2	0	2	2	4	
595	Lin Lan	Taung Poet Kwe	U Sai Kwae		U Pe	1	0	4	2	6	
596	Lin Lan	Taung Poet Kwe	U Yu		U Ma	1	2	2	2	4	
597	Lin Lan	Taung Poet Kwe	U Sai		U Moon	1	0	4	2	6	
598	Lin Lan	Taung Poet Kwe	U Sai Taw		U Kone	1	1	2	1	3	
599	Lin Lan	Taung Poet Kwe	U Mg Lone		U Ma	3	0	2	3	5	
600	Lin Lan	Taung Poet Kwe	U Mg Pot		U Ma	1	0	3	1	4	
601	Lin Lan	Taung Poet Kwe	U Sai Wone		U Ma	1	1	1	2	3	
602	Lin Lan	Taung Poet Kwe	U Nay Oo		U Tun Yee	1	0	2	1	3	
603	Lin Lan	Taung Poet Kwe	U Sai Kham		U Lu	1	0	3	1	4	
604	Lin Lan	Taung Poet Kwe	U Mg Hein		U Nan	1	2	3	1	4	
605	Lin Lan	Taung Poet Kwe	U Mg Bee		U Kan Kyi	3	2	3	5	8	
606	Lin Lan	Taung Poet Kwe	U Sai Hla Mg		U Kun	3	2	4	3	7	
607	Lin Lan	Taung Poet Kwe	U Mg Aye		U Lan	1	0	2	2	4	
608	Lin Lan	Taung Poet Kwe	U Khu Myen		U Chan	2	0	2	2	4	
609	Lin Lan	Taung Poet Kwe	U Sai So		U Ma	3	0	2	3	5	
610	Lin Lan	Taung Poet Kwe	U Mg Nge		U Cher	1	0	2	1	3	
611	Lin Lan	Taung Poet Kwe	U Phyu		U Lin	2	1	2	3	5	
	Total					**35**	**18**	**62**	**48**	**110**	

Pin Laung Township

612	Nang Toke	Kone Thar	U Mying Soe		U Tin	2	0	1	2	3	KT-001
613	Nang Toke	Kone Thar	U Than Mg		U Hswang	3	0	2	4	6	KT-002
614	Nang Toke	Kone Thar	U Than Myint		U Than Mg	3	0	2	4	6	KT-003
615	Nang Toke	Kone Thar	U Htun Kyi		U Pein	1	0	3	1	4	KT-004
616	Nang Toke	Kone Thar	U Ag Kyaw Soe		U Ni Kyaw	2	1	5	4	9	KT-005
617	Nang Toke	Kone Thar	U Naung Site		U Gyi	1	1	2	3	5	KT-006
618	Nang Toke	Kone Thar	U Mg		U Han	2	0	1	3	4	KT-007
619	Nang Toke	Kone Thar	U Htun Ag		U Soe	1	0	2	1	3	KT-008
620	Nang Toke	Kone Thar	Sai Lwin Kyaw		U Soe	1	1	2	3	5	KT-009

621	Nang Toke	Kone Thar	Mg Tan		U Ywunt	1	0	3	1	4	KT-010
622	Nang Toke	Kone Thar	U Win Hlaing Oo		U Ag Nge	1	0	3	2	5	KT-011
623	Nang Toke	Kone Thar	U Toe		U Mg	1	2	3	2	5	KT-012
624	Nang Toke	Kone Thar	U Kyaw Naing		U Khyaing	3	1	3	3	6	KT-013
625	Nang Toke	Kone Thar	U Ko Lay Khin		U Soe	0	0	1	1	2	KT-014
626	Nang Toke	Kone Thar	U Myo Kyi		U Phey	2	1	2	2	4	KT-015
627	Nang Toke	Kone Thar	U Naing Chaw		U Htun Chan	1	0	2	2	4	KT-016
628	Nang Toke	Kone Thar	U Hseing Mg		U Htun	2	0	2	2	4	KT-017
629	Nang Toke	Kone Thar	U Lin Sote		U Phey	3	1	3	4	7	KT-018
630	Nang Toke	Kone Thar	U Zaw Toe		U Htun Tin	0	0	1	1	2	KT-019
631	Nang Toke	Kone Thar	U Phaw Ku		U Zaw Toe	1	1	3	3	6	KT-020
632	Nang Toke	Kone Thar	U Law Hsin		U Hswang	1	0	2	2	4	KT-021
633	Nang Toke	Kone Thar	U Zaw		U Ote	2	0	2	3	5	KT-022
634	Nang Toke	Kone Thar	U Ko Lay		U Chwe	1	0	1	2	3	KT-023
635	Nang Toke	Kone Thar	U Soe Ag		U Ko Lay	1	1	2	1	3	KT-024
636	Nang Toke	Kone Thar	U Pan Phyu		U Phyain	2	1	3	3	6	KT-025
637	Nang Toke	Kone Thar	Mg Mai		U Chan	1	1	1	3	4	KT-026
638	Nang Toke	Kone Thar	Sai Phwe		U Hwont	1	0	3	1	4	KT-027
639	Nang Toke	Kone Thar	U Lwin Maw		U Phey	1	1	2	2	4	KT-028
640	Nang Toke	Kone Thar	U Soe Pain		U Mg	1	0	2	2	4	KT-029
641	Nang Toke	Kone Thar	U Chan		U Htaung			3	2	5	KT-030
642	Nang Toke	Kone Thar	U Chit Dwe		U Htun Naing	3	1	2	4	6	KT-031
643	Nang Toke	Kone Thar	U Htun Kyaw		U Phoe Khin	4	1	3	5	8	KT-032
644	Nang Toke	Kone Thar	U Hlang Kham		U Phey	1	1	3	2	5	KT-033
645	Nang Toke	Kone Thar	U Htun Naing		U Toe			3	2	5	KT-034
646	Nang Toke	Kone Thar	Sai Naung Ai		U Phyu	1	2	4	1	5	KT-035
647	Nang Toke	Kone Thar	Sai San Hla		U Sar			3	2	5	KT-036
648	Nang Toke	Kone Thar	Mg Hsin		U Lwone	1	0	2	1	3	KT-037
649	Nang Toke	Kone Thar	Sai Nwun		U Own Sheing	1	0	3	1	4	KT-038
650	Nang Toke	Kone Thar	Sai Pyat		U Paw	1	1	3	2	5	KT-039
651	Nang Toke	Kone Thar	Mg Kyaw Sein		U Pwint	2	0	2	4	6	KT-040
652	Nang Toke	Kone Thar	Mg Htun Aye		U Phey	2	1	3	4	7	KT-041
653	Nang Toke	Kone Thar	U Sai Yat		U Hswang	3	1	5	4	9	KT-042
654	Nang Toke	Kone Thar	Sai Nit		U Hswang	3	0	3	4	7	KT-043
655	Nang Toke	Kone Thar	Sai Ai Sai		U Eint	2	0	2	3	5	KT-044
656	Nang Toke	Kone Thar	Ag Naing		U Ag	1	1	1	2	3	KT-045
657	Nang Toke	Kone Thar	Mg Phyoe		U Char	1	1	1	2	3	KT-046
658	Nang Toke	Kone Thar	Mg Zaw Htun		U Htun Hla	1	0	2	1	3	KT-047
659	Nang Toke	Kone Thar	Sai Myo		U Htun Kyi	1	0	3	1	4	KT-048
660	Nang Toke	Kone Thar	Sai Nwun		U Nge	1	1	3	1	4	KT-049

661	Nang Toke	Kone Thar	U Sai Lin		U Too	1	0	3	2	5	KT-050
662	Nang Toke	Kone Thar	U Ag Khaing		U Sai Lin	1	0	3	2	5	KT-051
663	Nang Toke	Kone Thar	U Khaung		U Par	2	0	1	3	4	KT-052
664	Nang Toke	Kone Thar	U Lan Phar		U Khaung	2	1	1	3	4	KT-053
665	Nang Toke	Kone Thar	U Yoe		U Tu	2	0	3	3	6	KT-054
666	Nang Toke	Kone Thar	Sai Tun Aung		U oun	3	1	2	4	6	KT-055
667	Nang Toke	Kone Thar	Sai Thwet		U Aye	1	0	3	1	4	KT-056
668	Nang Toke	Kone Thar	Mg Nge		U Hla Phay	1	0	1	2	3	KT-057
669	Nang Toke	Kone Thar	Sai Kham Saung		U Phyu	2	1	1	3	4	KT-058
670	Nang Toke	Kone Thar	Nay Aung		U Ein	1	0	2	3	5	KT-059
671	Nang Toke	Kone Thar	U Ai Thein		U Ywung	1	0	2	2	4	KT-060
672	Nang Toke	Kone Thar	U Pan Seint		U Htun	1	1	3	1	4	KT-061
673	Nang Toke	Kone Thar	Sai Lone		U Kyar	1	1	1	2	3	KT-062
674	Nang Toke	Kone Thar	U Shwe		U Chan	1	0	3	1	4	KT-063
675	Nang Toke	Kone Thar	U Si		U Kaut	13	0	2	4	6	KT-064
676	Nang Toke	Kone Thar	U Own Phey		U Soe	1	1	3	2	5	KT-065
677	Nang Toke	Kone Thar	U Tin Own		U Htun Yin	1	0	1	2	3	KT-066
678	Nang Toke	Kone Thar	U Myint Ngwe		U Kan	1	1	2	1	3	KT-067
679	Nang Toke	Kone Thar	Sai Kaw		U Tin Own	2	0	2	2	4	KT-068
680	Nang Toke	Kone Thar	Nan Mein		U Ngyar	1	1	3	3	6	KT-069
681	Nang Toke	Kone Thar	Sai Khay		U Kyaw	1	0	3	1	4	KT-070
682	Nang Toke	Kone Thar	Mg Nge		U Htun Sar	0	0	2	1	3	KT-071
683	Nang Toke	Kone Thar	U Nge		U Lar	0	0	5	1	6	KT-072
684	Nang Toke	Kone Thar	U Own		U Aye	1	0	4	3	7	KT-073
685	Nang Toke	Kone Thar	U San Htoo		U San Hla	1	1	2	3	5	KT-074
686	Nang Toke	Kone Thar	U Kyaw Khaing		U Kyaw	2	0	2	4	6	KT-075
687	Nang Toke	Kone Thar	Daw Sanda Aye		U San Tin	2	0	3	3	6	KT-076
688	Nang Toke	Kone Thar	Sai Naung		U Kyaw	1	1	3	2	5	KT-077
689	Nang Toke	Kone Thar	U Htun Lu		U Pan	3	0	2	4	6	KT-078
690	Nang Toke	Nang Toke	Ko Kyaw Hla		U Tun	1		5	2	7	NT-001
691	Nang Toke	Nang Toke	U Moe Zaw		U Kyaw Win			2	1	3	NT-002
692	Nang Toke	Nang Toke	U Lin Ko		U Way	1	1	1	2	3	NT-003
693	Nang Toke	Nang Toke	U Myo Min		U Hmuu	1	1	2	1	3	NT-004
694	Nang Toke	Nang Toke	U Ohm Sein		U Tint	1		2	2	4	NT-005
695	Nang Toke	Nang Toke	U Kyaw San		U Tint	1	1	2	1	3	NT-006
696	Nang Toke	Nang Toke	Wai Naing Phyo		U Myo Khaing	1	1	3	1	4	NT-007
697	Nang Toke	Nang Toke	U Nyi Nyi Lwin		U Myint Ngwe	1		2	2	4	NT-008
698	Nang Toke	Nang Toke	U Win Naing		U San Ba	1		1	2	3	NT-009
699	Nang Toke	Nang Toke	U San My		U Tin	1	1	2	3	5	NT-010
700	Nang Toke	Nang Toke	U Kyaw Aung		U Tin Win	3		3	3	6	NT-011

701	Nang Toke	Nang Toke	Aung Naing		U Thein Aung	1		2	1	3	NT-012
702	Nang Toke	Nang Toke	Aye Aye Khaing		U Aung Soe	1	2	2	3	5	NT-013
703	Nang Toke	Nang Toke	U Soe Lwin Oo		U Soe Win	1	1	1	3	4	NT-014
704	Nang Toke	Nang Toke	Mg Lay		U Aung	1	1	2	3	5	NT-015
705	Nang Toke	Nang Toke	Daw Nang Cho		U Aye	3		2	3	5	NT-016
706	Nang Toke	Nang Toke	Ko Chan Thar		U Mya			2		2	NT-017
707	Nang Toke	Nang Toke	Ko Sein Kyu		U San Tint	1	1	1	2	3	NT-018
708	Nang Toke	Nang Toke	Ko Phyu Ku		U King	1	1	4	3	7	NT-019
709	Nang Toke	Nang Toke	Ko Myo Min Tun		U Rone	1		2	3	5	NT-020
710	Nang Toke	Nang Toke	Zaw Myint Oo		U Sein Lin	1	1	1	2	3	NT- 102
711	Nang Toke	Nang Toke	Aung Myint Thu		U Kyaw Tin	1	1	1	3	4	NT- 103
712	Nang Toke	Nang Toke	Mg Sein Lay		U Tun Mya			4	1	5	NT- 104
713	Nang Toke	Nang Toke	Ma Pu		U Mya	2		3	3	6	NT-105
714	Nang Toke	Nang Toke	Moe Zaw		U San Tin	3		2	3	5	NT-106
715	Nang Toke	Nang Toke	Mg Lwan Moe		U Tun Mya			4	1	5	NT- 107
716	Nang Toke	Nang Toke	Mg Htwe		U Nuu	2	1	3	4	7	NT- 108
717	Nang Toke	Nang Toke	U Htoo		U Ni			1	1	2	NT- 109
718	Nang Toke	Nang Toke	Mg Thein Tan		U Kyaw	1	1	4	2	6	NT- 110
719	Nang Toke	Nang Toke	U Htor		U Kywel			4	1	5	NT- 111
720	Nang Toke	Nang Toke	Ma Nu Nu		U Kout	3			3	3	NT- 112
721	Nang Toke	Nang Toke	Daw Sandar Aye		U Ko Oo	1	1	2	2	4	NT- 113
722	Nang Toke	Nang Toke	Win May Oo		U Moe San	4	1	2	6	8	NT- 114
723	Nang Toke	Nang Toke	Mg Tin Oo		U Soe Tint	1		2	1	3	NT- 115
724	Nang Toke	Nang Toke	San Zaw Oo		U Myint Ngwe	1	1	3	2	5	NT- 116
725	Nang Toke	Nang Toke	Mg Hla Win		U Hla	1	1	3	2	5	NT- 117
726	Nang Toke	Nang Toke	U Hla Tun		U Por	3		2	4	6	NT- 118
727	Nang Toke	Nang Toke	Aik Tut		U Lat	1	1	2	2	4	NT- 119
728	Nang Toke	Nang Toke	San Win Myint		U Phoe San	2	1	4	2	6	NT- 120
729	Nang Toke	Nang Toke	Ko Aung Thu		U Soe Nyunt	1	1	1	3	4	NT-021
730	Nang Toke	Nang Toke	U Tun Win		U San Tint			1			NT-022
731	Nang Toke	Nang Toke	Ko Kyaw Saw		U Soe Tin	1	1	1	1	2	NT- 120
732	Nang Toke	Nang Toke	U Phyu		U Pan Aung		2	2	3	5	NT-025
733	Nang Toke	Nang Toke	Ko Zaw Min		U Nyunt Mg	1		2	2	4	NT-026
734	Nang Toke	Nang Toke	U Tun Oo		U Ba Win	1		2	2	4	NT-024
735	Nang Toke	Nang Toke	Ma Nan Yi		U Hlaing	1		5	2	7	NT-027
736	Nang Toke	Nang Toke	Ma Than Yin		U Sein	1		2	2	4	NT-028
737	Nang Toke	Nang Toke	U Than Tun		U Khin	3	1	3	3	6	NT-029
738	Nang Toke	Nang Toke	Ko Naing Tu		U Thein Aung	1	1	1	2	3	NT-030
739	Nang Toke	Nang Toke	U Than Lwin		U Aung			1	1	2	NT-031
740	Nang Toke	Nang Toke	Ko Thant Zin Oo		U Soe	1		2	1	3	NT-032

741	Nang Toke	Nang Toke	Ko Kyaw Naing		U Htoo	1		2	2	4	NT-033
742	Nang Toke	Nang Toke	Ko Aung Sein		U Tin	1	1	4	3	7	NT-034
743	Nang Toke	Nang Toke	Aung Tun Lay		U Nyunt Mg	1	1	2	2	4	NT-035
744	Nang Toke	Nang Toke	Ko Mg Phor		U Hla Aye			5	1	6	NT-036
745	Nang Toke	Nang Toke	Ko Than Naing		U Hla Aye			5	1	6	NT-037
746	Nang Toke	Nang Toke	U Myo Aung		U Tin Mg	1		3	1	4	NT-038
747	Nang Toke	Nang Toke	U Than Naing		U Tin Mg			3	1	4	NT-039
748	Nang Toke	Nang Toke	Than Oo Lwin		U Pan	1		1	1	2	NT-059
749	Nang Toke	Nang Toke	U Min Oo		U Htar	1		1	3	4	NT-060
750	Nang Toke	Nang Toke	Ko Pyuu		U Suu	2		2	3	5	NT-061
751	Nang Toke	Nang Toke	Lwin Aung Oo		U Kyi	2		2	3	5	NT-062
752	Nang Toke	Nang Toke	Daw Sein Phyu		U Kyaw	2		2	3	5	NT-063
753	Nang Toke	Nang Toke	Mg Yin Htwe		U Lay Htoo	1		2	3	5	NT-064
754	Nang Toke	Nang Toke	Ko Than Htun		U Myint Swe	4	1	2	6	8	NT-065
755	Nang Toke	Nang Toke	Ko Zaw Latt		U kaung	1		5	2	7	NT-066
756	Nang Toke	Nang Toke	Ko Phor Ku		U Sein Lin	1	1	1	3	4	NT-067
757	Nang Toke	Nang Toke	Ko Mg Lay		U Chain	1	1	2	3	5	NT-068
758	Nang Toke	Nang Toke	Ko Nge		U Oun	1		3	2	5	NT-069
759	Nang Toke	Nang Toke	Naing Win Tun		U Soe Win	1		2	1	3	NT-070
760	Nang Toke	Nang Toke	Ko Pyar		U Tin	1		3	2	5	NT-071
761	Nang Toke	Nang Toke	Aung Naing Myo		U Soe Win	1		3	1	4	NT-072
762	Nang Toke	Nang Toke	Ko Soe Thu Nge		U Thein Aung	1		1	3	4	NT-073
763	Nang Toke	Nang Toke	Ko Bat Ohm		U Pan Aung	1	1	2	3	5	NT-074
764	Nang Toke	Nang Toke	Ko Soe Naing		U Kyaw	1	0	3	1	4	NT- 040
765	Nang Toke	Nang Toke	Kyaw Myo Htun		U Htun Myint	1	1	1	4	5	NT- 041
766	Nang Toke	Nang Toke	Kyaw Thu		U Chan	1	1	2	1	3	NT- 042
767	Nang Toke	Nang Toke	Daw Ma Pe		U Kyaw			3	1	4	NT- 043
768	Nang Toke	Nang Toke	Ko Mg Kyaw		U Hlat Htun	1	0	3	1	4	NT- 044
769	Nang Toke	Nang Toke	Ko Ag Myo Win		U Paul	1	1	4	2	6	NT- 045
770	Nang Toke	Nang Toke	U Own Mg		U San Tin	2	0	2	3	5	NT- 046
771	Nang Toke	Nang Toke	U Own Phey		U Tu	4	0	2	5	7	NT- 047
772	Nang Toke	Nang Toke	U Ko Moe		U Thein Mg	3	0	1	4	5	NT- 048
773	Nang Toke	Nang Toke	Mg Lay		U Sein	1	1	2	2	4	NT- 049
774	Nang Toke	Nang Toke	Mg Lin Nwen		U Gyi	2	1	1	3	4	NT- 050
775	Nang Toke	Nang Toke	Ko Soe Naing		U Phey	3	0	2	3	5	NT- 051
776	Nang Toke	Nang Toke	San Kyaw		U San Tin	1	1	3	1	4	NT- 052
777	Nang Toke	Nang Toke	Ag Kyaw Soe		U Chit Htaung	0	0	2	1	3	NT- 053
778	Nang Toke	Nang Toke	Nan Ni Win		U Kyaw Than			2	2	4	NT- 054
779	Nang Toke	Nang Toke	Nay Myo Lwin		U Pan	2	0	2	3	5	NT- 055
780	Nang Toke	Nang Toke	U Than Lwin		U Phey	3	0	1	5	6	NT- 056

781	Nang Toke	Nang Toke	U Kyaw Myo Tin		U Gyi	1	0	3	2	5	NT- 057
782	Nang Toke	Nang Toke	U Phyo Min		U Kyaw Myo Tin	1	0	3	2	5	NT- 058
783	Nang Toke	Nang Toke	Ko Htin Kyaw Lin		U Than Phey	2	0	2	2	4	NT-075
784	Nang Toke	Nang Toke	Ko Mhyo Ma Ag		U Than Mg	2	0	1	2	3	NT-076
785	Nang Toke	Nang Toke	Ko Min Naing		U Tin Nyunt	2	0	2	4	6	NT-077
786	Nang Toke	Nang Toke	Ko Way Yan Soe		U Myint Kyaw	2	1	2	4	6	NT-078
787	Nang Toke	Nang Toke	Ko Ngan O Win		U Gyi	3	0	1	5	6	NT-079
788	Nang Toke	Nang Toke	U Soe Nyunt		U Lu	0	0	1	1	2	NT-080
789	Nang Toke	Nang Toke	Sar Oo Thar Oo		U Htun Chain	2	0	2	1	3	NT-081
790	Nang Toke	Nang Toke	Ko Gyi Phu		U Nyo	1	0	2	2	4	NT-082
791	Nang Toke	Nang Toke	Ko Zaw Min		U Gyi Phu	1	0	1	1	2	NT-083
792	Nang Toke	Nang Toke	Ko Moe Win		U Phu	1		2	2	4	NT-084
793	Nang Toke	Nang Toke	Ko Pwar San Lin		U Myat	3	0	3	3	6	NT-085
794	Nang Toke	Nang Toke	Ko Too		U Lin	1	2	2	4	6	NT-086
795	Nang Toke	Nang Toke	Ko Than Tu		U Bee Lon	1	1	1	2	3	NT-087
796	Nang Toke	Nang Toke	Myo Khin Zaw		U Lay Mg	1	0	2	2	4	NT-088
797	Nang Toke	Nang Toke	Ko Myo Thant		Ko Lune Khaing	2	1	1	4	5	NT-089
798	Nang Toke	Nang Toke	Ko Than Zaw		U Nuu	1	1	3	1	4	NT-090
799	Nang Toke	Nang Toke	Ko Lay Mg		U Myint	1	0	2	2	4	NT-091
800	Nang Toke	Nang Toke	Mg Zay Yar Htun		U Hla Won	1	1	1	2	3	NT-092
801	Nang Toke	Nang Toke	Mg Zay Yar Mg		U Hla	1	0	2	2	4	NT-093
802	Nang Toke	Nang Toke	Daw Sandal Aye		U Ko Oo	1	1	2	2	4	NT-113
803	Nang Toke	Nang Toke	Daw Win May Oo		U Phoe San	4	1	2	6	8	NT-114
804	Nang Toke	Nang Toke	Mg Tin Oo		U Soe Tin	1	0	2	1	3	NT-115
805	Nang Toke	Nang Toke	Than Zaw Oo		U Myint Ngwai	1	1	3	2	5	NT-116
806	Nang Toke	Nang Toke	Mg Hla Win		U Hla	1	1	3	2	5	NT-117
807	Nang Toke	Nang Toke	U Hla Tun		U Paw	3	0	2	4	6	NT-118
808	Nang Toke	Nang Toke	Eite Tu		U Lat	1	1	2	2	4	NT-119
809	Nang Toke	Nang Toke	San Win Myint		U Phoe Son	2	1	4	2	6	NT-120

810	Nang Toke	Nang Toke	Ko Htoo		U Kin	1	0	1	1	2	NT-121
811	Nang Toke	Nang Toke	Ma Htay Myint		U Myint Ngwai	1	0	5	2	7	NY-122
812	Nang Toke	Nang Toke	Ko Mg Lwin Aye		U Ko Lin	1	1	2	1	3	NT-094
813	Nang Toke	Nang Toke	Mg Nyi Lay		U Hla	2	1	2	4	6	NT-095
814	Nang Toke	Nang Toke	U Tin Nyut		U Ya	2	0	2	4	6	NT-096
815	Nang Toke	Nang Toke	Mg Tin Win Aung		U Myat	1	1	1	3	4	NY-097
816	Nang Toke	Nang Toke	Mg Tin Mg		U Gyi	1	0	4	1	5	NY-098
817	Nang Toke	Nang Toke	Mg Khauk		U Kyaw Win	2	0	2	3	5	NT -099
818	Nang Toke	Nang Toke	Ko Naing Win		U Nyut Maung	1	0	2	2	4	NT-100
819	Nang Toke	Nang Toke	Kyin So		U Hla	2	0	3	2	5	NT-101
820	Nang Toke	Nang Toke	Zaw Myint Oo		U Sein Lin	1	1	1	2	3	NT-102
821	Nang Toke	Nang Toke	Aung Myat Thu		U Kyaw Tin	1	1	1	3	4	NT-103
822	Nang Toke	Nang Toke	Mg Sein Aye		U Tun Myat	0	0	4	1	5	NT-104
823	Nang Toke	Nang Toke	Ma Pon		U Myat	2	0	3	3	6	NT-105
824	Nang Toke	Nang Toke	Moe Zaw		U San Tin	3	0	2	3	5	NT-106
825	Nang Toke	Nang Toke	Mg Lwon Moe		U Tun Myat	0	0	4	1	5	NT-107
826	Nang Toke	Nang Toke	Mg Htwe		U Nuu	2	1	3	4	7	NT-108
827	Nang Toke	Nang Toke	U Htoo		U Ni	0	0	1	1	2	NT-109

828	Nang Toke	Nang Toke	Mg Thine Tan		U Kyaw	1	1	4	2	6	NT-110
829	Nang Toke	Nang Toke	U Htaw		U Kwere	0	0	4	1	5	NT-111
830	Nang Toke	Nang Toke	Ma Nu Nu		U Kauk	3	0	0	3	3	NT-112
831	Nang Toke	Ein Mu	Mg Soe		U Tun Kwel	1		1	1	2	
832	Nang Toke	Ein Mu	U Tun Kwel		U Hone	1		3	1	4	
833	Nang Toke	Ein Mu	Mg Aung Htay		U Mg Thar	1	1	2	2	4	
834	Nang Toke	Ein Mu	Khun Ton		U Mg	3	1	2	4	6	
835	Nang Toke	Ein Mu	Khun Tun Thar		U Mg	2	1	3	3	6	
836	Nang Toke	Ein Mu	Mg Htun Tin		U Nyo	1		2	1	3	
837	Nang Toke	Ein Mu	Nay Lin Oo		U Pu	2		2	3	5	
838	Nang Toke	Ein Mu	Ma Cho		U Htun	2		4	3	7	
839	Nang Toke	Ein Mu	San Tu		U Hai	1		2	3	5	
840	Nang Toke	Ein Mu	Mg Aye Mg		U Tont	1		2	1	3	
841	Nang Toke	Ein Mu	Ko Sate		U Pwar	2	1	2	5	7	
842	Nang Toke	Hu Woe	Sai Youm		U Phate	2	1	2	3	5	HW-001
843	Nang Toke	Hu Woe	Sai Bee		U Sai Pee	1	1	2	3	5	HW-002
844	Nang Toke	Hu Woe	Sai Tuu		U Phyu	1	0	3	1	4	HW-003
845	Nang Toke	Hu Woe	Mg Ni		U Nyat Za	1	1	2	2	4	HW-004
846	Nang Toke	Hu Woe	Sai Lan		U Sant	3	0	3	3	6	HW-005
847	Nang Toke	Hu Woe	Sai Tuu		U Thu Pin Nyar	2	0	2	2	4	HW-006
848	Nang Toke	Hu Woe	Sai Key		U View	2	0	4	2	6	HW-007
849	Nang Toke	Hu Woe	Sai Mine		U Kyin	2	1	1	4	5	HW-008
850	Nang Toke	Hu Woe	Sai Son		U Ngar	1	2	2	4	6	HW-009
851	Nang Toke	Hu Woe	Sai Bee		U Ngar	2	0	2	2	4	HW-010

852	Nang Toke	Hu Woe	U Thine Aung		Sai Byar	2	0	1	2	3	HW-011
853	Nang Toke	Hu Woe	Sai Kar Khan		U Lay	1	0	1	1	2	HW-012
854	Nang Toke	Hu Woe	Sai Ohh Mar		U Shwe	1	0	4	2	6	HW-013
855	Nang Toke	Hu Woe	Sai Tin Aung		U Kom	1	0	5	1	6	HW-014
856	Nang Toke	Hu Woe	Sai Naung		U San	5	1	1	6	7	HW-015
857	Nang Toke	Hu Woe	Sai Pan Maung		U Phyu	2	0	4	2	6	HW-016
858	Nang Toke	Hu Woe	Sai Thar Oo		Sai Kyaw	1	1	1	2	3	HW-017
859	Nang Toke	Hu Woe	Sai Soul		U Ngar	1	0	2	4	6	HW-018
860	Nang Toke	Hu Woe	Sai Thine Soe		U Phyu	1	1	2	2	4	HW-019
861	Nang Toke	Hu Woe	Sai Lon		U Maung	3	0	2	4	6	HW-020
862	Nang Toke	Hu Woe	Sai Tun Lay		U Ko Oo	2	0	5	3	8	HW-021
863	Nang Toke	Hu Woe	Daw Hla Kwere		U Phyu	2	0	5	3	8	HW-022
864	Nang Toke	Hu Woe	Sai Moe Kyaw		U Shar	2	0	1	3	4	HW-023
865	Nang Toke	Hu Woe	Sai Phel Buu		U Shar	2	0	3	2	5	HW-024
866	Nang Toke	Hu Woe	Sai Aung Tun		U Shar	1	0	1	2	3	HW-025
867	Nang Toke	Hu Woe	Sai Soe Pel		U Shar	1	1	4	2	6	HW-026
868	Nang Toke	Hu Woe	Sai Bee		U Kyin	1	0	2	2	4	HW-027
869	Nang Toke	Hu Woe	Sai Tin Hlaing		U Lon	2	0	3	4	7	HW-028

870	Nang Toke	Hu Woe	Sai Lin		U Sai Htoo	1	0	1	3	4	HW-029
871	Nang Toke	Hu Woe	Sai Kyaw		U Lone	1	0	2	2	4	HW-030
872	Nang Toke	Hu Woe	Sai Thar Lay		Sai Kyaw	1	1	1	2	3	HW-031
873	Nang Toke	Hu Woe	Sai Thar Nge		Sai Kyaw	1	0	2	1	3	HW-032
874	Nang Toke	Hu Woe	Sai Tun		U Cell	1	2	4	2	6	HW-033
875	Nang Toke	Hu Woe	Sai Law Pan		Sai Tun	2	0	1	1	2	HW-034
876	Nang Toke	Hu Woe	Sai Than Htoo		U Sai Gyi	1	0	2	2	4	HW-035
877	Nang Toke	Hu Woe	Sai Kyaw Myo Aung		u Aung Tun	1	1	1	2	3	HW-036
878	Nang Toke	Hu Woe	Sai Pee		U Phyu	4	0	7	4	11	HW-037
879	Nang Toke	Hu Woe	Sai Tin Soe		U Nge	1	1	2	2	4	HW-038
880	Nang Toke	Hu Woe	Mg Win Min Aung		U Win Ko	1	0	1	2	3	HW-039
881	Nan Tote	Loi Kyein	Aik Nge		U Saung	1		3	2	5	
		Total				**385**	**112**	**625**	**629**	**1253**	

		Grand Total	**1178**	**397**	**2093**	**2039**	**4131**	

Pekhon Township **State/ Region: Southern Shan** **Data collector's name:** **Partner's name: KMSS-Pekhon**

Sr.	Village Tract	Village Name	Farmer Name	Phone number	Father's name	Number of women between 15-49 years	Number of children under 5 years	Household size			Pond size			Pond ownership	Licensed/non-licensed	Latitude	Longitude
								M	F	T	L (ft)	W (ft)	Acre	Own/ Rent	Yes/ No		
1	Mobye	Kan Oo	U Ko Tun		U Kyaw Shain		1	2	3	5	250	100	0.57	Rent	No	19.8024	97.1059
2	Mobye	Se Mi Lot	U Bee		U KarawTee	1		5	2	7	80	30	0.05	Own	No	19.8088	97.1066
3	Mobye	Se Mi Lot	U Soe Moe	09-770539188	U Thar Pouk	1		5	2	7	120	45	0.12	Own	No	19.8054	97.1045
4	Mobye	Se Mi Lot	U Antonio	09-49403145	U Kyar			4	1	5	70	45	0.07	Own	No	19.8047	97.1020
5	Mobye	Se Mi Lot	Daw Mu Thi		U Khu	1		3	2	5	40	40	0.03	Own	No	19.8045	97.1018
6	Mobye	Se Mi Lot	U Luigy	09-899066535	U Sue	1	2	4	3	7	70	70	0.04	Own	No	19.8042	97.1017
7	Mobye	Se Mi Lot	U Lukar	09-250519994	U Su	1		3	2	5	450	450	4.64	Own	No	19.804	97.1021
8	Mobye	Nyaung Pin Thar	U Andrea	09-799124106	U Paul Moe Lwin	1	2	2	1	3	100	60	0.13	Own	No	19.8053	97.0981
9	Mobye	Nyaung Pin Thar	U Mateo		U Oh	3		4	4	8	130	65	0.19	Own	No	19.8049	97.0969
10	Mobye	Nyaung Pin Thar	U Lawrence	09-452694057	U Luigy	3		3	4	7	70	70	0.11	Own	No	19.8058	97.0958
11	Mobye	Daw Paw Ku	U Teri	09-799658804	U Dereh	1	2	2	3	5	600	500	6.89	Rent	No	19.8013	97.1087
12	Mobye	Lel Htun	U Marko	09-787344807	U Wei	1	-	5	2	7			0.5	Own	No	19.7692	97.1155
13	Mobye	Lel Htun	U Moe Zet	09-788060907	U Wei	1	1	3	5	8			1	Own	No	19.7748	97.1156
14	Mobye	Lel Htun	V Noe	09-428001827	U Pyan	1	2	4	5	9	209	209	1	Own	No	19.7697	97.1190
15	Mobye	Lel Htun	U Paulu		U V Noe	2	1	2	4	6	108	108	0.5	Own	No	19.7686	97.1190
16	Mobye	Lel Htun	U Mg Thein		U Hwei	1	-	3	2	5			1	Own	No	19.7686	97.1189
17	Mobye	Lel Htun	U La		U Pyan	2	-	3	3	6			1	Own	No	19.7687	97.1192
18	Mobye	Lel Htun	U Lae		U Lie	1	-	3	2	5			1.5	Own	No	19.7683	97.1187
19	Mobye	Le Htun	Mg Pai		U Kasii						210	210	1				
20	Mobye	Hpar Lai Taungche	Mg Khun								440	80	0.81				
21	Mobye	Don Du Htan	U Pan	09-778799613	U Htun	1	1	3	2	5	120	60	0.17	Own	No	19.4259	97.4193

22	Mobye	Don Du Htan	U Talet	09-751687158	U Petru	3	0	3	3	6			3.75	Own	yes	19.6982	97.1178(
23	Mobye	Don Du Htan	U Ka Tan		U La Khun	1	1	1	2	3	300	160	1.10	Own	No	19.7	97.1125:
24	Mobye	Loi Yin Taung Che	U Paung	09-252670293	U Htan	2	-	3	2	5	200	70	0.3	Own	No	19.4257	97.0420:
25	Mobye	Loi Yin Taung Che	U Htike		U Neit	1	-	6	1	7	600	20	0.3	Own	No	19.425	97.0428(
26	Mobye	Loi Yin Min Ga Lar	U Saw Shwe	09-780044376	Phu Kaut	2	1	2	4	6	200	70	1.5	Own	No	19.4316	97.0455:
27		Loi Yin Min Ga Lar															
28		Saungpalan Kone	Jovanni	9768246482													
29		Saungpalan Kone															
30	Mobye	Hpar Lai Nang Pei	U Matteo	09-253503717	U J Hla Moe	2	-	3	4	7			2	Own	No	19.7266	97.1155:
31	Mobye	Hpar Lai Nang Pei	Charles Kanedy	09-458760190	U Mg Mg	2	-	3	3	6			6	Own	No	19.7282	97.1150(
32	Mobye	Hpar Lai Nang Pei	U Aung Myint		U Hlaing	2	1	3	5	8			1.8	Rent	No	19.7255	97.1139:
33	Mobye	Hpar Lai Nang Pei	U Clemen Mg		Daw Mu Yan	2	-	2	3	5			3	Own	No	19.72690	97.1146:
34	Mobye	Hpar Lai Nang Pei	U Luizi Plou	09-252722043	U Dai	2	-	4	6	10			1	Own	No	19.7281	97.1149:
35																	
36	Mobye	Thit Yar Htin Shue Kone	U Latt Kyaw	9458342517	U Than	3		3	3	6	100	50	0.2	Own	No	19.7909	97.0737:
37	Mobye	Thit Yar Htin Shue Kone	U Nyo		U Dan	4		5	5	10	150	150	0.5	Own	No	19.8008	97.0774:
38	Mobye	Thit Yar Htin Shue Kone	U Min Naung		U Kyaw Yin	3	0	4	4	8	120	80	0.22	own	No	19.745	97.0300(

39	Moebye	Thar Yar Kone	U San To	9252796589	U Pan	2	1	7	3	10	130	25	0.07	Own	No	19.7589	97.0982
40	Moebye	Thar Yar Kone	U Soe Myint		U Khan	2	1	4	3	7	200	30	0.14	Rent	No	19.785	97.0967
41	Mobye	Thar Yar Kone	U Thine Paulu		U Pho Nyaung	1		2	3	5	300	50	0.34	Own	No	19.7635	97.1005
42	Mobye	Moe Bye Yae Kar Tar	U Naing Oo	9680000112	U latt Thein	2		3	3	6			1.90	Own	No	19.7789	98.0960
43	Mobye	Moe Bye Yae Kar Tar	U Myat Moe	9896229657	U Myint Aye	3	1	2	5	7	80	70	0.13	Own	No	19.781	97.0930
44	Mobye	Moe Bye Yae Kar Tar	U Kyaw Win	9776527623	U Ba	1		4	1	5	110	90	0.23	Own	No	19.781	97.3320
45	Mobye	Thit Yar kone	U Thay Luka	9898409505	U Khaing	5	1	5	7	12	140	40	0.13	Own	No	19.7659	97.1017
46	Mobye	Thar Yar kone	Fr. Paul Lwe		Bording house						100	150	0.34				
47	Mobye	Pwe Kone (2)	U Thomaso		U Maw						50	50	0.06				
48	Mobye	Pwe Kone(1)	U Yae Nyut	9780514350	U Kalice	1	1	1	2	3			30	Own	Yes	19.6968	97.1121
49	Mobye	Pwe Kone(2)	U ZarKaMo	9428001954	U Petru	1		2	2	4			15.9	Own	Yes	19.7003	97.1126
50	Mobye	Pwe Kone(2)	U Soe Pine	9751332811	U Ci	2		5	3	8			3	Own	Yes	19.712	97.1073
51	Mobye	Pwekone(2)	Zetaman		religious institute								3	Own	Yes	19.7361	97.1072
52	Mobye	Pwekone(2)	Satamaria		religious institute								3	Own	Yes	19.7364	97.1080
53	Mobye	Pwekone(2)	NanKi		religious institute								3	Own	Yes	19.7361	97.1080
54	Mobye	Pwe Kone (3)	Abraham	9263229922	U Ag	1		2	3	5			17.8	Own	Yes	19.7016	97.1168
55	Mobye	Pwe Kone(3)	U Pa Loat	9760404096	U Mg Kalay	2	2	4	2	6			11	Own	Yes	19.6968	97.1120

56	Mobye	Pwe Kone(3)	U Htay Ko		U Ywe			2	3	5			9	Own	Yes	19.7336	97.1053(
57	Mobye	Paw Oo(1)	U Sun Lwin	949277281	U Oh	3		2	4	6			11.8	Own	Yes	19.698	97.1121(
58	Mobye	Paw Oo(1)	Daw Pariti			1		2	4	6			70	Own	Yes	19.6193	97.1170:
59	Mobye	Paw Oo(1)	U Ngwe soe	949277281	U BaKhin	1		1	3	4			15	Own	Yes	19.6968	97.1121-
60	Mobye	Si Kar (2)	U Mg Oo	94590403	U Mg Mg	3		2	3	5			5	Own	Yes	19.7661	97.1072(
61	Mobye	Paw Oo(2)	U Myo		U Young	1		1	2	3			8.5	Own	Yes	19.7338	97.1062'
62	Mobye	Paw Oo(2)	U Ke Naing Oo		U Mg AG	1	2	2	2	4			9	Own	Yes	19.7336	97.1053(
63	Mobye	Zay Kone	U Mg Nge		U Qui	6	2	4	9	13			5	Own	Yes	19.7661	97.1072(
64	Naung Laing	Naung Laing	U Phyoe Reh	09-428360190	U Phre Reh	1	1	1	3	4	100	40	0.09	Own	No	19.8848	97.3507(
65	Ka Yin	Shwe San	U Yo Shout	09-428340747	U ShiShiot	2		3	6	9	80	40	0.07	Own	No	19.8691	97.0744(
66	Ku Yin	Shwe San	U Yo Shout	09-428340747	U ShiShiot	2		3	6	9	30	20	0.01	Own	No	19.8691	97.0819(
67	Ku Yin	Shwe San	U Phe Bu	09-254708530	U Nygar Re	2		2	3	5	100	18	0.04	Own	No	19.8647	97.0787:
68	Ku Yin	Kone Paw	U Pay	09-799782478	U Ni	2	2	3	4	7	215	60	0.29	Own	no	19.904	97.1326(
69	Ku Yin	Kone Paw	U Let	09-773740694	U Nyan	3	0	2	5	7	40	25	0.02	Own	No	19.9155	97.1113(
70	Ku Yin	Taung Poet Gyi	U Lour	09-456129522	U Bee	2	1	6	5	11	35	35	0.02	Own	No	19.9093	97.0668(
71	Pekhon	Nyaung Kone	U Than Oo		U Jaw Jaw	4		4	5	9			5.55	Own	Yes	19.7367	97.1038(
72	Pekhon	Nyaung Kone	Daw Soe Soe	09-428362444	U Mya Kyaw	2	0	3	5	8	692	304	4.83	Own	No	19.533	96.5970(
73	Pekhon	Nyaung Kone	U Kyaw Lwin		U Anesto	1	0	3	1	4	572	187	2.46	Own	No	19.532	96.5910(
74	Pekhon	Nyaung Kone	U Aung Ko Myint		U Anesto	1	0	2	2	4	173	152	0.60	Own	No	19.532	96.5910(
75	Pekhon	Nyaung Kone	U John Nay Aung		U Anesto	1	1	2	2	4	196	163	0.73	Own	No	19.532	96.5910(
76	Pekhon	Nyaung Kone	Mg Dray		U Hla Mg	1	0	2	2	4	293	157	1.06	Own	No	19.532	96.5910(
77	Pekhon	Nyaung Kone	Mg Chang Aung		U Khu Ba	1	0	1	1	2	308	147	1.04	Own	No	19.532	96.5910(
78	Pekhon	Nyaung Kone	Mg Silio		U Khu Ba	1	2	2	2	4	416	109	1.04	Own	No	19.533	96.5912(
79	Pekhon	Nyaung Kone	Khu Lawrance	09-259421701	U Santino	1	0	2	2	4	775	445	7.92	Own	No	19.533	96.5913(

80	Pekhon	Nyaung Kone	U Tint Lwin Oo		U Anesto	1	3	3	2	5	160	90	0.33	Own	No	19.532	96.5913(
81	Pekhon	Nyaung Kone	U Francis		U Khu Ba	1	0	3	1	4	138	110	0.35	Own	No	19.533	96.5919(
82	Pekhon	Nyaung Kone	U Ar Cha					4	1	5	240	40	0.22	Own	No	19.543	96.5828(
83	Pekhon	Zay Shayk	U Than Mg		U Yan	0	0	2	1	3	452	81	0.84	Own	No	19.535	96.5910(
84	Pekhon	Kar Thea	U Kyaw San Oo		U Nay Lin Oo	1	0	1	2	3	250	75	0.43	Own	No	19.545	96.5911(
85	Kone Hson	Pu Chei	Saya San					1		1	530	432	5.26	Own	No	19.533	96.5940(
86	Kone Hson	Pu Chei	U Joseph								523	279	3.35	Own	No	19.5347	96.5920(
87	Kone Hson	Pu Chei	U Aung Hein								213	63	0.31	Own	No	19.532	96.5920(
88	Kone Hson	Kone Hson	U Thein Mg		U Let	0	0	2	1	3	315	140	1.01	Own	No	19.879	96.9850(
89	Kone Hson	Long Kar	U Khuri Doo		U Aung Lin	1	0	4	2	6	137	209	0.66	Own	No	19.899	96.9890(
90	Nar Hee	Pon Law	U Mg Soe	09-771707566	U Lao Ngote Pein	1	-	3	2	5	300	60	0.4	Own	No	19.9574	97.0991
91	Nar Hee	Kar La (East)	U Kyaw Than	09-666514496	U Tin Mg	1	1	4	3	7	200	60	0.3	Own	No	19.0089	97.0944
92	Nar Hee	Ban Hku	U Sein	09-772235492	U See	2	1	2	4	6	60	30	0.04	Own	No	19.94450	97.0957
93	Nar Hee	Ban Hku	U Yoon	09-760175587	U Cin	2	-	3	2	5	150	22	0.1	Own	No	19.9565	97.0848
94	Nar Hee	Ban Hku	U Kham Mu	09-770571014	U Hont	1	2	3	2	5	200	30	0.1	Own	No	19.9414	97.0925
95	Nar Hee	Ban Hku	U Phor	09-774159707	U Kyar	2	1	5	3	8	15	15	0.01	Own	No	19.94870	97.0881
96	Nar Hee	Ban Hku	U Aung Mine	09-762958342	U Han	2	1	4	5	9	60	15	0.02	Own	No	19.9592	97.0879
97	Nar Hee	Ban Hku	U Pwount	09-789423511	U Oung	1	1	3	3	6	33	18	0.01	Own	No	19.9576	97.0971(
98	Nar Hee	Ban Hku	U Sai Suu	09-774162695	U Long	2	1	3	3	6	150	28.5	0.1	Own	No	19.956	97.0863
99	Nar Hee	Ban Hku	U Sai Hein	09-771734469	U Pee	1	1	2	1	3	30	15	0.01	Own	No	19.9514	97.0368(
100	Nar Hee	Ban Hku	U Sai Lu	09-774159751	U See	1	1	3	2	5	70	35	0.1	Own	No	19.9483	97.0956
101	Nar Hee	Ban Hku	U Shein		U Pwint						45	15	0.02				
102	Nar Hee	Ban Hku	Nang Ein		U Ngo						80	30	0.06				

103	Nar Hee	Ban Hku	U Hon	09-774165824	U See	2	1	2	5	7	60	20	0.03	Own	No	19.9682	97.0891
104	Nar Hee	Ban Hku	U Sai Mg	09-051152832	U Ku	2	1	1	2	3	30	30	0.02	Own	No	19.9404	97.0918
105	Nar Hee	Ban Hku	U Sai Gyi	09-787482418	U Saung	1		3	1	4	105	30	0.1	Own	No	19.9519	97.0892
106	Nar Hee	Ban Hku	Daw Yin		U Aung	1		2	2	4	30	15	0.01	Own	No	19.9679	97.0879
107	Nar Hee	Ban Hku	U Sai Lon	09-761316500	U Ang	1		3	2	5	30	15	0.01	Own	No	19.8914	97.0918
108	Nar Hee	Ban Hku	U Saung	09-788568646	U Thar	1	2	2	4	6	200	30	0.1	Own	No	19.9677	97.0937
109	Nar Hee	Ban Hku	U Sai Aye	09-794455313	U Aung	1	1	2	2	4	150	20	0.1	Own	No	19.9432	97.0951
110	Nar Hee	Ban Hku	U Sein	09-772235492	U See	2	1	2	4	6	60	30	0.04	Own	No	19.9453	97.0937
111	Nar Hee	Ban Hku	U Sai Kaw	09-777083078	U Kyi	1	1	2	3	5	40	30	0.03	Own	No	19.9592	97.0669
112	Nar Hee	Ban Hku	U Tee	09-771270718	U Nan	1	0	2	2	4	75	22	0.04	Own	No	19.9029	97.0878
113	Nar Hee	Ban Hku	U Phee	09-769531538	U Nan	2	1	3	3	6	50	30	0.03	Own	No	19.9584	97.0666
114	Nar Hee	Nant Sa Mote	U Ka Let	09-778772581	U Poe	1		1	2	3	250	80	0.5	Own	No	19.9531	97.0955
115	Nar Hee	Nant Sa Mote	U Ka Let	09-778772582	U Poe						300	100	0.7	Own	No	19.9528	97.0906
116	Loi Paw	Nang Paw Lon	U Aung Thein	9787489779	U Laysio	1	1	2	1	3	30	18	0.012	Own	No	19.9386	97.0899
117	Loi Paw	Nang Paw Lon	U Peter	9267322422	U Kyaw	2	1	7	2	9	30	15	0.010	Own	No	19.9526	97.0858
118	Loi Paw	Nang Paw Lon	U Khu Htwe		U kalite	7	0	2	11	13	70	15	0.024	Own	No	19.9521	97.0859
119	Loi Paw	Nang Paw Lon	U Maung Khin		U Moe	2	1	5	3	8	50	15	0.017	Own	No	19.9521	97.0843
120	Loi Paw	Nang Paw Lon	U Pio	9772433276	U Paw Nyut	1	1	2	1	3	100	80	0.368	Own	No	19.9494	97.0840
121	Loi Paw	Nang Paw Lon	Mario		U Nae						30	20	0.014				
		Total				**167**	**58**	**301**	**308**	**609**			**308**				

USAID
FROM THE AMERICAN PEOPLE

MARKET SYSTEMS ANALYSIS AND INTERVENTION DESIGN WORKSHOP

Small-Scale Aquaculture Investments for Livelihoods and Nutrition in Myanmar (SAIL)

Yangon 17th-20th &24th -26th February 2020

WorldFish

Asper Consulting

Schedule

Areas	Date	Time	Venue
Shan East	Monday 17th February	09:00 to 17:00	Summit Park View Hotel Yangon
	Tuesday 18th February (am)		
Shan South	Tuesday 18th February (pm)		
	Wednesday 19th February		
Sagaing	Thursday 20th February		
Magway	Monday 24th February		
Mandalay	Tuesday 25th February		
Kachin	Wednesday 26th February		

Agenda

1. Understand SAIL and SAIL's targets
2. Understand the inland fisheries market system and behavior change
3. Understand and discuss specificities of the state/region and townships
4. Present small scale aquaculture value chain analysis
5. Discuss market systems analysis and inputs from participants
6. Vision, prioritisation and root cause analysis
7. Generate ideas for addressing selected root causes
8. Design intervention and draft budget
9. Validate design
10. Agree road map

Objective of SAIL

Provide a means of ensuring the improved availability of diverse, safe, affordable nutrient-rich foods, especially for women and young children from poor and vulnerable households

SAIL's main outputs

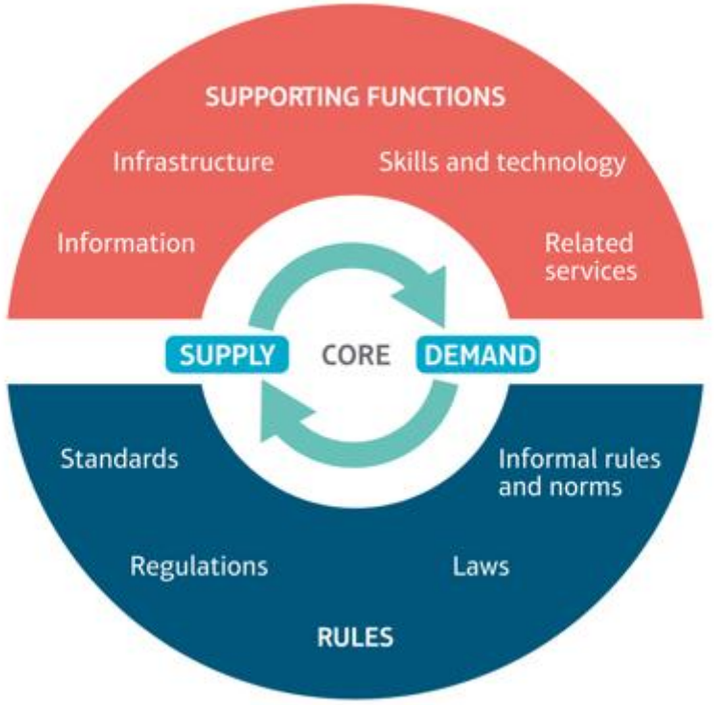
- Small-scale aquaculture production increased through strategic activities including improved land and water use, increased access to high quality inputs (feed, seed and equipment), capacity development and research into production, and access to credit.
- Market-based system approaches (MSA) further developed and utilized to increase access to food safe fish and fish products by poor people. Capacity building will ensure that market systems function more effectively, sustainably and to the benefit of the poor.
- Enhanced nutrition and WASH practices delivered via social behaviour change communication (SBCC). Capacities developed into the production, processing and consumption of food safe aquaculture and other fish-based products.

MARKET SYSTEM

Definition

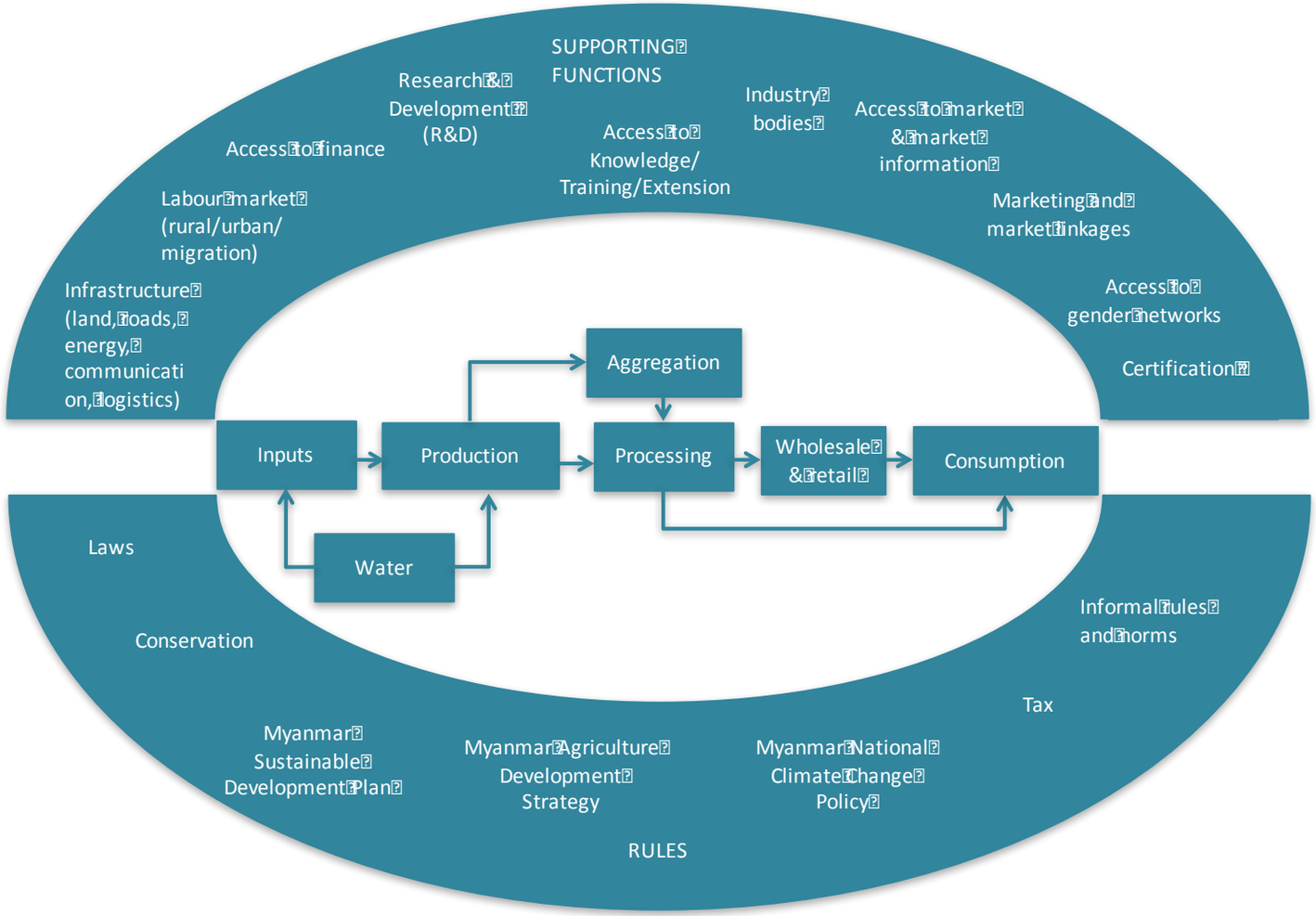
- **Market systems approaches address the underlying causes of poor performance in specific markets that matter to people living in poverty, in order to create lasting changes that have a large-scale impact.**

The market system 'doughnut'

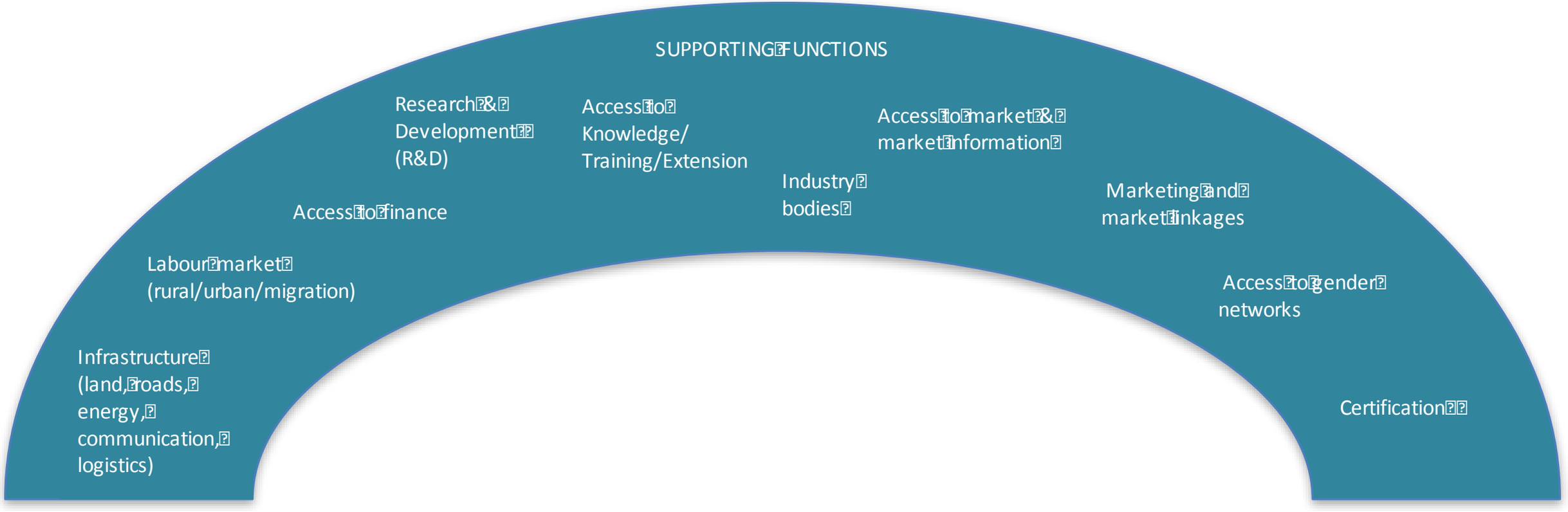


Source: M4P Operational Guide (2015)

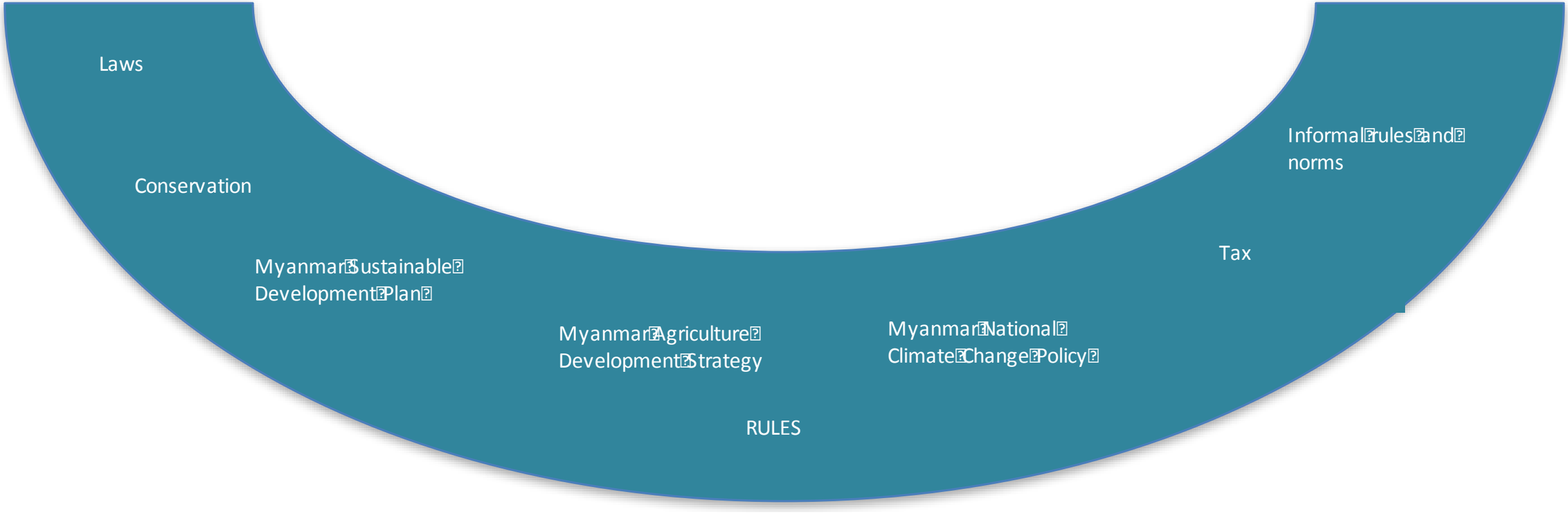
Inland fisheries market system



Supporting functions



Rules


Laws
Conservation
Myanmar Sustainable Development Plan
Myanmar Agriculture Development Strategy
Myanmar National Climate Change Policy
Tax
Informal rules and norms
RULES

System change

System change is when something becomes the 'new normal'. It **requires both adoption in sheer numbers** (horizontal scaling) and **institutionalization** at different levels (vertical scaling).

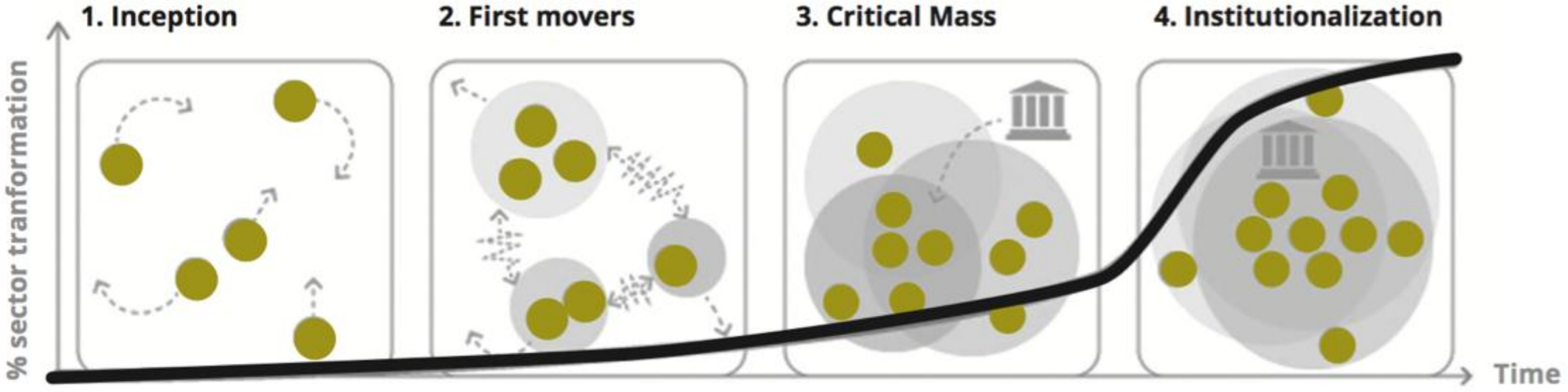
Vertical and horizontal scaling

The relation of number of people reached and system levels

Source: PPPLab Explorations 04

Sector Transformation

Four stages of sector transformation (Simons 2014 and NewForesight 2016).



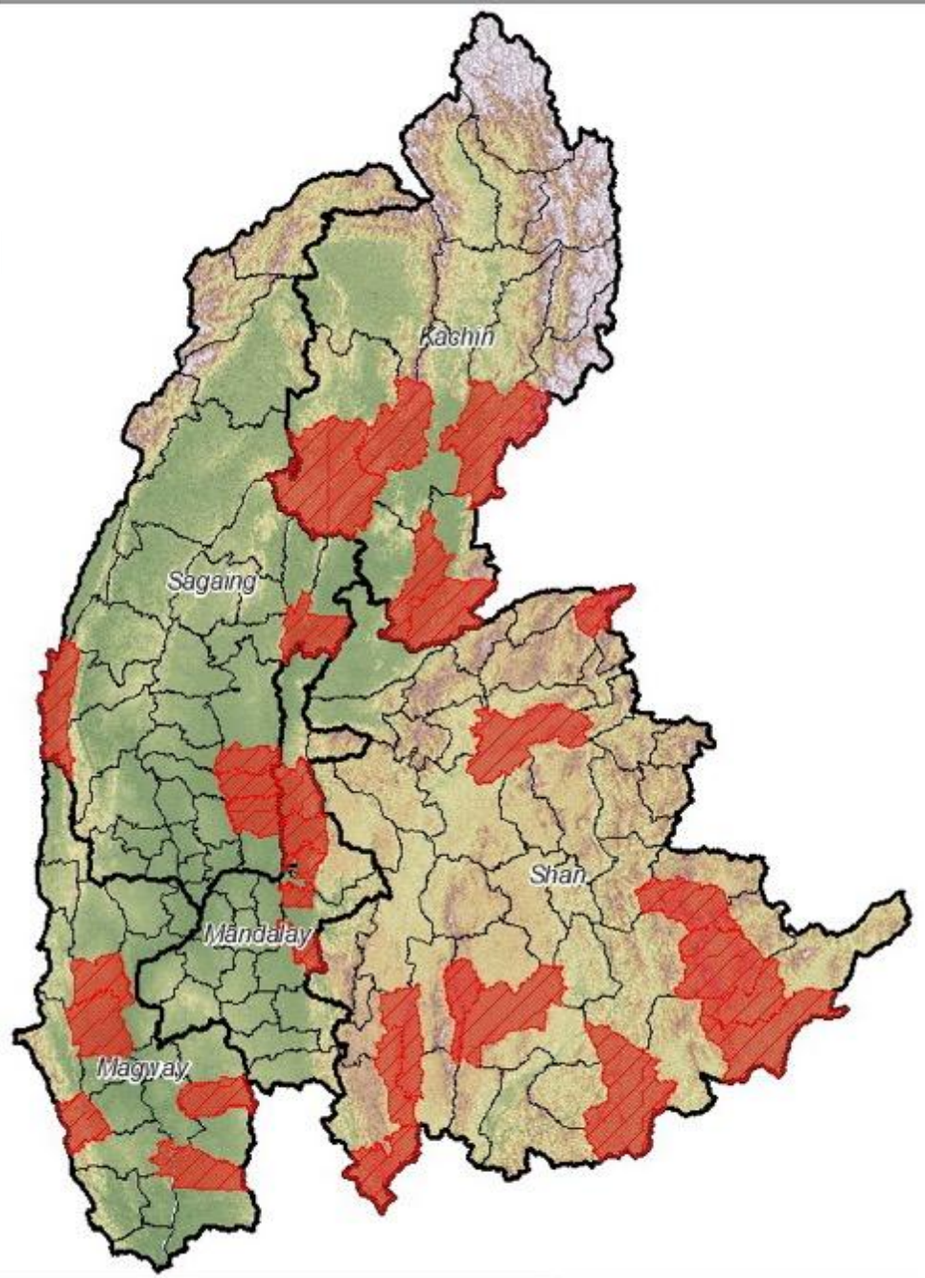
Source: PPPLab Explorations 04

INTERVENTION AREA

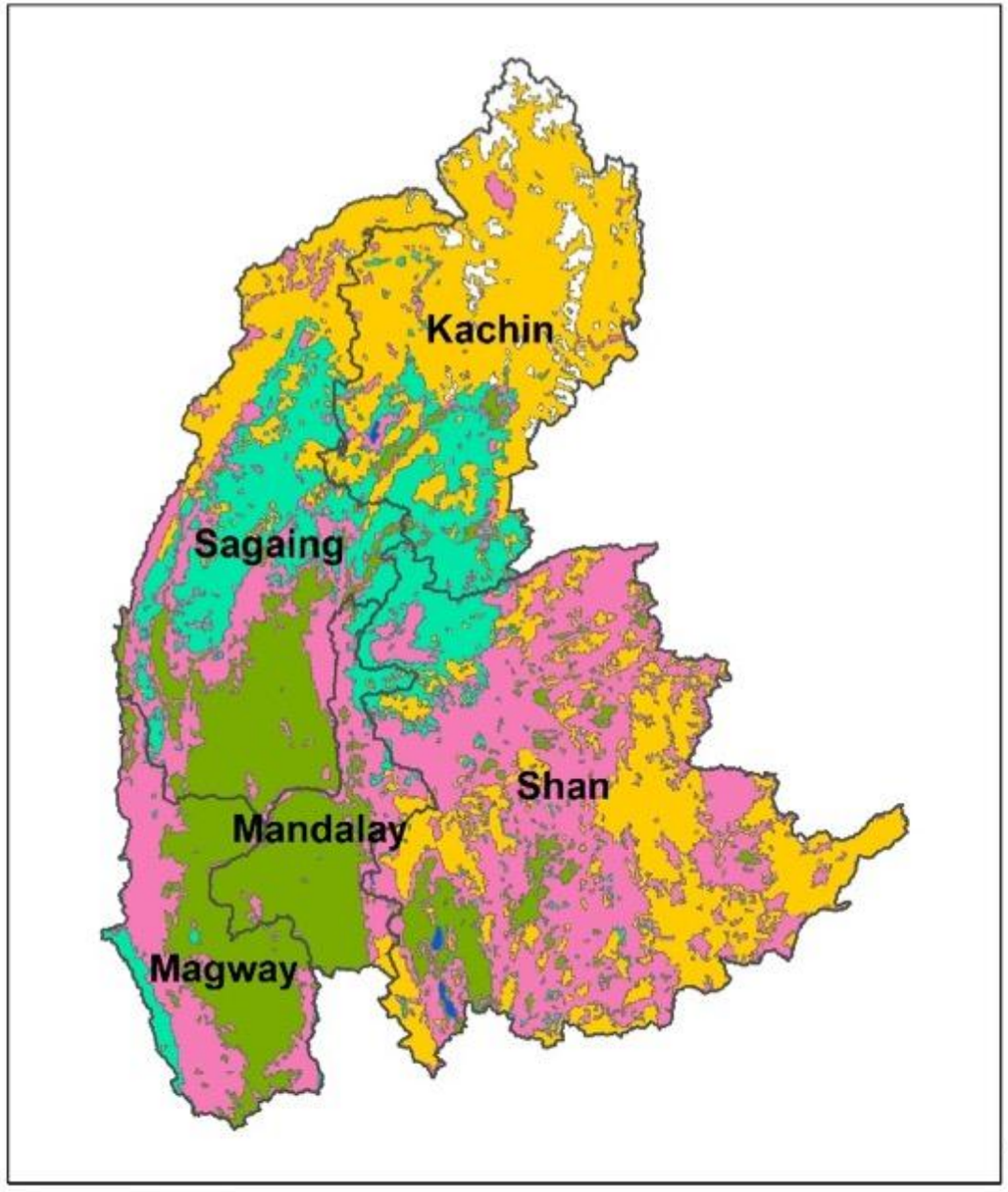
Intervention areas

Areas	Mandalay	Kachin	Shan East	Shan South	Magway	Sagaing
Townships	Madaya	Mohnyin	Monghpyak	Nyaungshwe	Ngape	Shwebo
	Sintgaing	Mogaung	Kengtung	Pekon	Myothit	Khin-U
	Patheingyi	Waingmaw	Mongkhet	Nansang	Salin	Wetlet
	Myittha	Bhamo	Tachileik	Taunggyi	Seikphyu	Tigyaing
	Singu	Mansi	Mongton	Loilen	Sinbaungwe	Kale
		Mitkyina		Pinlaung		

Source: WorldFish 2020



Land cover



Land_cover

Type of Land

- Agriculture
- Deciduous Forest
- Dry Mixed Deciduous Forest
- Evergreen Forest
- Forest
- Moist Mixed Deciduous Forest
- Scrubland
- Waterbody

N

0 55 110 220 330 440 Kilometers

Source: SOBA

Summary information by State/Region

State	Area (km^2)	Mean annual precipitation (mm)	Mean annual potential evapotranspiration (mm)	Percentage of houses with good source of water (piped, artesian well, covered well) (Maung, 2017)	Irrigation-Beneficial Area (FAO, 2011)+
Mandalay	38,987	759	1,655	87.3	135,392
Magway	45,927	866	1,644	66.6	118,712
Sagaing	96,172	1,528	1,505	74.9	149,714
Kachin	89,906	1,853	1,301	65.7	40
Shan (N &E)	62,394	1,182	1,480	50.9	44,858

SHAN EAST

Selected townships

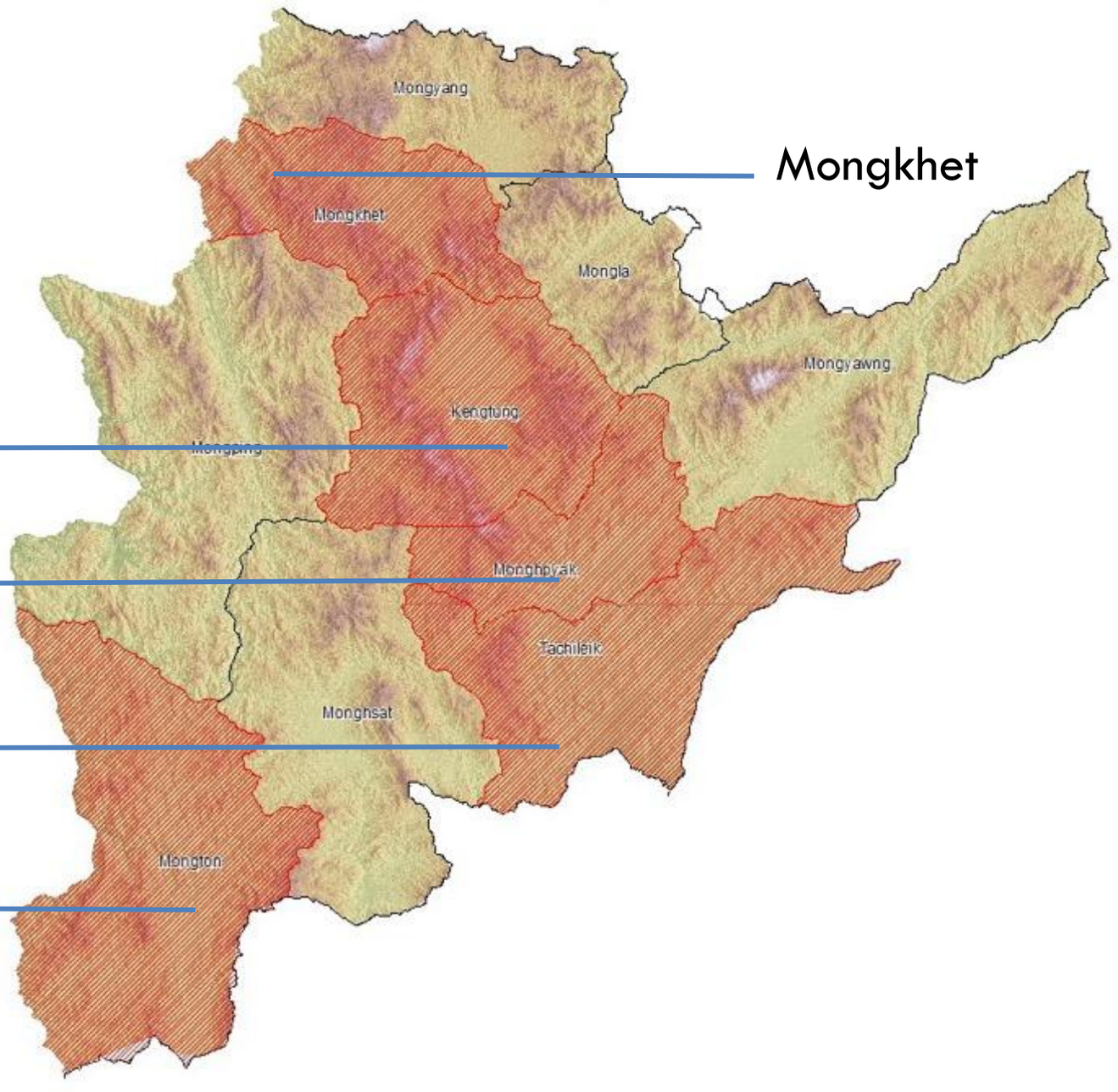
Mongkhet

Kengtung

Monghpyak

Tachileik

Mongton



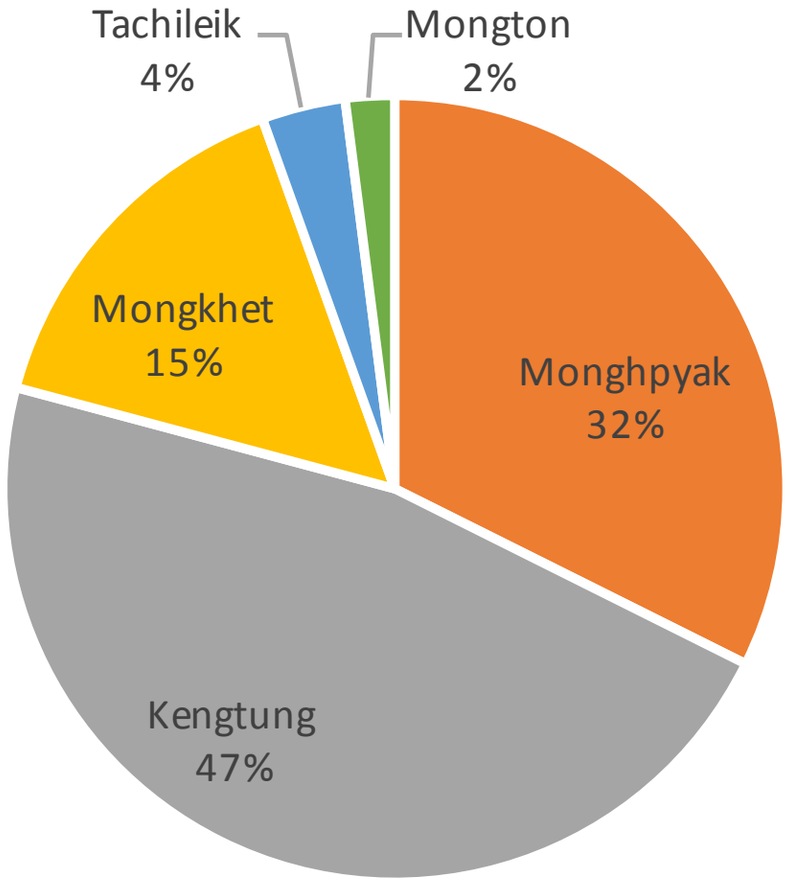
Socio–eco data – selected townships

Shan East	Aea (km2)	Households (number)	Population Density (hab/km2)	Per capita income (kyatt)	Under 5 under weight (%)	Population without sanitation (% households)
Monghpyak	3,503.30	34,096.00	39.07	982,176.00	0.01	27.90
Kengtung	4,594.20	17,196.00	14.16	789,645.00	1.60	39.50
Mongkhet	3,917.40	37,673.00	36.96	1,012,302.00	1.60	9.60
Tachileik	2,051.80	6,165.00	11.26	1,132,263.00	0.16	34.90
Mongton	2,719.80	19,404.00	31.08	893,700.00	0.47	57.10
Total	16,786.50	114,534.00	132.53	4,810,086.00	-	-

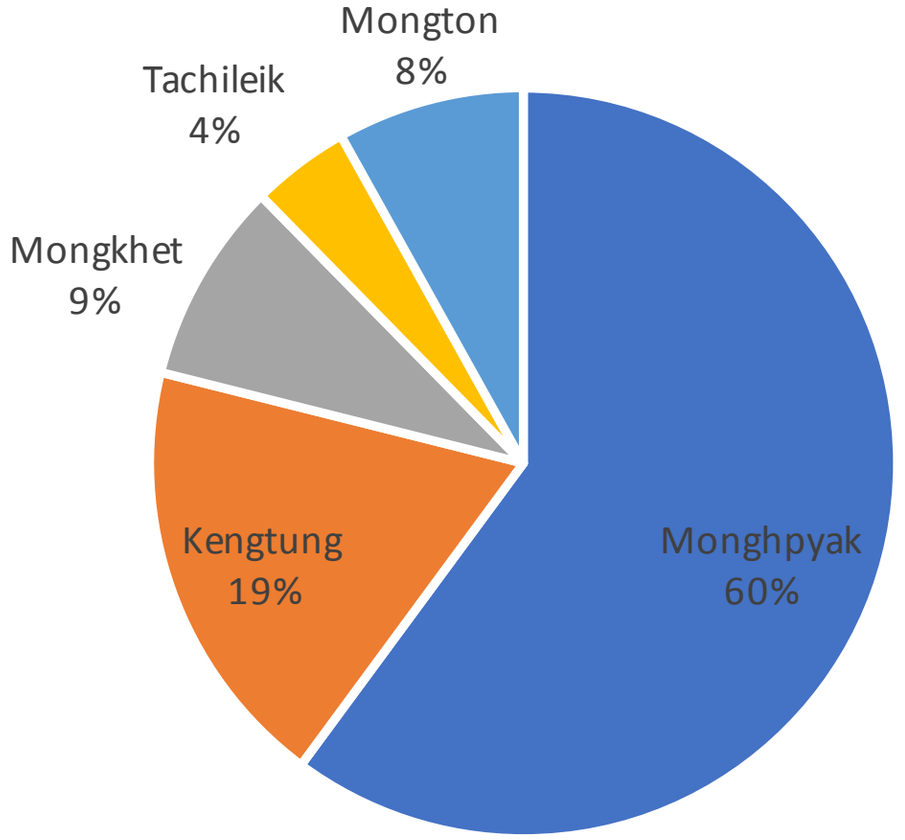
Aquaculture data – selected townships

Shan East	Licensed pond (number)	Pond area (acres)	Pond production (viss)	Average production (viss/acre)	Average pond production (kg/acre)
Monghpyak	318.00	670.80	1,184,300.00	1,765.50	2,824.81
Kengtung	460.00	508.80	369,470.00	726.16	1,161.86
Mongkhet	151.00	154.00	171,929.00	1,116.42	1,786.28
Tachileik	34.00	21.70	83,610.00	3,853.00	6,164.79
Mongton	20.00	8.00	160,000.00	20,000.00	32,000.00
Total	983.00	1,363.30	1,969,309.00	-	-

Distribution of ponds - selected townships



Distribution of production - selected townships



AQUACULTURE VALUE CHAIN ANALYSIS

KENGTUNG TOWNSHIP

Research Team:

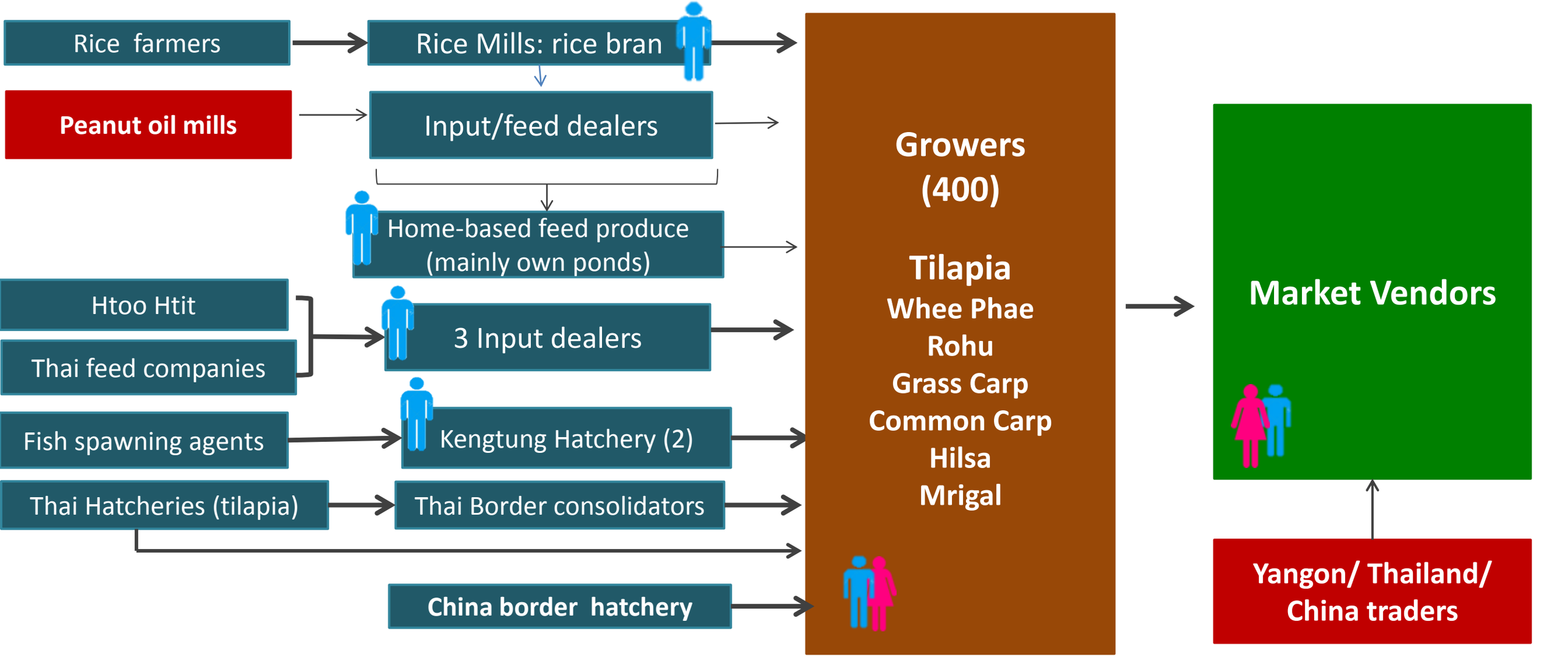
Marian Boquiren
Momo Aung

MOST DEMANDED SPECIES IN LOCAL MARKET

Species		Source
Tilapia	Most saleable	Kengtung; iced tilapia from Thailand
Mrigal		Kengtung
Hilsa		Kengtung Yangon
Catfish		Mainly Thailand/China
Common carp		Kengtung
Pangasius		Mainly Thailand

Average daily volume sold per vendor: 60 viss

VALUE CHAIN MAP



HATCHERIES IN KENGTUNG

- **Existing hatcheries - combined capacity of 700,000 fries/fingerlings Current seed requirements: 1,200,000 fries/fingerlings (source: DOF)**

- **Top species: rohu, common carp, grass carp, hilsa, and local tilapia. Also produces mrigal but as per one hatchery, spawning is oftentimes difficult – as such, higher price**

- **Supplies growers in Kengtung, Mong Phayk, and neighboring townships especially for rohu and common carp.**

Circular Tank for spawning

Operates only during the rainy season

Workers: household members – 5 male

Skills handed from one generation to another/ On-the-job learning

HATCHERIES IN KENGTUNG

Risk of in-breeding
Limited number of species

Water access constraint; crop farmers prioritized → Dependence on rainfall →
Hampers operations and timely supply of fries
Water quality problems/ no testing instrument

Broodstock from grow-out ponds → Injection of spawning agent (LHRH) → Spawning in circular tank → Eggs transferred to hapa

Practices generally not aligned to GAqP

Hatchlings transferred to hapa/ fed with egg yolk (3 to 4 days) → Nursery ponds (1 month to 45 days – 1 inch; ground pellets/ rice bran) → Grow-out pond

Most saleable size: 1 inch

Price per piece

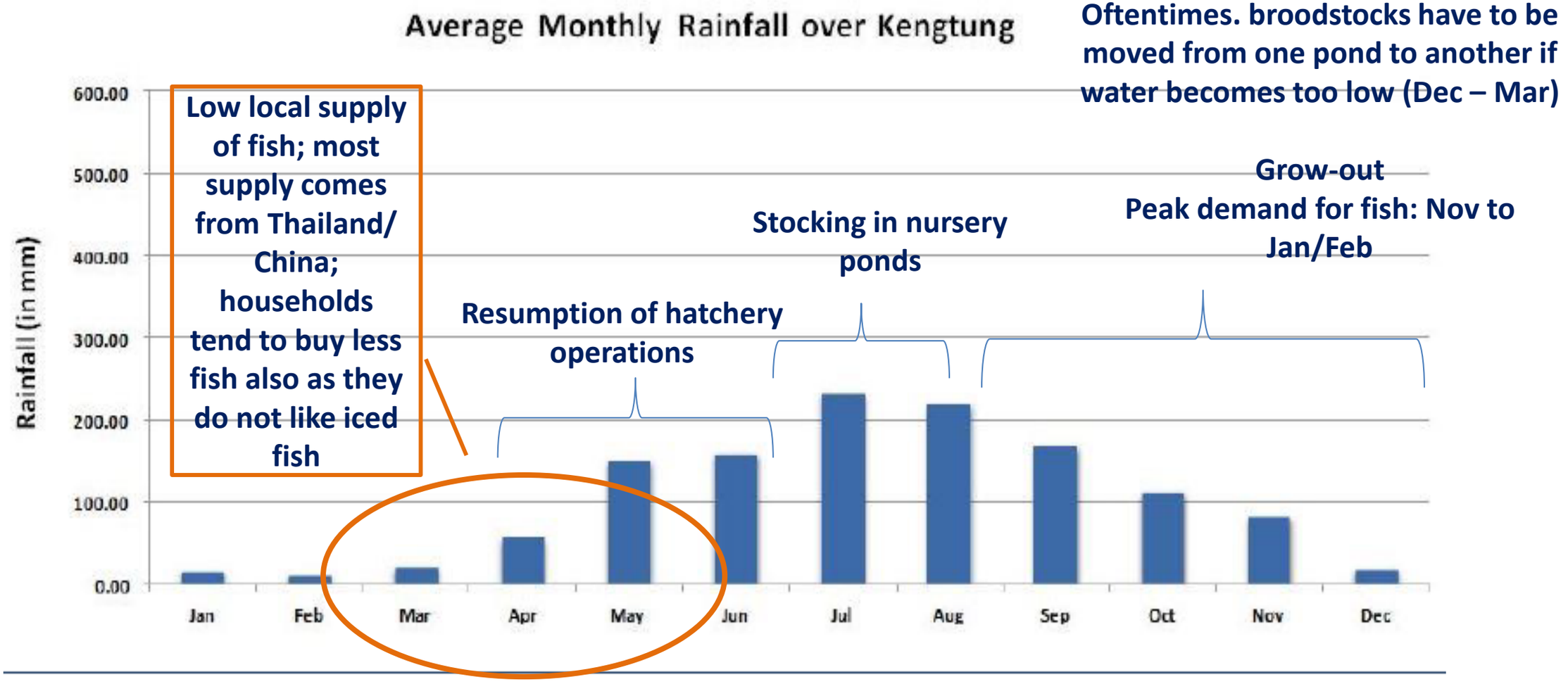
Hilsa: 20 kyats/inch; Rohu: 25 kyats/inch;
Mrigal: 30 kyats/inch

Terms of sale

Upfront cash payment
Packed in oxygenated bags
No mortality allowance
Spot transactions; no advisory support

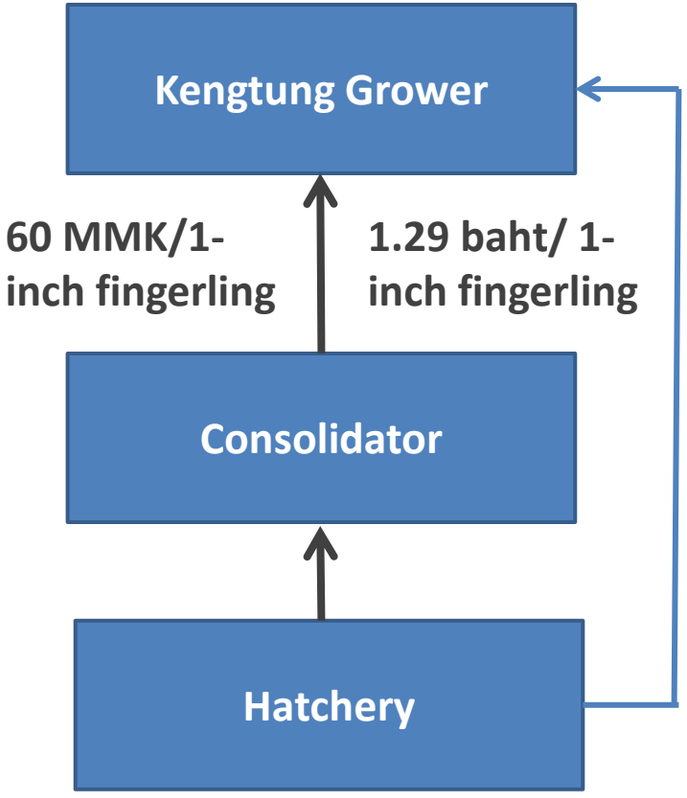
Estimated 10% to 20% profit; no records and monitoring on production and survival rate as well as expenses

RAINFALL AND AQUACULTURE OPERATIONS



Source of rainfall data: Myanmar Environmental Institute, Kengtung Environmental Assessment, 2017; Climate Profile, BRACED Project

HATCHERIES IN THAI/CHINA BORDER



Farm gate price (Nam Sai): 0.45 baht for 0.25 g (about 1 inch) monosex fingerling

Rice bran size: 0.50 baht

Sunflower seed size: 1 baht

Spot transactions
No advisory support

Individual purchases; spends about 3,000 to 4,000 baht for accommodation and transportation

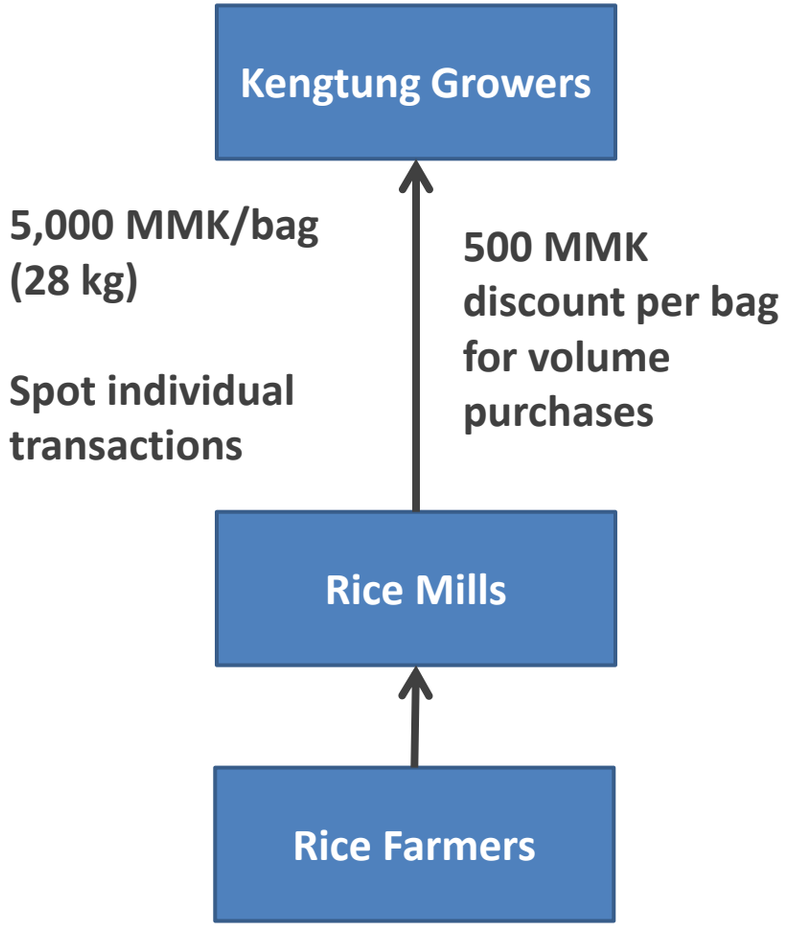
- Preferred source of Tilapia monosex fingerlings; local tilapia are small – average 300 grams (one year culture) vs half viss (6 to 7 months) for Thai fingerlings
- No mortality allowance --- growers though said that mortality during transport is generally low
- 1,000 fingerlings per bag; fish are starved to keep water clean and prevent ammonia build-up
- Available year round ; low supply from May to July and Dec to Feb

FEEDS: RICE BRAN

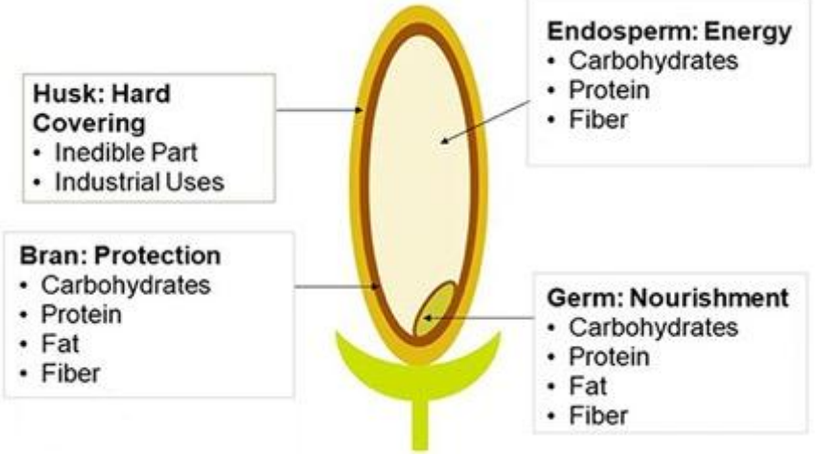
Rice bran from small milling facilities are generally coarser than those produced by big mills

Most preferred feed among farmers; cheapest and accessible; available throughout the year

Available and currently used by farmers: bran from white rice



- Rice bran is a mixture of protein, fat, ash, and crude fiber. Rice bran's composition is largely dependent on the type of rice and the efficiency of the milling system.
- Pigmented bran has more nutritional value than white bran because it possesses more bioactive compounds (Foo and Hameed, 2009; Friedman, 2013).



FEEDS: PEANUT CAKE

- High protein content, low fiber, high oil (for expeller meal)
- Vulnerable to aflatoxin contamination
- Not readily available in Kengtung; insufficient domestic supply --- fresh peanuts sold to China; decline in peanut oil (and other vegetable oil) price due to abundant supply of palm oil

Studies suggest that peanut meal is acceptable in fish diets but only in limited amounts, usually less than 15% of the diet in herbivorous and omnivorous fish, and less than 10% for carnivorous fish. Amino acid supplementation (lysine, threonine and methionine) may be necessary. (https://www.feedipedia.org/node/699)

FEEDS: OWN PRODUCTION (MYSAP)

- Mainly produced for own ponds; individual production; **cost efficiency and productivity/FCR have yet to be fully demonstrated**
- Raw materials easy to source except for peanut cake

Feed	Cost (in MMK)	
	Per kg	Per Viss
Htoo Thit	781.25	1,273.44
Thai Feeds	1,500.00	2,445.00
Own Production	**920.25**	**1,500.00**

Weak economies of scale: raw material procurement and production

FEEDS: PELLET FEEDS

- **Feeds available in local retail shops: Thai brands, De Heus, Htoo Htit.**
- **Thai feeds: generally used for juvenile fishes; feeds for different growth stages available; generally more expensive than Htoo Thit**
- **Traditional home-mixed feed is typically produced with 19-20 percent protein, commercial feed mills produce sinking feed and floating pellets with 20-28 percent protein for carp and 35-39 % protein for snakehead and catfish.** (USDA GAIN: Myanmar Feed Industry Update 2018)

Htoo Thit: most popular among growers for grow-out stage; when used in juvenile, pellets are crushed or ground

FEEDS: PELLET FEEDS

Biggest input retailer in Kengtung

Feed mill → Input Retailer → Kengtung Growers

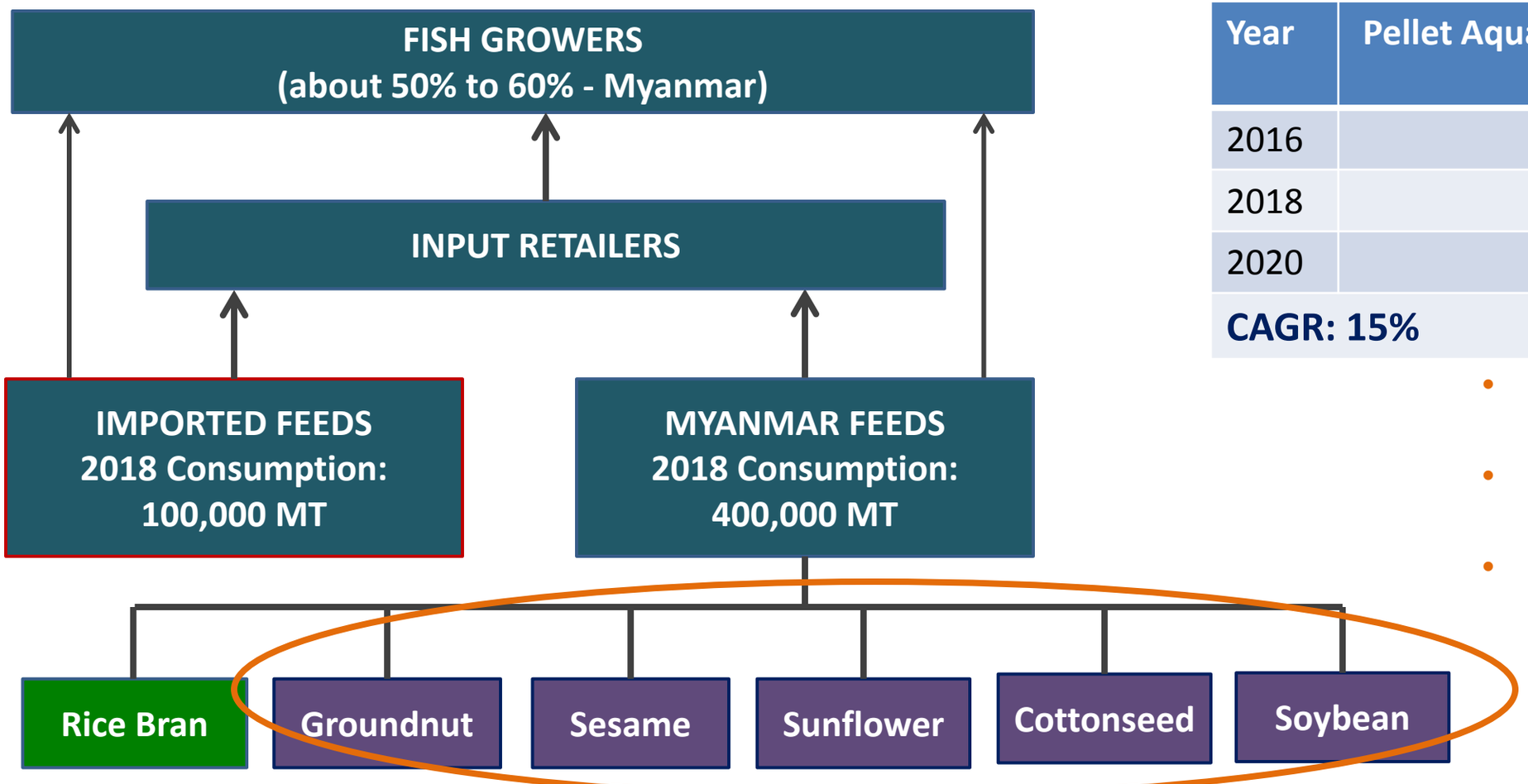
Semblance of long-term relationship
No advisory support

Spot transactions
No advisory support

In other key aquaculture producing states, Htoo Htit provides extension services to clients. Likewise, credit is provided under buy back scheme.

- **Use of pellet feeds among Kengtung growers increasing**
- **Non-users – limited appreciation of benefits – no active campaign in the area from feed companies ; risk aversion to invest; limited capacity to pay upfront**

OVERVIEW OF PELLET FEEDS SUPPLY CHAIN IN MYANMAR



Local production + imports; increasing import trends

Year	Pellet Aqua Feed Estimated Demand (in million MT)
2016	0.4
2018	0.5
2020	0.7
CAGR: 15%	

- Tight supply of raw materials/rising prices
- Inconsistent quality of raw materials
- Limited research on alternative ingredients including nutrient content and nutritional value and net environmental impact
- Domestic self-sufficiency vs. Export revenue

GROW-OUT PONDS

One stocking per year due to water constraint – quality and availability

Partial harvesting starting 5 to 6 months of stocking

Farms generally consist of both nursery and grow-out ponds

Majority practice polyculture

- Choice of species to grow is primarily driven by consumer demand and smoothing of cash flow/profit maximization (3 to 4 species of different culture periods; 5 to 6 months for common carps to 20 months for rohu)
- In polyculture ponds, tilapia comprise 50% to 60% of fish stocked followed by common carp. Rohu comprised about 5%.
- Mortality rate from nursery until harvesting: 20% to 40% --- but farmers are generally not monitoring or conscious unless they experience massive fish kill which are readily visible
- Generally use a mix of feeds: pellets, rice bran, and peanut cake. Main motivation: fish should be of marketable size before dry season --- only rohu remains.
- Yield per acre: 2 to 2.2 MT; 3 to 5 pieces per viss
  Gross profit margin: 35% to 50%

GROW-OUT PONDS

Limited technical skills➔ nutritional degradation, food safety hazards and risks, suboptimal production

- Feed management/aquaculture practices acquired from experience and/or passed on by parents. Majority have not attended training or extension services on aquaculture.
- Labour provided mainly by husband and wife. Farms that hire at least 1 fulltime laborer (wife also helps but husband is the "recognized" employee) are those also engaged in livestock raising and agricultural crops. Average salary – 150,000 MMK + housing.
- Harvesting is done by vendors who bring their own nets and harvesters. 300 MMK /viss deducted from farm gate price. Selection of size and species also made by vendors.
- Used own money to establish farms and operation costs. In case of emergency, prefer to borrow from friends and relatives. General risk aversion to borrow from formal institutions; collateral constraint (absence of land use certificates/title)

VENDORS

Vendors no storage of unsold fish/ Lack of facilities in the market to facilitate safe fish handling

Fish storage after harvest

Fish on display: usually still "breathing"

All parts of the fish are utilized and sold

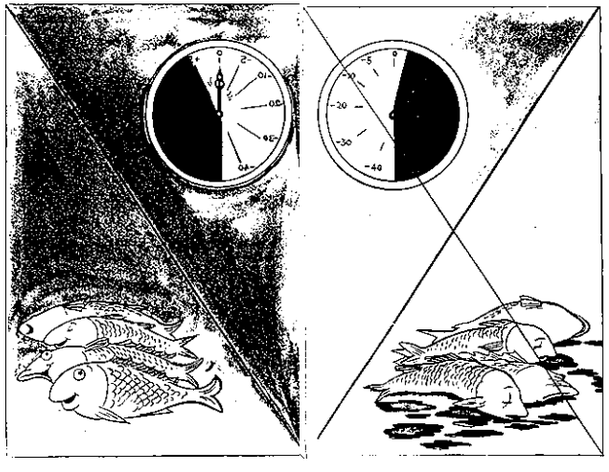
Fish on ice: not fresh and does not taste good

Fresh fish – still breathing

Concept of fresh fish among consumers ➔ reinforced non-use of ice among consumers

Preferred size of fish: medium to large ➔ small fish from the wild generally expensive due to limited supply; maximization – "value for money"

Vendors' support and consumer awareness will be crucial in pushing adoption of mola culture among farmers --- lack of knowledge on nutrition profile of fishes



Food safety/ routes of contamination and quality deterioration including shelf life not well understood by all players

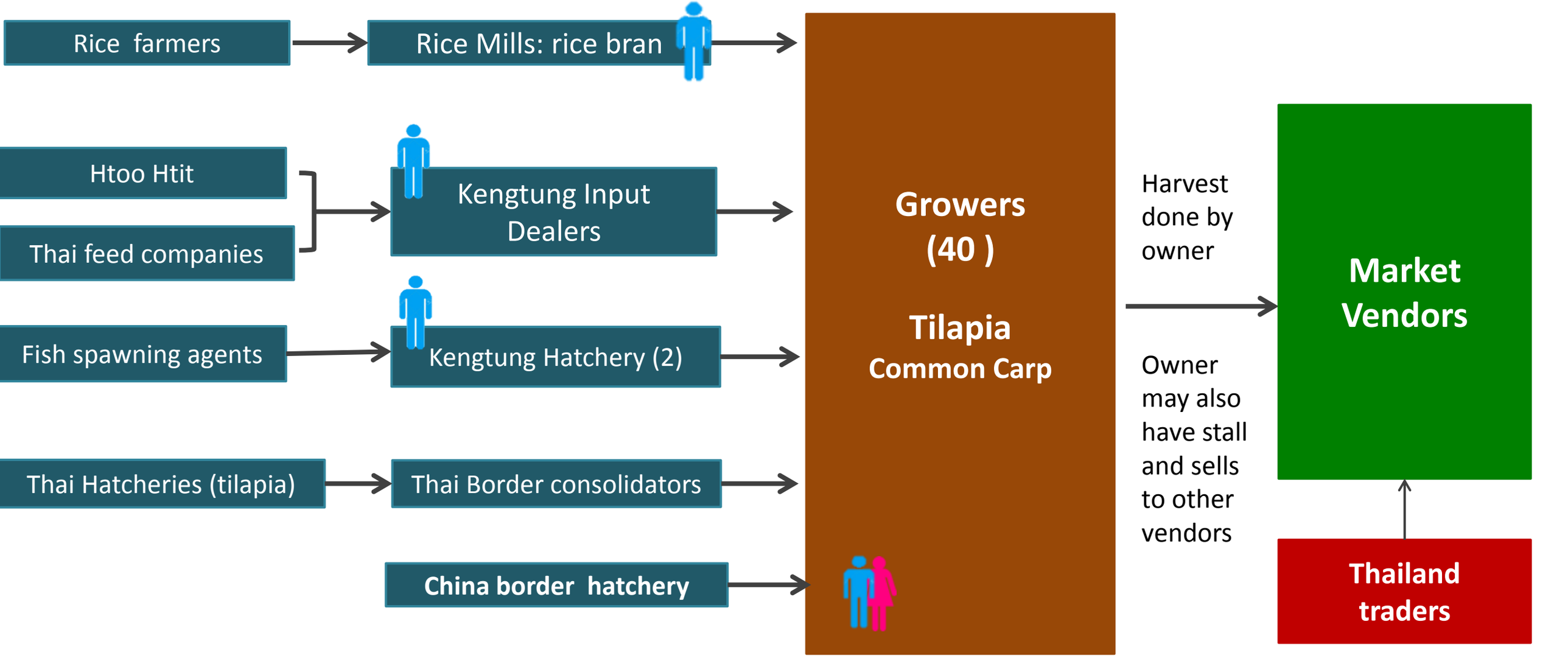
Only 2 ice plants in Shan

MONGPHYAK TOWNSHIP

Research Team:

Marian Boquiren
Momo Aung

VALUE CHAIN MAP



GROW-OUT PONDS

Generally have access to water throughout the year --- from streams

Can stock tilapia twice per year
- 1st stocking: May
- 2nd stocking: Oct/Nov

About 95% mortality most likely due to use of chemical cleaning agent in pig pens; pond is also located in a residential zone – limited knowhow on GAqP

Pellets and rice bran: tilapia – 5 months culture period; common carp – 1 year culture period

Rice bran and broken rice + some natural food: 18 months culture period --- low stocking density

Availability of fry supply (Kengtung); very late

COMMON ELEMENTS

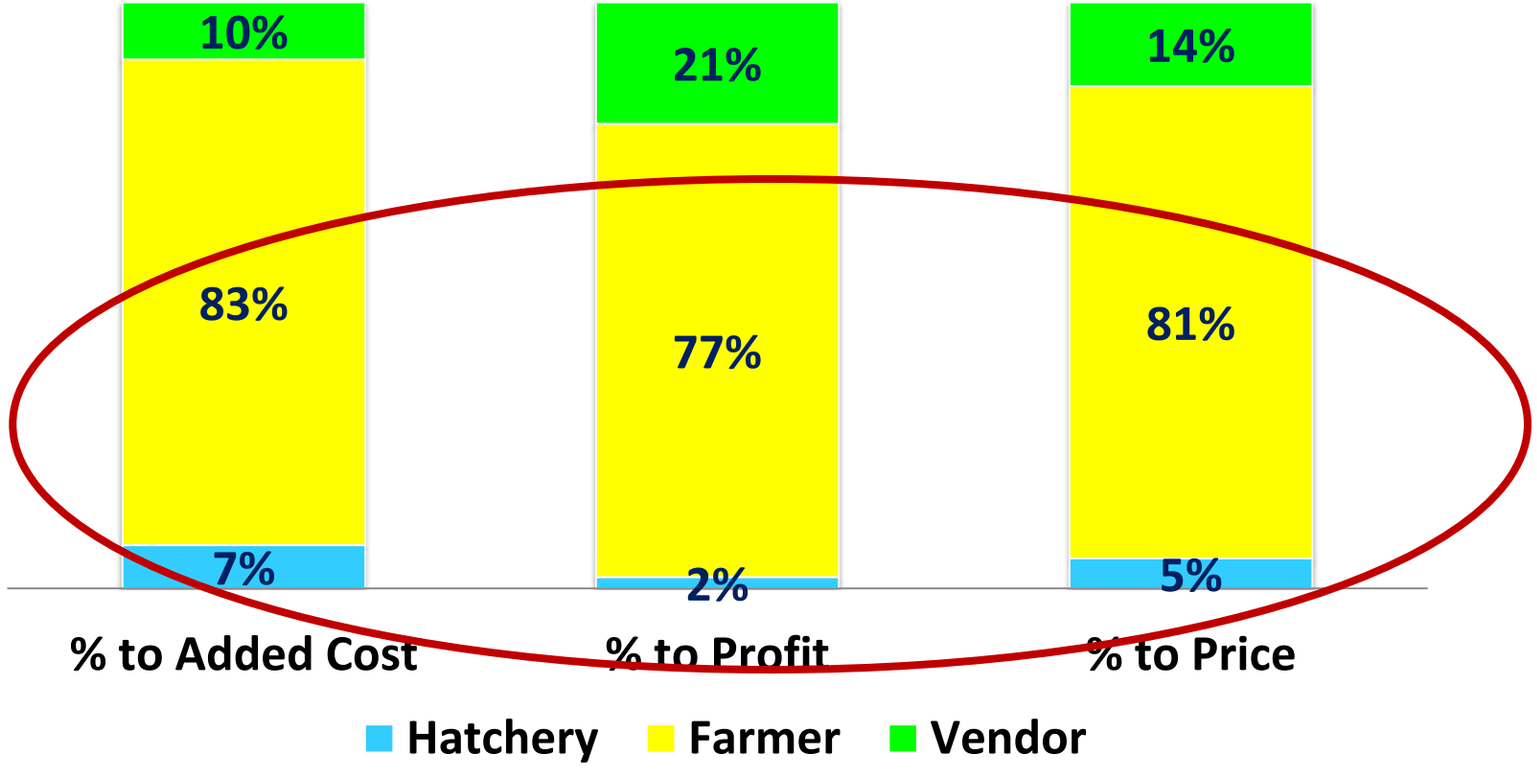
Research Team:

Marian Boquiren
Momo Aung

SUPPORT MARKETS

- **Except for MYSAP target group, majority of players have not received extension services including embedded services from input suppliers such as feed companies.**
- **Players relied on their experience and peer-to-peer advice - copycats/"me too" --- but proof of concept/tangible benefits important in diffusion of new practices and technologies.**
- **DOF: resource constraints; able to provide training/extension services through development programs**
- **Majority did not access financial services ← risk aversion, financial institutions required license and/or land use certificates as collateral**

INDICATIVE DISTRIBUTION OF COSTS AND BENEFITS



Percentage share to profit < Percentage share to added cost

- **Inefficiencies**
- **Suboptimal production rooted to farming practices**
- **Farmers – generally price takers --- absence of collective initiatives to promote economies of scale, lower transaction cost, and improve bargaining power.**

NUTRITIVE QUALITY OF FISH FARMED

Fish Species	Vitamin A (RAE/100 g)	Calcium (mg/100 g)	Iron (mg/ 100 g)	Zinc (mg/100 g)
Mola	2680	776	5.7	3.2
Silver carp	< 30	36	4.4	1.4
Tilapia	< 30	95	1.1	1.2

Source: Based on testing of Bangladesh species; Maximizing the Contribution of Fish to Human Nutrition, FAO and WorldFish

Fishes currently farmed are at the lower nutritive value.

↑

Limited incentives/Stifles diversification in both production and consumption

↑

Nutritive value not a significant factor in purchasing criteria.

↑

Limited information/awareness on nutritive value of fish species

NUTRITIVE QUALITY OF FISH FARMED

The proximate composition and fatty acid composition of fish species may be influenced by age, season, different environmental factors, culture systems and diet.

Culture Condition of Carp	Percentage		
	Protein Content	Fat Content	Saturated Fatty Acid
Polyculture – natural food	16.21	2.42	27.15
Monoculture – natural food	15.40	2.07	28.82
Supplementary feeds (corn – 80%; wheat – 20%)	15.59	6.85	24.19
Feed mixtures in earthen pond	17.10	3.19	22.40

Source: D Ljubojevi et al 2017 IOP Conf. Ser.: Earth Environ. Sci. 85 012013

Upgrading and alignment of farming practices and feed management can potentially contribute to maximizing contribution of farmed fish to human nutrition and incomes.

SHAN SOUTH

Selected townships

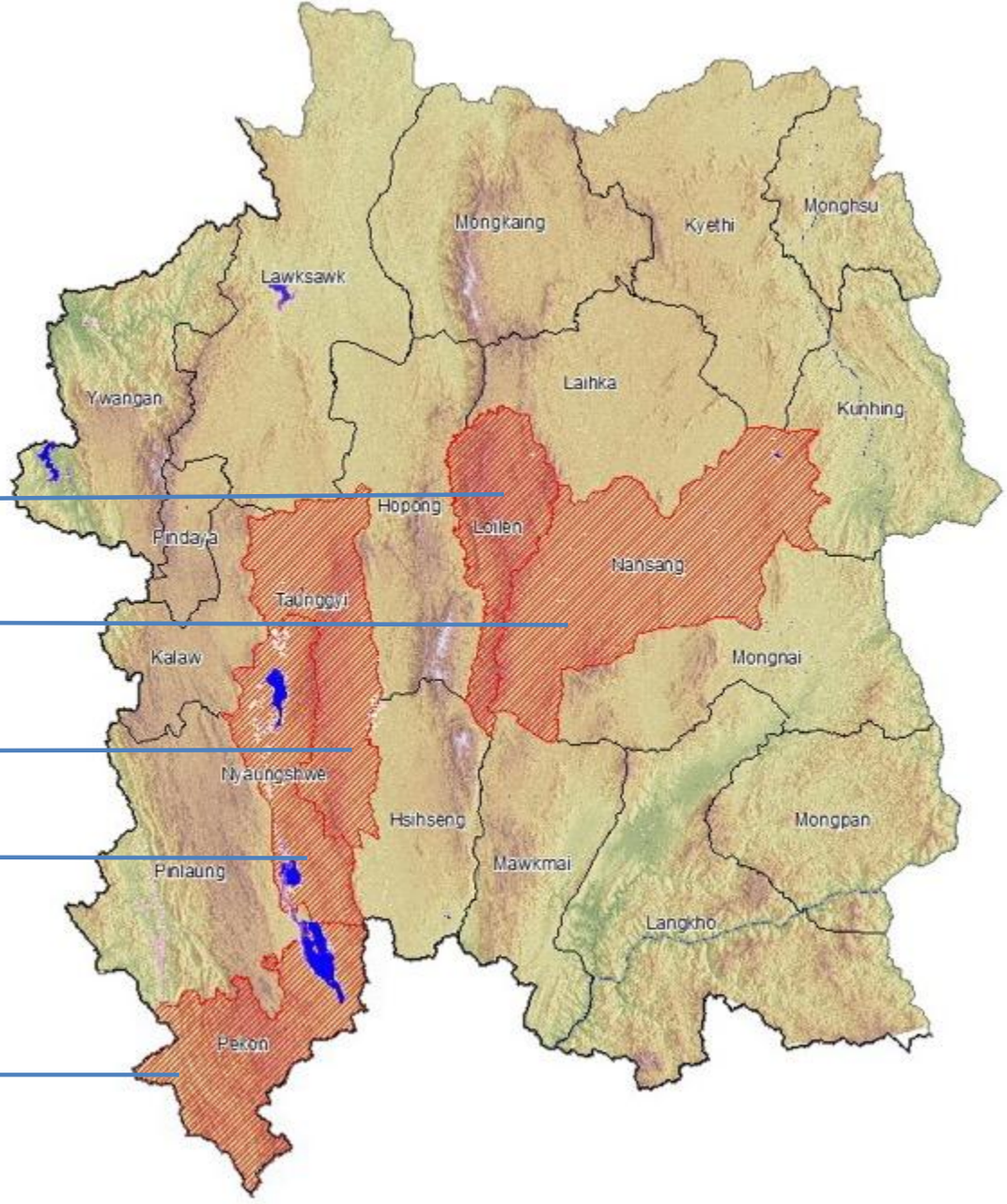
Loilen

Nasang

Taunggyi

Nyaungshwe

Pekon



Socio-eco-aqua data – Shan South

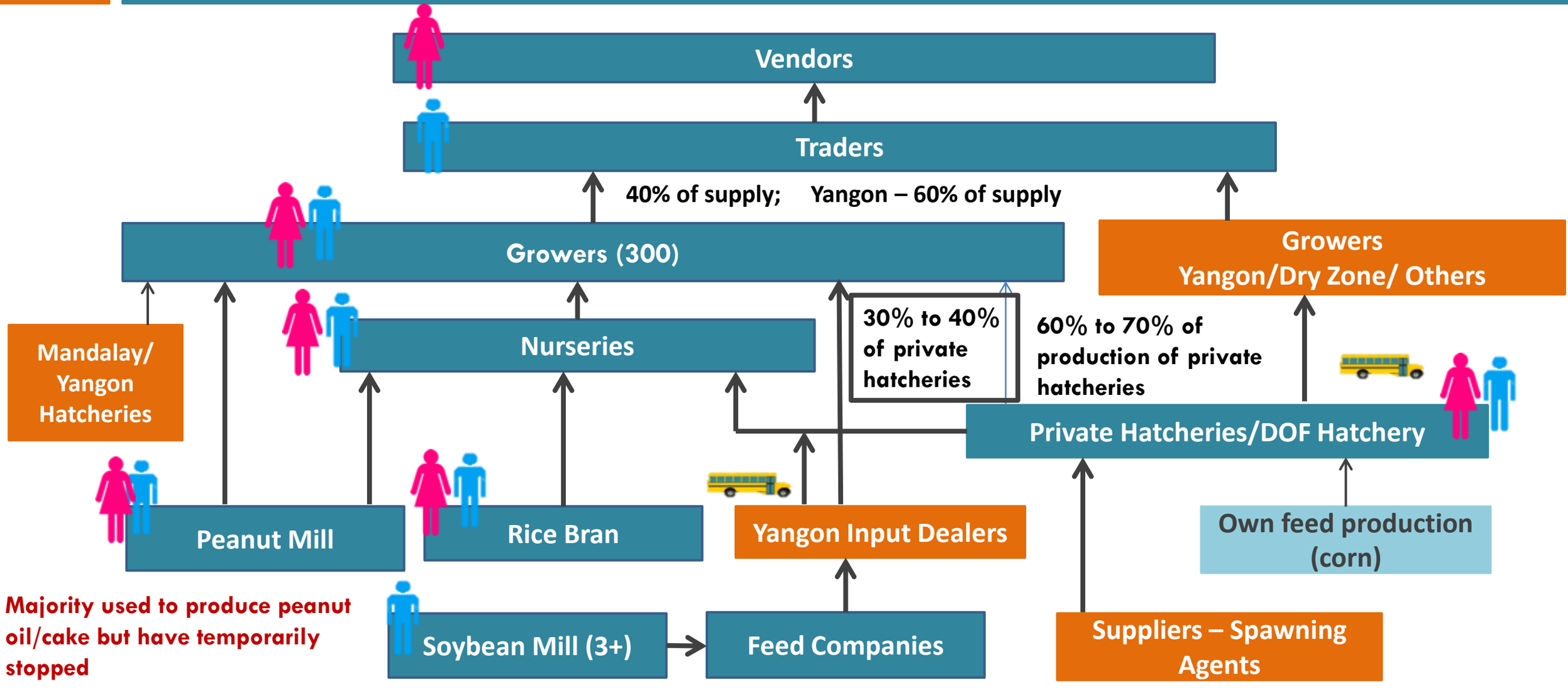
	Aea (Km2)	Households (Number)	Population Density (hab/Km2)	Per capita income (Kyatt)	Under 5 under weight (%)	Population without sanitation (% Households)	Agricultural land (% total)	Licensed pond (number)	Pond area (acres)	Pond production (viss)
Nyaungshwe	1,477.40	42,634.00	105.55	658,748.00	3.30	39.80	61.50	109.00	1,053.30	1,459,610.00
Pekon	2,073.50	20,084.00	37.10	526,091.00	3.40	13.10	26.60	73.00	73.10	624,040.00
Nansang	3,670.30	23,227.00	26.75	835,494.00	2.60	36.60	44.80	39.00	59.40	23,200.00
Taunggyi	2,007.00	94,869.00	180.08	1,130,469.00	0.86	9.10	78.50	69.00	78.40	19,604.00
Loilen	1,323.20	25,417.00	30.83	711,882.00	0.96	51.80	31.60	23.00	33.60	21,220.00

NYAUNGSHWE TOWNSHIP

Research Team:

Marian Boquiren
Than Than Swe
Kyaw Win Khaing

VALUE CHAIN MAP



FEEDS

PEANUT CAKE

Inconsistent quality/moisture content of peanuts
Tight supply of peanuts; competition – China export

1,500 MMK/Viss
27,500 viss annual production;
45% fish farmers

SOYBEAN OIL/ CAKE

Htoo Htit: oil and cake
Cake: JAPFA Indonesia, CP
Shan State: about 50% of soybean production
Insufficient supply

FEEDS

RICE BRAN
4,000 MMK/bag (25 viss)
Supply available throughout the year
Fish farmers buy directly from mills
Fine bran – lower supply and available nearer to Taunggyi; more expensive but better FCR

CORN
For own ponds/nursery

PELLETS

No supplier in township
Buys from Yangon --- delivered via bus
--- 1,000 MMK transport cost per bag

Current demand low to warrant establishment within the township

DOF HATCHERY

Grass carp
Common carp
Rohu
Silver barb
Cyprinus intha
Catla

DOF HATCHERY

2018 Production: 4 to 5 million pieces
Re-stocking: 50% to 60%
Yangon, Dry Zone, others: 20% to 40%
Within Shan: 10% to 20%

Highest demand for grass carp; low demand for rohu
Most saleable size: 1 inch
Mortality allowance: fries – 10%; fingerlings – 5%

Supply < demand

- Not enough broodstock
- Small hatchery
- Water availability

Monitoring of survival rate of fries/fingerlings sold has yet to be institutionalized

Provides free training but not a regular program – dependent on resources and development projects

PRIVATE HATCHERIES

LARGE/CIRCULARTANKS/ UPGRADED TECHNOLOGY

Grass carp
Common carp
Silver barb
Catla
Thailand silver barb
Prices and mortality allowance: the same among all hatcheries

SMALL/ TRADITIONAL HAPA

Market: within Shan south

Water: Dam
Competition with agri crops
Land ownership
High electricity cost

Nursery: pesticide contamination from nearby farms ➔ mortality

<u>Markets</u>
Yangon/Delta/Others: 70% to 80%
Shan South: 20%

GROW-OUT PONDS

Integrated nursery and grow-out farms
Nursery – pellets
Grow-out: rice bran + peanut cake

FISH FARM – POULTRY
If poultry becomes more intensive, taste of fish is affected --- consumers not keen on buying

Difficulties in getting land title/land certificate use

Market: traders for local market

Floods during rainy season; water use conflict – rice farmers vs ponds; priority provided to rice farms

RICE – FISH FARM (MYSAP)
About 30 have adopted

Rice bran + natural feeds

FISH VENDORS

Production within township: 40% of supply; generally size smaller than those from Yangon; low self-sufficiency

Yangon (iced): 60% of supply; from jetties --- marine and capture fisheries; main clients – restaurants/hotels

General preference among households: fresh (still breathing) fish; not iced

Crowded; high food safety risk

SAGAING

Selected townships - Sagaing

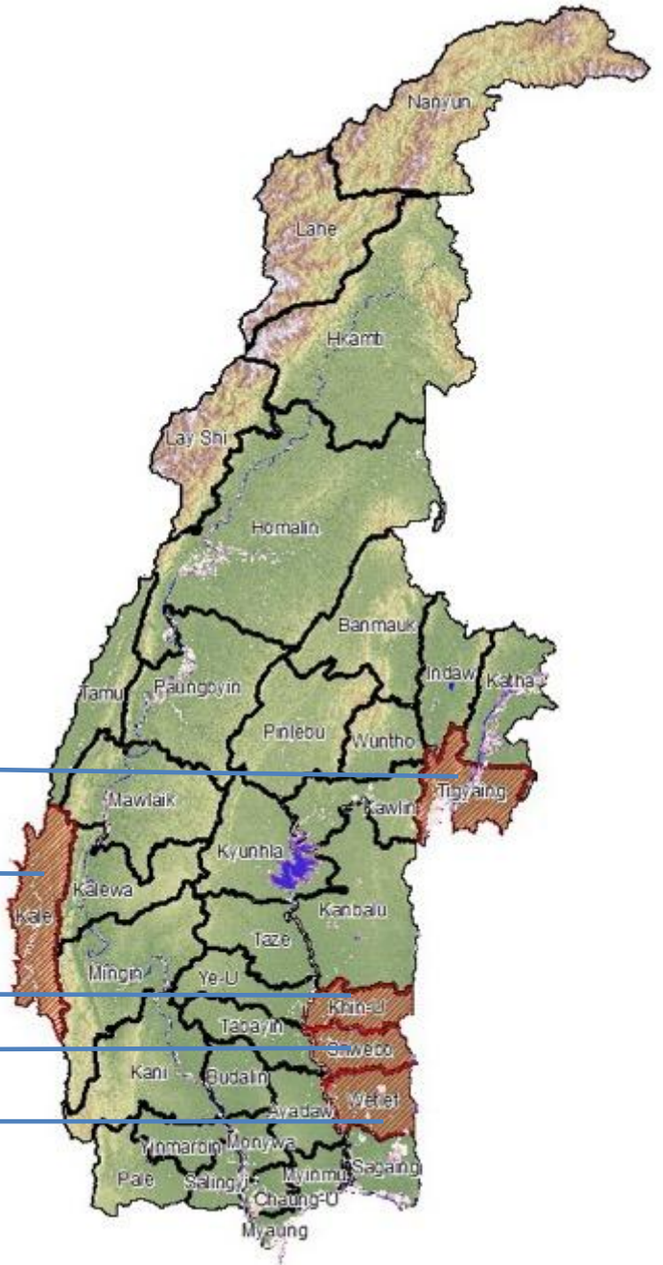
Tingyaing

Kale

Khin-U

Shwebo

Wetlet




WorldFish


Freshwater Fishes







MAGWAY

Selected townships – Magway

Seikphyu

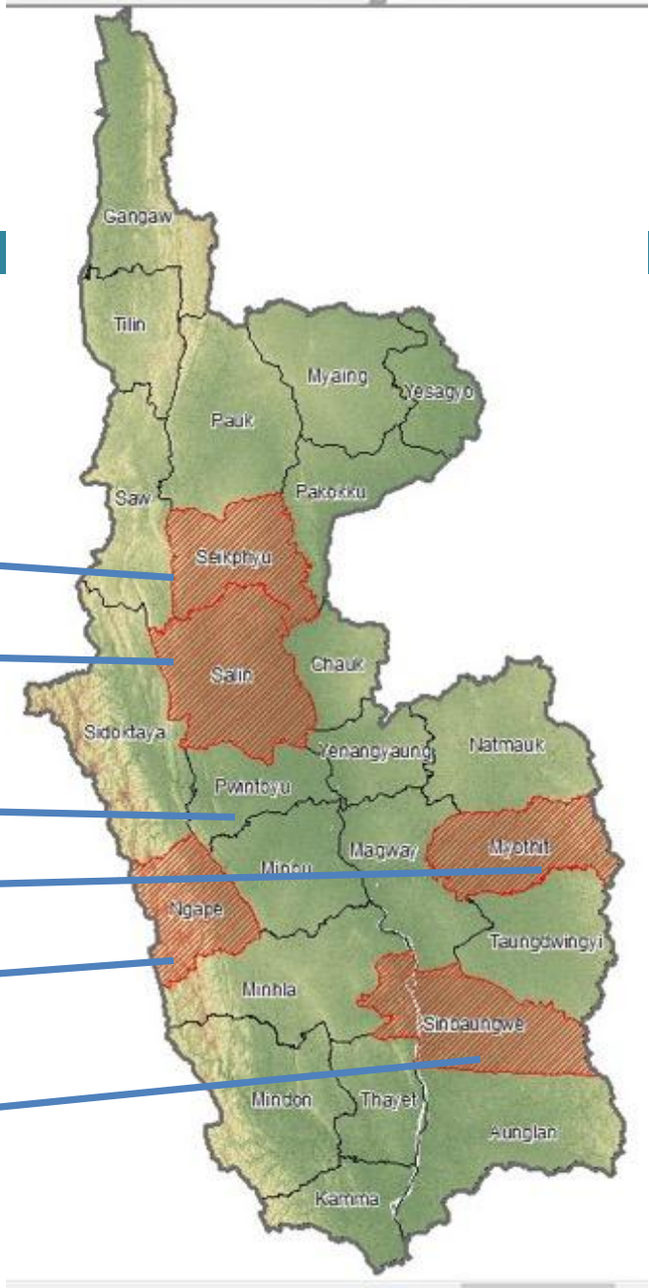
Salin

Pwintbyu

Myothit

Ngape

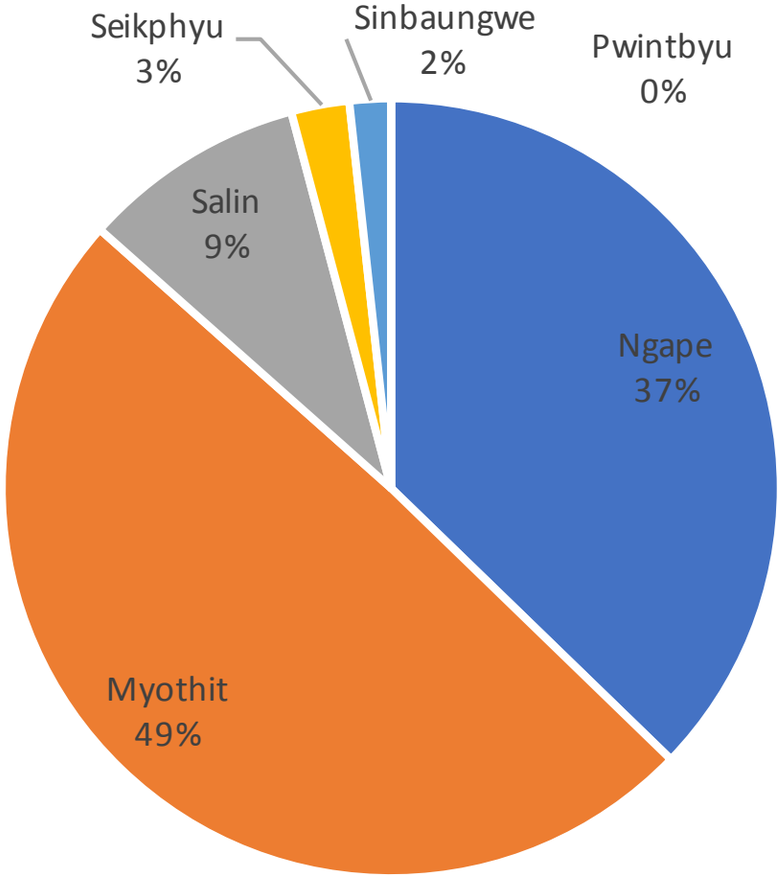
Sinbaungwe



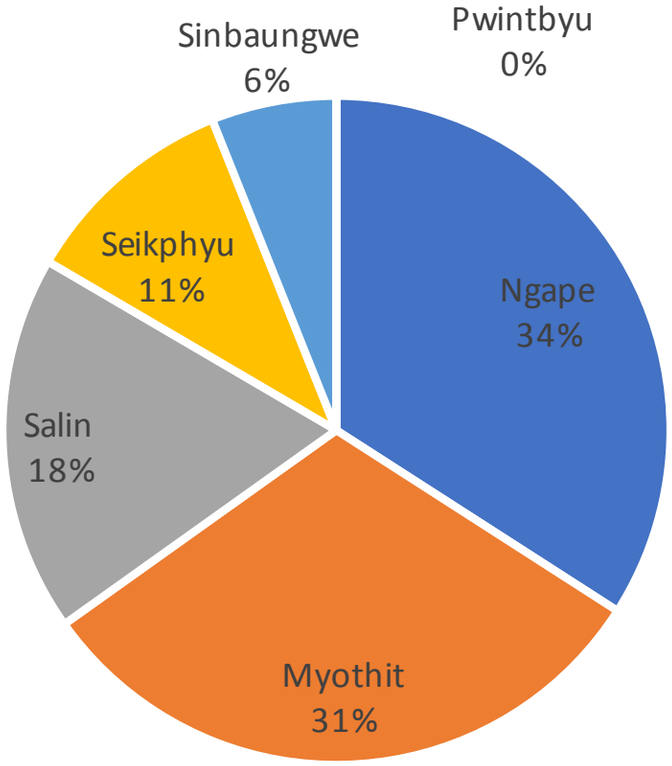
Socio–eco-aqua data – selected townships

	Aea (Km2)	Households (Number)	Population Density (hab/Km2)	Per capita income (Kyatt)	Under 5 under weight (%)	Population without sanitation (% Households)	Agricultural land (% total)	Licensed pond (number)	Pond area (acres)	Pond production (viss)
Ngape	1,205.10	39,764.00	112.02	1,730,784.00	4.50	17.00	83.00	108.00	103.40	79,680.00
Myothit	2,322.70	55,605.00	84.03	1,701,019.00	3.70	23.90	82.50	143.00	94.30	79,240.00
Salin	1,973.40	60,263.00	108.58	1,993,183.00	0.59	20.20	78.90	27.00	55.40	43,490.00
Seikphyu	1,206.10	25,972.00	74.08	2,104,381.00	4.20	81.40	73.40	7.00	31.90	30,260.00
Sinbaungwe	1,003.00	44,618.00	153.53	2,432,409.00	2.80	20.30	95.70	5.00	18.40	15,740.00
Pwintbyu	2,383.20	31,622.00	51.68	1,880,621.00	0.02	84.80	58.00	-	-	-

Distribution of ponds # - selected townships



Distribution of production - selected townships








MANDALAY

Selected townships – Mandalay

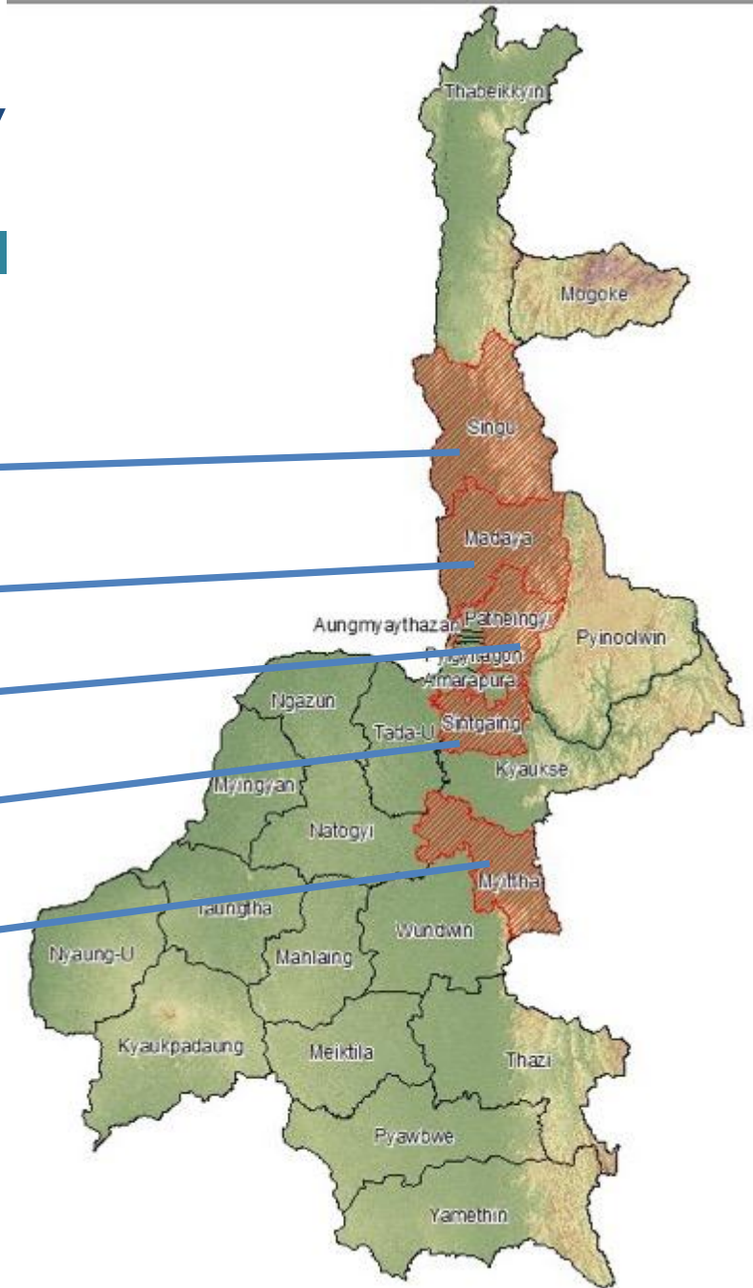
Singu

Madaya

Patheingyi

Sintgaing

Myittha



Socio–eco-aqua data – selected townships

	Aea (Km2)	Households (Number)	Population Density (hab/Km2)	Per capita income (Kyatt)	Under 5 under weight (%)	Population without sanitation (% Households)	Agricultural land (% total)	Licensed pond (number)	Pond area (acres)	Pond production (viss)
Madaya	1,099.30	**58,645.00**	191.17	787,796.00	3.71	**33.60**	77.10	**2,718.00**	**5,261.20**	**895,500.00**
Sintgaing	448.40	33,579.00	276.98	953,286.00	3.51	15.90	**97.00**	249.00	465.90	708,000.00
Patheingyi	593.60	52,990.00	**362.56**	**2,169,668.00**	2.02	23.80	77.10	263.00	441.00	779,000.00
Myittha	891.50	46,017.00	181.34	1,298,654.00	3.08	25.20	90.40	111.00	230.90	395,500.00
Singu	**1,509.20**	34,533.00	84.75	663,776.00	**3.86**	29.90	56.80	29.00	164.30	50,500.00

MADAYA TOWNSHIP

Research Team:

Marian Boquiren
Than Than Swe
Kyaw Win Khaing

FISH SUPPLY

www.shutterstock.com · 1443406955

Daily volume requirement:
70,000 to 80,000 viss (source: DOF)

40% of supply from Yangon
60% from Mandalay
Local fish preferred by consumers

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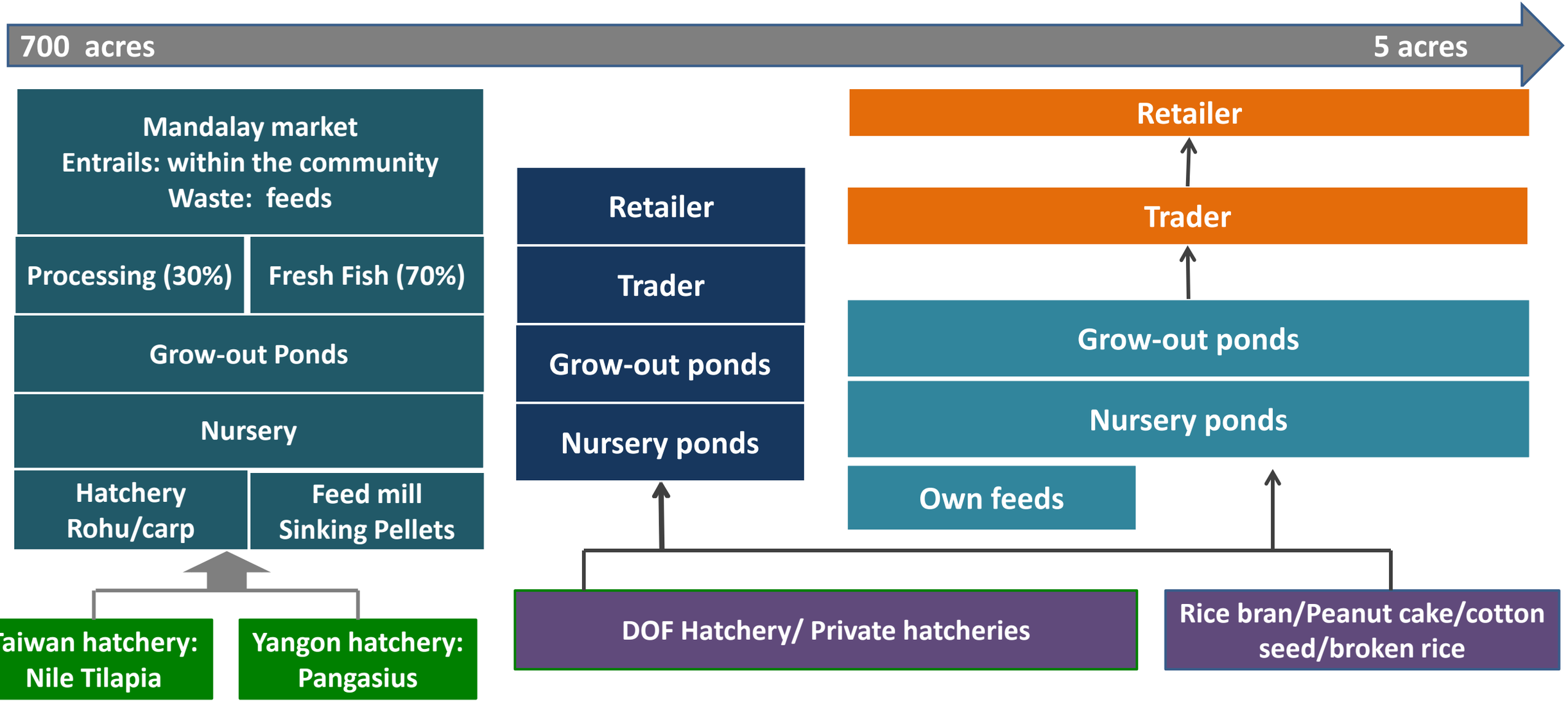
SUPPLY CHAIN STRUCTURE



HATCHERY

Limited operations during dry season due to water constraint

Rohu/silver barb: demand greater than supply

Most saleable: 1 inch

Lower price than hatcheries in other states
Yangon/Kale: 60%
Mandalay: 40%
Rohu – almost 100% sold to Mandalay growers

FRIES AND FINGERLINGS

Generally stocks bigger size fingerlings (4 to 6 inches) reared in own nursery ponds

Main species: rohu, common carp

GROW-OUT PONDS

Integrated poultry-fish farm

Water available throughout the year

Growers able to stock throughout the year

Concerns among growers:

- Quality of fingerlings especially rohu – in-breeding
- Inconsistent quality of rice bran
- Difficulty to get certificate of land use/license: fine of 1 million MMK/acre
- High electricity cost
- Although some growers have attended training, majority are interested on new technology (e.g., use of aerators, etc.)

PROCESSING

Trader:
14,000 viss
Retail:
18,000/viss

Fish sourced from own pond

3,000 viss/month (dried fish)
All parts of the fish utilized

KACHIN

Selected townships – Kachin

Waingmaw

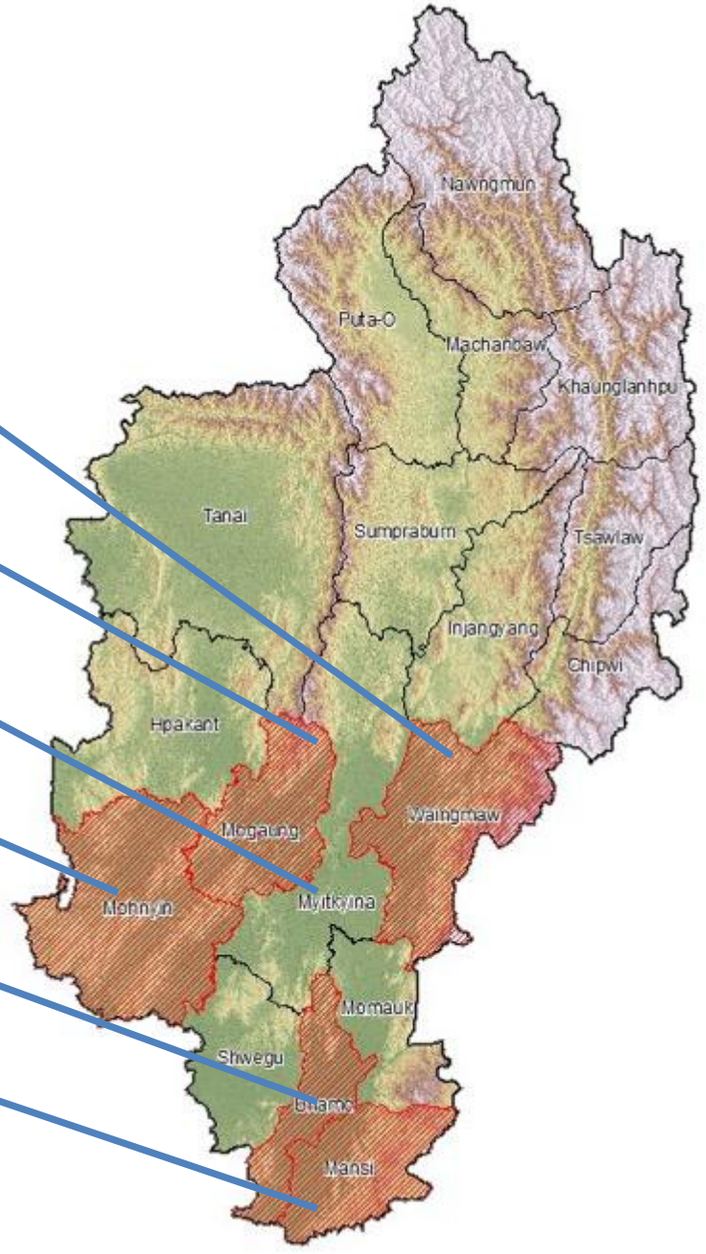
Mogaung

Myitkyina

Mohnyin

Bhamo

Mansi



IDPs in selected townships

Waingmaw

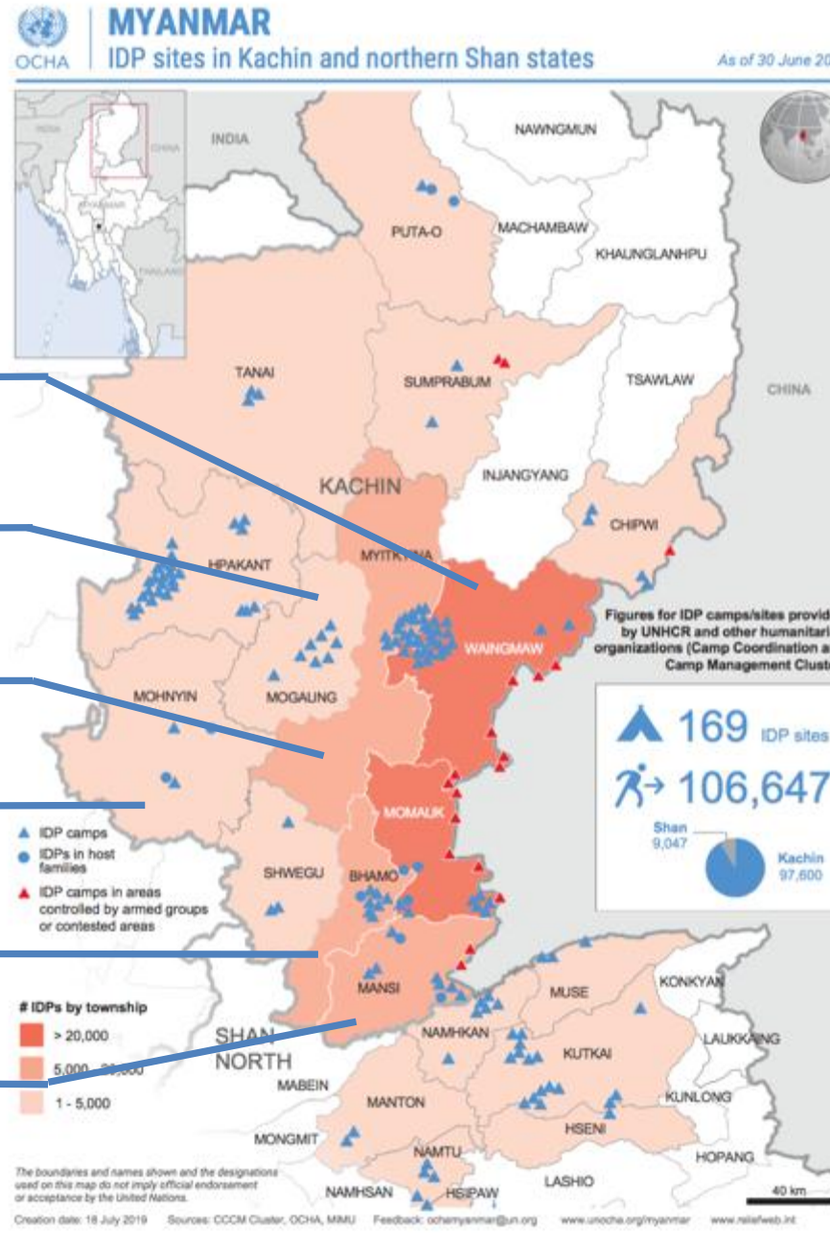
Mogaung

Myitkyina

Mohnyin

Bhamo

Mansi



Socio–eco-aqua data – selected townships

	Aea (Km2)	Households (Number)	Population Density (hab/Km2)	Per capita income (Kyatt)	Under 5 under weight (%)	Population without sanitation (% Households)	IDP (Number)	Agricultural land (% total)	Licensed pond (number)	Pond area (acres)	Pond production (viss)
Mohnyin	2,156.60	24,161.00	**50.72**	952,388.00	**2.60**	2.20	8,096.00	16.20	**206.00**	**342.40**	158,020.00
Mogaung	3,316.70	24,898.00	31.66	751,175.00	2.50	0.40	455.00	**20.10**	83.00	220.20	**197,770.00**
Waingmaw	2,681.90	12,370.00	18.65	699,824.00	2.40	7.00	**15,855.00**	7.80	123.00	262.10	175,090.00
Bhamo	3,088.80	16,621.00	24.26	1,083,110.00	3.30	**7.10**	2,170.00	17.70	23.00	77.00	75,000.00
Mansi	**6,226.90**	**52,591.00**	41.42	**1,127,598.00**	1.40	0.60	6,460.00	9.20	139.00	106.40	84,520.00
Mitkyina	3,204.80	1,719.00	2.01	814,744.00	1.90	1.00	-	3.30	10.00	2.20	7,000.00

Some findings from the scoping study

Township	DoF	MFF
Waimo	1	2
Putao	1	
Shwegu	1	
Mongien	1	2
Bhamo	1	1
Myitkyina		3
Total	**5**	**8**

Distribution of hatcheries in Kachin

Species	Sales price
Rohu	5,000 MMK/viss
Tilapia (local)	5,000 MMK/viss
Pangasia (local river)	3,500 MMK/viss
Pacu	3,500 MMK/viss

Myitkyina market prices

All fish come from Yangon except Pangasia and Tilapia. In average sellers trade 200 viss per day, and wholesaler 10,000 viss.

The average size of the farms is 5 acres

MFF Kachin:

- Established two years ago
- Want to have township level representations
- Work with DoF to train farmers (e.g. hatchery training)
- Take part in the annual MFF meetings in Yangon and convey the demand from the Kachin farmers which is mostly investment.





MARKET SYSTEM ANALYSIS

Market Systems Analysis

1. Take 15 min to review market constraints identified
2. Group discussion on constraints

VISION FOR CHANGE

STRATEGY DEVELOPMENT

VISION FOR MARKET SYSTEM CHANGE → **PROJECT OBJECTIVES**

ANALYSIS OF CONSTRAINTS AND OPPORTUNITIES

REVIEW
Identified constraints and opportunities

→

PRIORITIZE
Which constraints
- Have the most significant impact on livelihoods and nutrition of women and men
- Hinder the most the achievement of the vision

→

ROOT CAUSE ANALYSIS
Identify underlying causes

INTERVENTION DESIGN

IDEA GENERATION
Generate ideas to address priority constraints

→

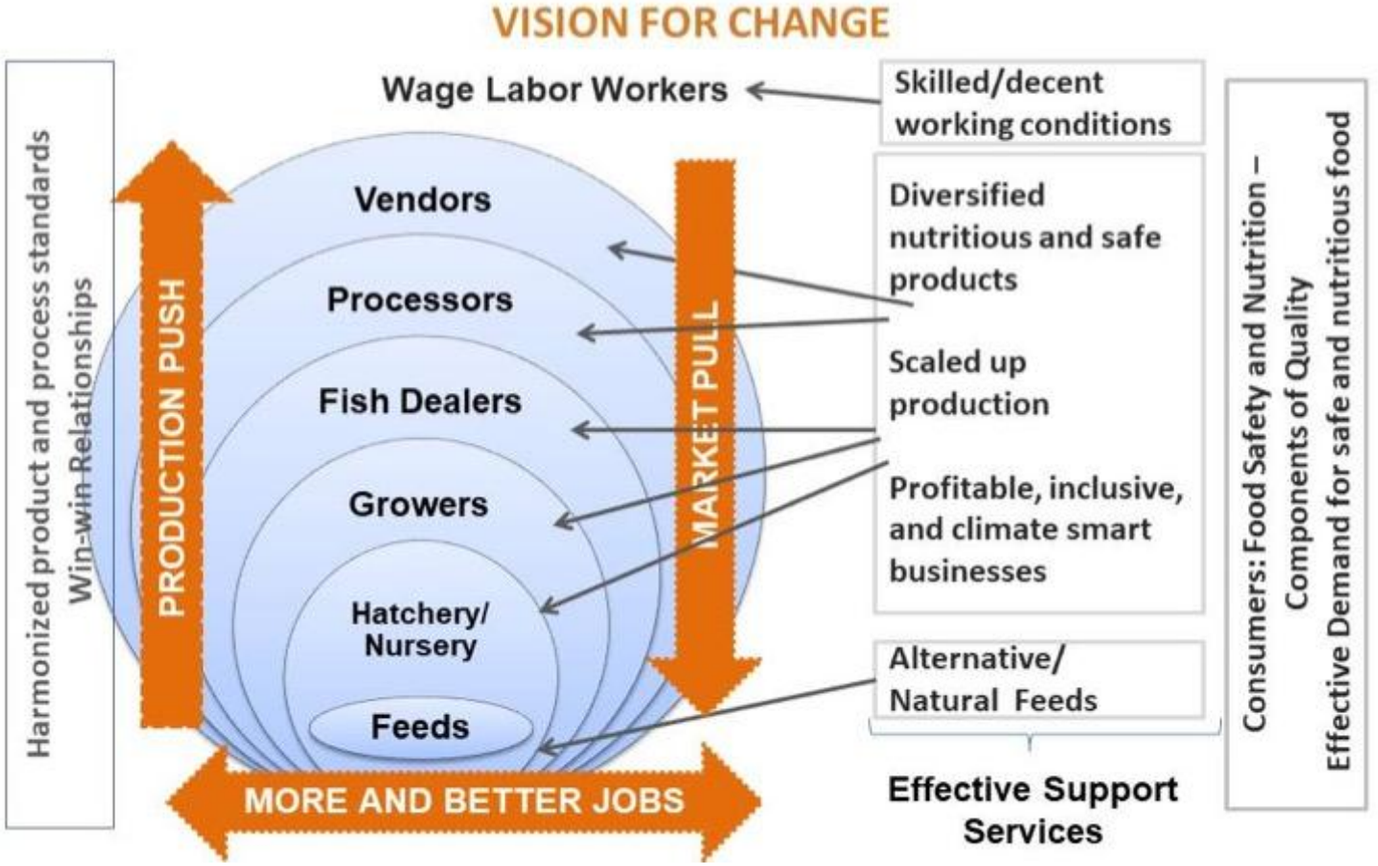
PRIORITIZE
Rank interventions

→

DETAILING/ELABORATION
What needs to be done
How will it be done
Who will do it
What resources are needed

VISION FOR MARKET SYSTEM CHANGE

A vision describes the aspired change within a market system / of the value chain answering the question: How should the market system / the value chain look like at the end of the project?



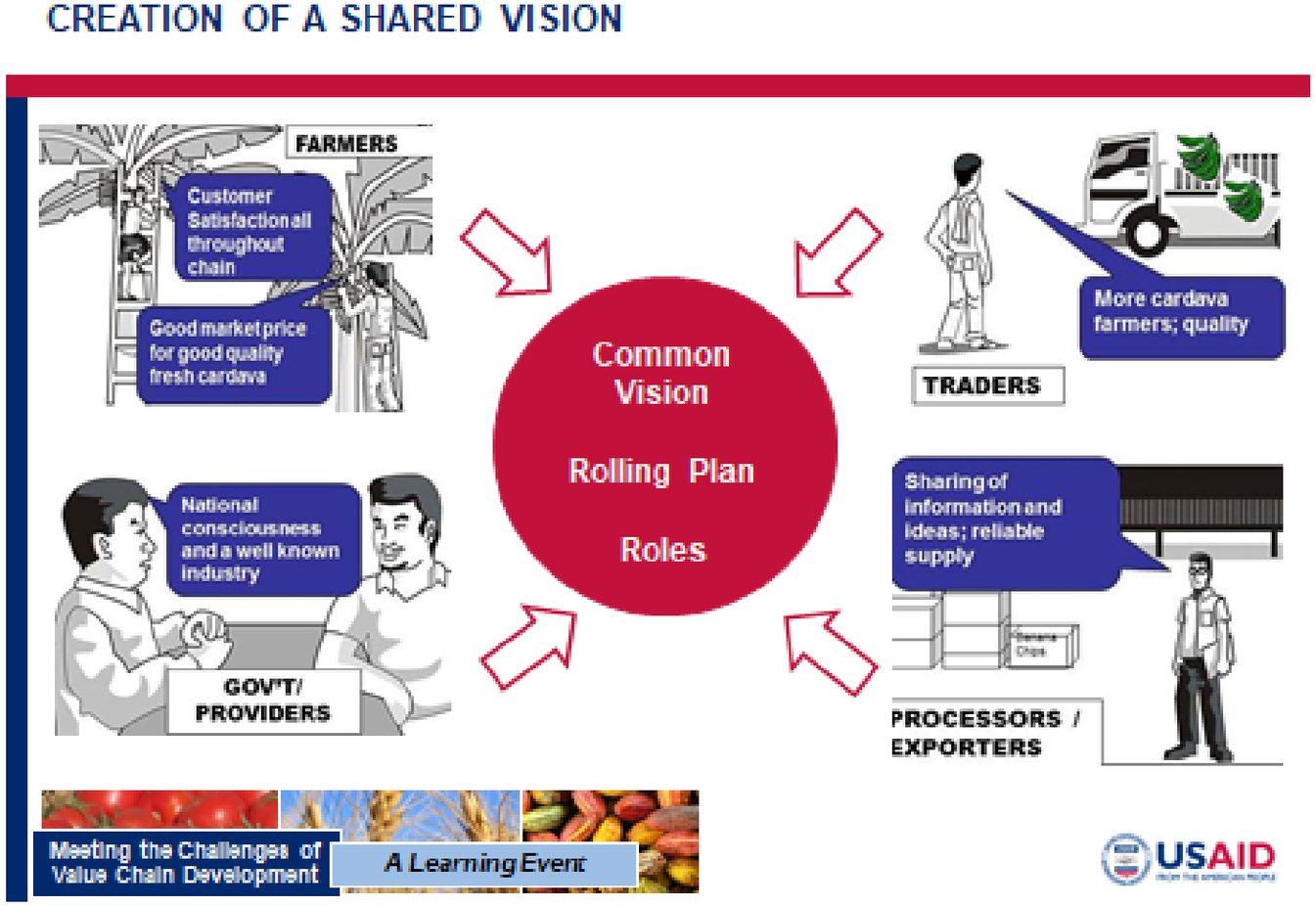
VISION FOR MARKET SYSTEM CHANGE

Ambitious but realistic

Should seek to be as close as possible to the aspirations of where the market actors and stakeholders want to go so that they are engaged and motivated.

Use the findings and information that you know to keep visioning process specific and relevant to the market system in the region

Inclusive and shared vision … and not just the target groups. Upgrading requires chain wide collaboration and cooperation.



VISION FOR CHANGE FOR SHAN EAST

1. Each group formulates a vision for change. Use keywords (15 minutes)
2. Group shares their vision for change (2 minutes/group
3. Plenary: commonalities and consensus

Guide Questions

How would the supply (seeds, feeds, fish) change? How would the products change in variety, quality, and volume?

How would the market actors change? Would the existing functions involve new practices, technology, and business models? Would there be new opportunities for women?

How would the support markets look? How would the enabling environment evolve?

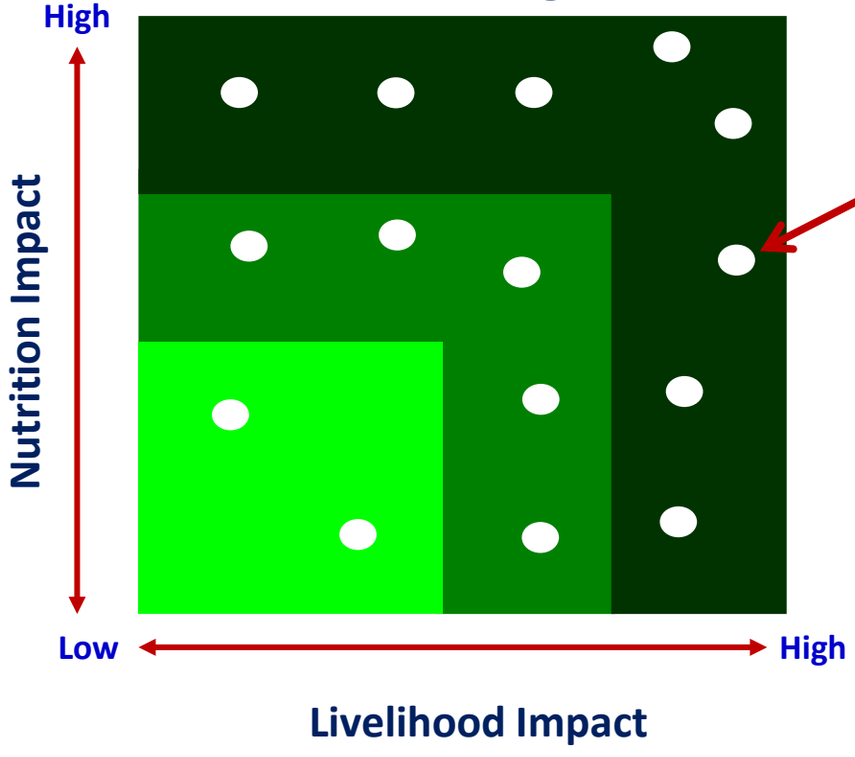
How would the relationships between market actors change? How would supply chain governance change?

What is the demand for products expected to be? How will the markets look like and operate?

PRIORITIZATION OF CONSTRAINTS AND OPPORTUNITIES

CONSTRAINTS PRIORITY MATRIX

Gender and Environment :
Crosscutting



Assess extent to which constraints negatively impacts livelihood and human nutrition

High priority issues

Medium priority issues

Low priority issues

High Livelihood Impact; High Nutrition Impact

Algae (almost always insufficient) + **Bread crumbs/ Snack food rejects**

Cheap but …

Low feed conversion ratio
Longer culture period
Stunted growth
Water pollution
Marginal contribution to employment
Consumers do not like taste
Nutritive value degraded

WORKSHOP: PRIORITIZATION OF CONSTRAINTS

1.
   - Review constraints
   - Add or modify whenever necessary
2.
   - Analyze and categorize constraints under high feasibility using the priority matrix (use flip chart and cards)
   - When all constraints have been categorized, review to show indicative ranking
3.
   - Share results of priority matrix
4.
   - Plenary: consensus on high and medium priority issues

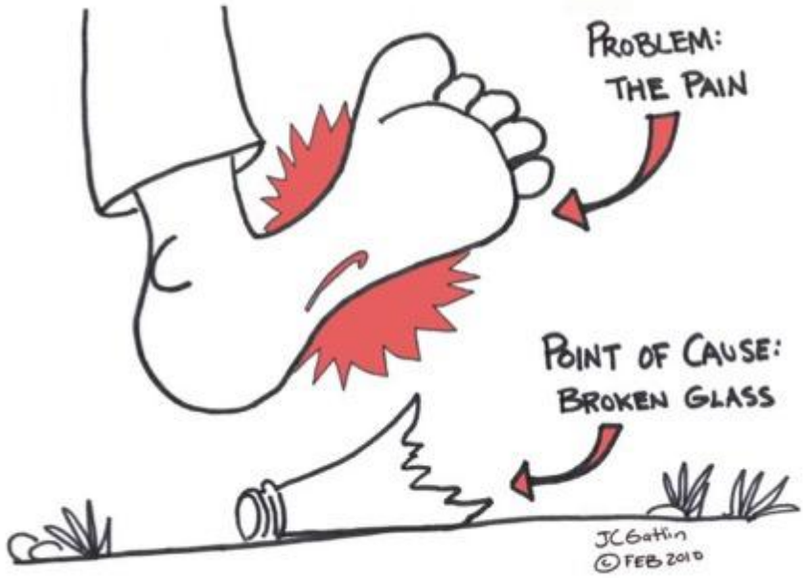
ROOT CAUSE ANALYSIS

ROOT CAUSE ANALYSIS

- Root cause analysis is an approach for identifying the underlying causes of an incident so that the most effective solutions can be identified and implemented.

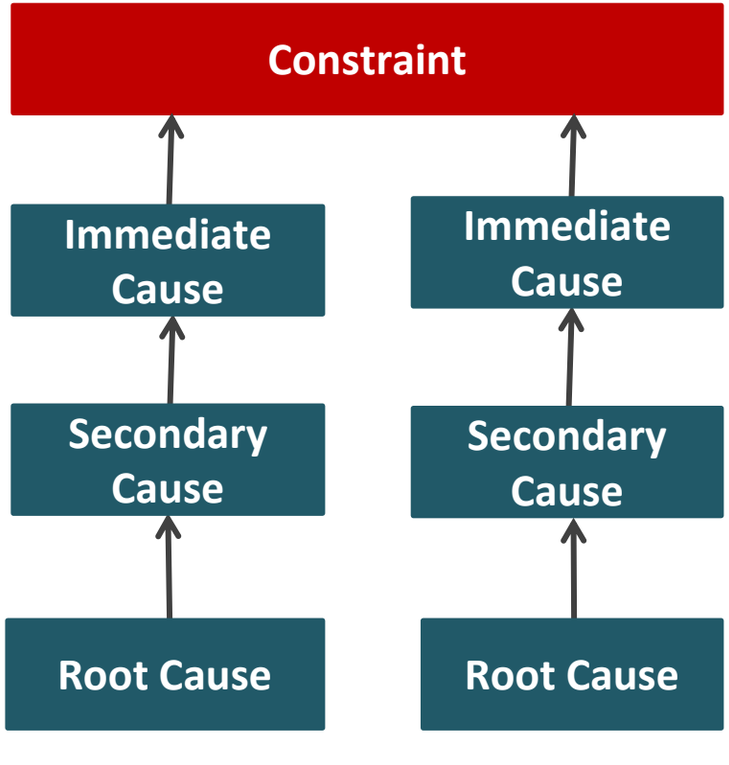
- The root cause of the problem must be understood before action is taken. Defining the problem better is half the work of solving the problem. Reasons for this problem will identify the real need.

- Removing a causal factor might improve the situation, but it will not necessarily keep the problem from occurring. This is one way to distinguish a causal factor from a root cause.



Root Cause/s: ???

ROOT CAUSE ANALYSIS



Step 1. What is the cause of the constraint?

Step 2. What is the cause of the immediate cause?

Step 3. What is the cause of the secondary cause?

When doing the root cause analysis, it is also important to recognize differences in men's and women's roles and responsibilities and social norms that shape access to resources (land, labour, money), education differentials, the nature of men's and women's economic activities, time use, mobility, and patterns of control over income.

WORKSHOP: ROOT CAUSE ANALYSIS

1. Do the root cause analysis of priority constraints assigned to your group
2. Share analysis to the plenary
3. Plenary: Agreement on root causes of priority constraints

INTERVENTION DESIGN

Idea generator

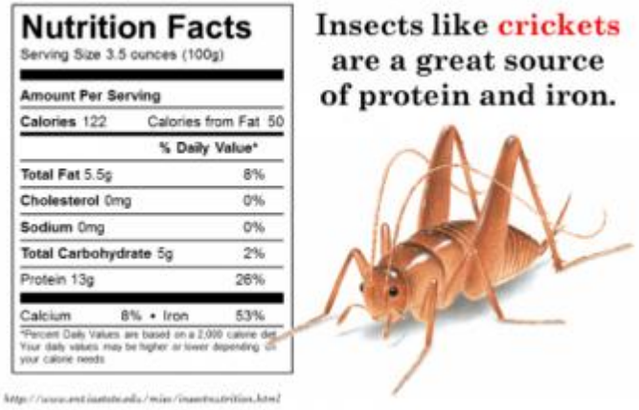
The Approach		The Normal Rule	Bending & stretching the rule
Integration	Integrate the offer with other offers	People access a range of services in different locations	What if different local services had one point of access?
Extension	Extend the offer	Hatchery provide seeds to farmers and traders	What if hatchery also provided support to out grower hatcheries
Differentiation	Segment the offer	There is a one size fit all approach	What if a service or product was developed for local people using local resources
Addition	Add a new element	Feed companies provide extension services in main aquaculture regions	What if feed companies provided extension services remote areas using a last mile distribution system and inputs for value addition activities by women

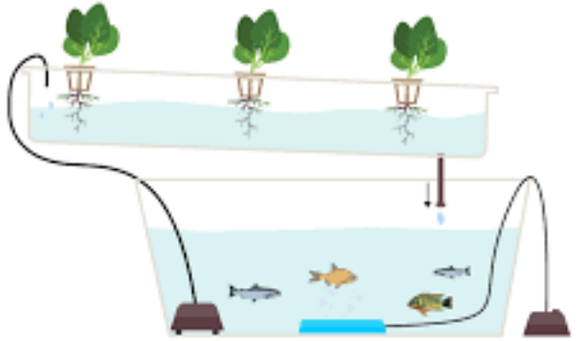
Fast idea generator

Start from an existing concept, problem or opportunity and then apply the 4 challenges suggested.

These are simple steps to help come up with alternatives that bend, break and stretch the ‘normal rules’ in such a way that you can generate many surprising ideas in a short period of time

Think out of the box & innovate





Think out of the box & innovate

PRIORITIZATION OF INTERVENTIONS

PRIORITIZING INTERVENTIONS

Constraint:

	Score 1 – High 2 – Medium 3 --- Low			
	Intervention 1	**Intervention 2**	**Intervention 3**	**Intervention 4**
Total: RELEVANCE				
Number of poor women/men that will be benefitted				
Scope for poor women/men to improve their incomes				
Scope to improve nutrition especially among vulnerable population				
Scope to lower net environmental impact				
Total: EFFECTIVENESS				
Potential contribution to achieving vision and objectives				

PRIORITIZING INTERVENTIONS

Constraint:

	Score 1 – High 2 – Medium 3 --- Low			
	Intervention 1	**Intervention 2**	**Intervention 3**	**Intervention 4**
Total: FEASIBILITY				
Availability of players with incentives to drive the change process				
Willingness of players and stakeholders to adopt/embrace the change process				
Conduciveness/Alignment to national plans				
Alignment with project resources and mandates				
Alignment with project time frame --- gestation period within project's time frame				
TOTAL SCORE				

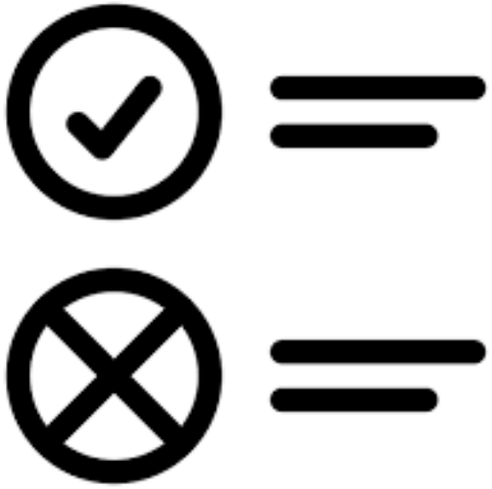
WORKSHOP

1. Score and prioritize interventions of constraints assigned to your group
2. Share analysis to the plenary
3. Plenary: Agreement on scores and prioritization

Intervention design

Root causes	Change required	Intervention & Activities	Potential Results	Potential partners	Budget	Risks	Timeline
		Intervention A • Activity A1 • Activity A2					
		Intervention B • Activity B1 • Activity B2					

Design validation



THANK YOU!

Contact:

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Marian E. Boquiren, Asper | Value Chain Specialist

E-mail: marianeboquiren@asperconsulting.com

SAIL NM Gender Integration Workshop Report

Reporting Period: 14-15 January 2020

Date submitted: 25 January 2020

Submitted by KIT Royal Tropical Institute

Julie Newton

KIT Royal Tropical Institute

Contents

1. Introduction

SAIL aims to provides a means of ensuring the improved availability of diverse, safe, affordable nutrient-rich foods, especially for women and young children from poor and vulnerable households. This will be achieved by ensuring that poor households have an increased ability to purchase accessible nutritious foods due to improved incomes from entrepreneurial activities including improved small-scale aquaculture in the intervention areas and the strengthening of aquaculture market systems with particular attention to expanding opportunities for women and youth. In addition, behavioural change work will prioritize nutritious-conscious household decisions by means of both home production and local markets. Specifically, it is expected that the adoption of fish culture technologies would contribute to improved food and nutrition security for poor households in several ways; i) generating income from fish culture which would be used to purchase nutritious food, ii) creating alternative employment generating activities and increasing labour productivity, and iii) increasing available food supply and fish consumption.

KIT Royal Tropical Institute was commissioned by WorldFish Myanmar to support gender integration during the inception phase through a participatory workshop to inform the design of the gender mainstreaming in SAIL. This comes at a critical point in the project inception phase following the project scoping phase (where township selection modelling has taken place) where there is opportunity to fine-tune project objectives and strategies. The workshop provided a starting point for supporting project staff to prioritize relevant gender outcomes and identify feasible and realistic gender integration strategies to achieve the development and gender objectives of the program. Achieving both the development and gender objectives of the program will only be successful if program staff take ownership of integrating gender across the activities rather than seeing gender is not a standalone activity.

The workshop was jointly facilitated by Julie Newton (KIT) and Jessica Scott (WorldFish).

This report provides an account of the workshop. Note that the key deliverables are available as separate attachments detailed in Table 1. Also see Annex for Agenda, Participants, evaluation and PowerPoint slides (separate attachment).

Table 1: Expected workshop outputs

Deliverable	Remark
1. Revised Theory of Change which specifies desired gender outcomes	Included in Building Blocks document Note that this has been simplified to highlight the gender assumptions.
2. Draft gender integration entry points in Activities by pathway	In Building Blocks document and excel sheet
3. Draft gender indicators in MEL framework	(Was not possible to complete since the project design has yet to be finalized). Tentative indications provide in excel sheet

2. Workshop roll out

2.1. Objective of the workshop

The overall goal of the workshop was to help WorldFish SAIL staff and partners understand what gender integration implies for SAIL. The objectives of the participatory gender integration workshop were to work together with key project staff and potential implementing partners to:

- To jointly identify the key gender outcomes to be achieved in the project
- To jointly identify key areas in the project where gender integration can take place
- To foster enthusiasm and learning for gender

Through the workshop, the aim was to:

- Revise the SAIL theory of change to integrate gender throughout the program
- To identifying priority gender outcomes and relevant gender strategies for different impact pathways of SAIL as input into the Myanmar gender strategy which is to be updated 2020.
- Identify where there is need for better gender integration in layers of data required for different outputs and identify strategy/next steps to meet these needs.
- Review opportunities to better integrate gender into the MEL

2.2. Tailoring of workshop objectives and agenda

A flexible approach was taken to the workshop agenda for a number of reasons. First, due to uncertainty about how many participants and their availability for the two days. Second, because not everyone has been on a gender training , this meant more time was needed to explain core gender concepts prior to the group work. Third, lack of clarity around project design components (particularly market systems) also meant more delay in explaining components. In spite of these challenges, the objectives of workshop were achieved and participant acknowledge the value of workshop at this point in time.

Annex 1 presents the Agenda for day 1 and day 2.

2.2 Work Participants

A total of 19 participants were present, of which 68% were WorldFish staff and remaining were project partners and others. See more detail in Table 2. These figures do not reflect the variation in attendance for Day 1 and 2.

Table 2. Breakdown of training participants by country

	Participants Day 1	**Participants Day 2**
World fish MY	13	12
WF global	1	1
Partner (BRAC, PACT)	4	4
Donor (USAID)	1	2
Total	*19*	*19*

2.3 Training Evaluations

Overall the workshop was well received. The value of having the workshop at this stage of project design was appreciated and acknowledged at coming at a critical time. For next time, it was noted that more effort to encourage more participatory process that caters for different language needs.

See Annex 3 for detailed responses.

Table 3: Summary of evaluation

Questions	Summary
Three most useful learnings	How to practically integrate gender into activities (walking through ToC and activity plan: mapping gender to concrete activities) Gender outcomes typology Unpacking ToC Learning more about what is GTA
What was not useful	Nothing specific. All relevant.
Ranking facilitation	Excellent (3) Very good (7) Good (1) Ok (1)
Suggestions for improvement	More interaction with participants (noting language was a barrier) Identify representative of 3 pathways to support co-facilitation Do same activity at concept note stage Think of different way to do group work around activities (two projector screens)
Further comments	Arrange refresher workshop More support for language translation

3. Recommendations and next steps

For follow up gender integration it is critical to ensure:

1. The building block document + gender integration matrix should be shared with CoP (Chief of Party)and core project team as input into the Detailed Implementation Plan and MEL framework. It is recommended that the DIP should note when gender support is required.
2. Use the baseline findings and value chain analysis to support design of gender interventions to respond to gender barriers and opportunities. Arrange workshop of core people to process implications of baseline findings to project design and revise detailed activity plan and budget accordingly.
3. Use baseline findings to re-align gender strategy and prioritize the key gender outcomes for SAIL to be followed up. This is also an opportunity to identify what key areas of gender learning the project wants to prioritize as part of MEL. Note that USAID stated that whatever learning is embarked on, it should seek to make the link to food and nutrition security outcomes. A separate workshop could be organized to validate the gender strategy as part of broader inception workshop for project partners once they have been selected.
4. New partners: When onboard new partners – arrange an inception workshop that covers the ToC. This will include the gender assumptions in the ToC (but not calling it gender workshops) the expectation of gender integration throughout the program. This should be in Myanmar language to ensure everyone understands.

Annex 1: Program

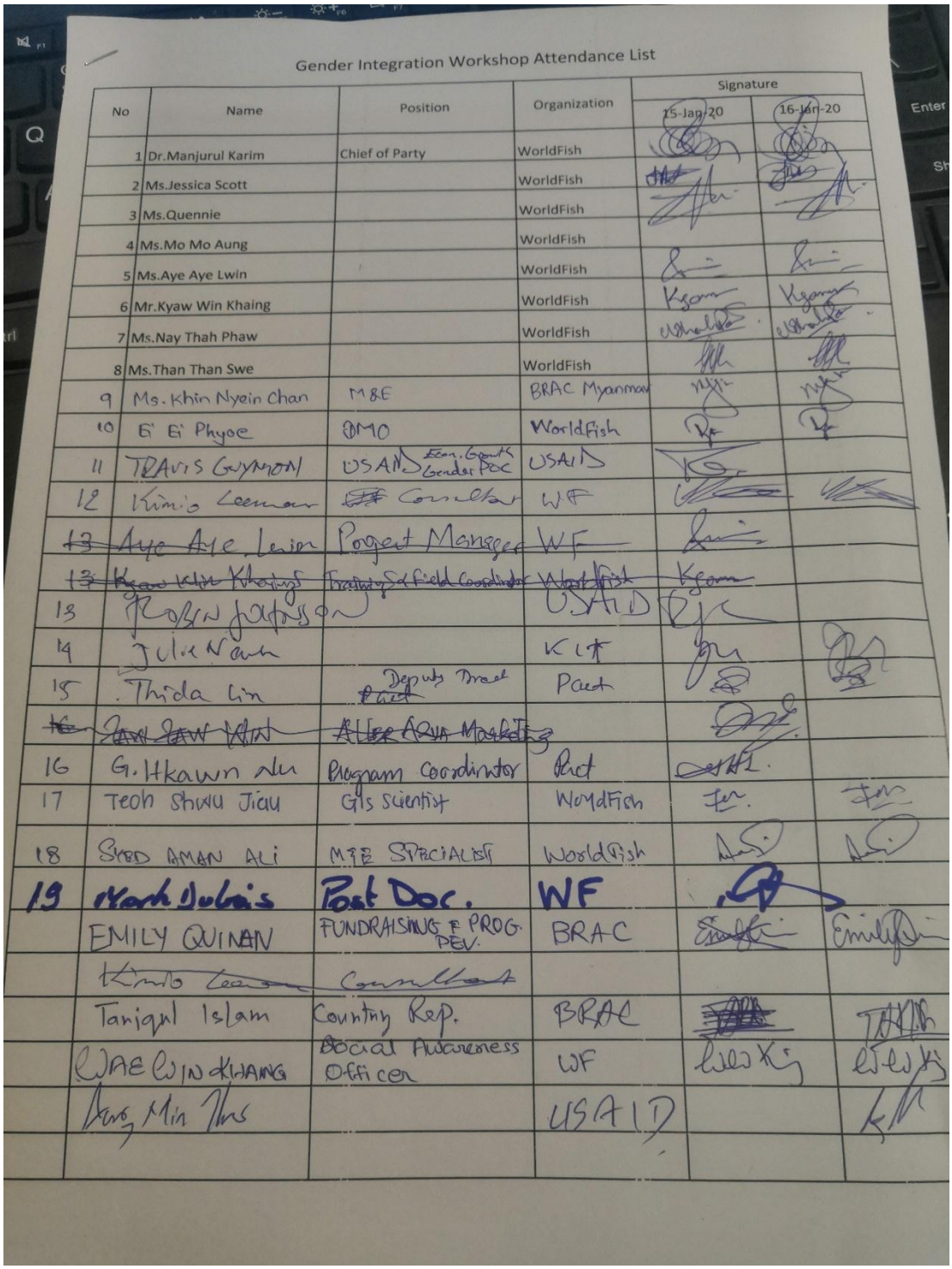
Day 1: Wednesday 15th January

8.45 am	Registration and welcome
9am	**Introduction** Getting to know each other, reviewing why gender matters and objectives of workshop
10.15	**Tea break**
10.30	Recap of main gender (concepts + outcomes)
12.30	**Lunch**
13.15	**Understanding gender outcomes by pathway (aquaculture production, market systems, nutrition)**
	Unpacking the gender dimensions of SAIL ToC To identify the main gender assumptions and gender outcomes by pathway (group work by pathway and plenary by pathway)
16.00	**Introduction to gender strategies**
	Wrap up and next steps for Day 2
5.00 pm	Close

Day 2 Thursday, 16th January

8.45 am	Welcome
9am	**Welcome and AHA moments**
9.30	**Recap of ToC and Assumptions:** Identifying gaps in intervention + data needs for baseline/value chain analysis, MEL
10.30	**Tea break**
10.45	**Working session: gender integration into activities**
12.30	**Lunch**
13.15	**Working session: gender integration into activities**
16.45	Wrap up and evaluation
5.00	Close

Annex 2: Participants list



Gender Integration Workshop Attendance List

No	Name	Position	Organization	Signature 15-Jan-20	Signature 16-Jan-20
1	Dr.Manjurul Karim	Chief of Party	WorldFish		
2	Ms.Jessica Scott		WorldFish		
3	Ms.Quennie		WorldFish		
4	Ms.Mo Mo Aung		WorldFish		
5	Ms.Aye Aye Lwin		WorldFish		
6	Mr.Kyaw Win Khaing		WorldFish		
7	Ms.Nay Thah Phaw		WorldFish		
8	Ms.Than Than Swe		WorldFish		
9	Ms. Khin Nyein Chan	M&E	BRAC Myanmar		
10	Ei Ei Phyoe	BMO	WorldFish		
11	TRAVIS GUYMON	USAID Econ. Growth Gender POC	USAID		
12	Kim's Leeman	~~Consultant~~	WF		
~~13~~	~~Aye Aye Lwin~~	~~Project Manager~~	~~WF~~		
~~13~~	~~Kyaw Khin Khaing~~	~~Training & Field Coordinator~~	~~WorldFish~~		
13	Robin Johnson		USAID		
14	Julie Nash		KIT		
15	Thida Lin	Deputy Head Post	Post		
~~16~~	~~Zaw Zaw Htet~~	~~Aller Aqua Marketing~~			
16	G. Htawn Ali	Program Coordinator	Post		
17	Teoh Shiau Jiau	GIS Scientist	WorldFish		
18	SYED AMAN ALI	M&E SPECIALIST	WorldFish		
19	Mark Dubois	Post Doc.	WF		
	EMILY QUINAN	FUNDRAISING & PROG. DEV.	BRAC		
	Kimlo Leeman	Consultant			
	Tanjqul Islam	Country Rep.	BRAC		
	WAE WIN KHAING	Social Awareness Officer	WF		
	Daw Min Thu		USAID		

Annex 3: Workshop evaluation

1. 3 most useful learnings:

Gender outcomes and transformative approach knowledge
Exploring ways that would help in gender integration strategy
Team work for set up detail plan activity in align with indicators, outputs (IR) etc

Gender outcomes typology
Proper activities discussion
Baseline discussion

Walk through of the activities.
Integrating gender into the IRs.
Group aspect – collaboration in general was very good.

A good way to validate project documents (log frame, work plan, result framework, ToC)
Process of how gender could be integrated.
Methods to disaggregate activities into sub-activities.

GTA in MEAL framework
Find out gap in indicator
Linkage between control (Activity and output) and influence (outcome level)

Know what is gender integration.
How to link with our current job.

Better understanding of SAIL Programme & ToC
Levels of gender mainstreaming
Implications for gender mainstreaming across all levels & functions of Programme

Looking at assumptions behind the activities
Empowerment is a slow process
Mapping gender to concrete activities

Gender responsive programing
Detailed capacity of SAIL NM ToC
Participatory approach followed

Exit strategy is important even at the early stage of the project
GTA is not easy to do and we should not be using the work transformative because we are not yet of this stage/ we have not done this at all!

Definition of gender lens
Understanding of GTA
Integrate gender into activity plan of program

Gender does not stand alone. It should be integrated at each level.
We should consider sustainability, minor groups with gender lens. Should not be top-down, should be bottom up.
We did not think about gender outcomes. And we usually implement the activities – Reach and access to resources & benefits. We should focus on empowerment & transform.
We need to know local context.

Different perspectives on gender solutions.
Different contextual clarities from different participants
Understanding the project concept for log frame discussion.

2. Not useful
Can't really say anything was un-useful.
Introductions are long, but very interesting – may be a quicker icebreaker. Something like "one word to describe gender"
All good.
Everything seems relevant
All useful but not sure if others who are not SAIL NM project team have the same enthusiasm as me.
All sessions of workshop are useful
One way interaction (less comments from some participants)

3. Rank facilitation
Very good
Excellent
Excellent – great guidance but not over bearing. Allowed (and forced sometimes) participants to get fully involved. And it's clear you both know your stuff. Great work
Good
Very good – all consideration are very relevant with our hope.
OK
Very good
Very good
Excellent
Very good! However, because of limited time & colleagues who are not fluent in English may have struggled to follow the discussion. So not sure how to make it better.
Facilitation – Very good (interactive discussion & lecture are balance, keep up good work & have space to improve)
Very good
Very good

4. Suggestions to improve
All management and operation team could participate
To time enough for workshop
More interaction by participants. Find ever more ways to get people involved.
Following using more participatory tools/methods.
These workshop should be continued before every project designs.
Need to be more active/live. Get more time.
More into each session – what is objective of work we are doing?
Do this as part of the concept note proposal stage
There has to have some energizer.
Suggestion to improve: identify representative of 3 outputs – production, market & nutrition before the workshop – who can co-facilitate the discussion together with main facilitators (also note-taker) during day 2 group discussion.
Instead of laptop based, could be screen based projection.

5. Any comments
Refresher workshop should be organized.
All the best
Look for work to the next moment.
Might be good to have more fun / ice breaking
Nothing
N/A
Grateful for the participatory, inclusive process
A very well conducting workshop. Hats off!
Thanks & fantastic workshop!
Thanks!

USAID
အမေရိကန် နိုင်ငံသားများမှ

အချက်အလက်ပြစာရွက်
ဝင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစား ငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှုအစီအစဉ်
(Small – Scale Aquaculture Investments for Livelihoods Project)

နိဒါန်း

မြန်မာလူမျိုးများ၏ ငါးစားသုံးမှုပမာဏသည် အသားငါးစားသုံးမှုစုစုပေါင်းပမာဏ၏ ၆၀% ကျော်ရှိပါသည်။ လက်ရှိတွင် သဘာဝမြစ်ချောင်း၊ အင်းအိုင်၊ ပင်လယ်များမှ ငါးဖမ်းခြင်းလုပ်ငန်းများလုပ်ကိုင်မှုအနေဖြင့် ကျဆင်းလျက်ရှိသော်လည်း ငါးမွေးမြူရေးလုပ်ငန်းအနေဖြင့်မူ တိုးတက်လျက်ရှိပါသည်။ ယင်းလုပ်ငန်းမှ နှစ်စဉ်တန်ချိန်တစ်သန်းနီးပါးမွေးထုတ်ပေးလျက်ရှိပြီး အဓိကအားဖြင့် ရေချိုငါးမွေးမြူထုတ်လုပ်ခြင်းဖြစ်ပါသည်။ ယင်းသို့ငါးစားသုံးမှု မြင့်မားလာခြင်းသည် ငါးမွေးမြူရေးလုပ်ငန်းအတွက် အလားအလာကောင်းတစ်ရပ်ဖြစ်ပြီး ငါးဈေးကွက်ကြီးထွားလာသည်နှင့်အမျှ အရည်အသွေးပြည့်ဝသည့် ငါးသားပေါက်၊ အစာ၊ အသေးစားချေးငွေ၊ သတင်းအချက်အလက်နှင့် ငါးမွေးမြူရာတွင်လိုအပ်သည့် ထည့်ဝင်ပစ္စည်းများအား ပံ့ပိုးပေးနိုင်ရေး စီစဉ်ဆောင်ရွက်ပေးရန်မှာလည်း အရေးကြီးလိုအပ်လျက်ရှိလာပါသည်။ ရေရှည်စဉ်ဆက်မပြတ် ဖွံ့ဖြိုးတိုးတက်သည့် ငါးမွေးမြူရေးစနစ်ဖြစ်လာစေရန်အတွက် အသုံးပြုသည့်ရေ၊ မြေ၊ ထည့်ဝင် သုံးစွဲသည့်ပစ္စည်းများ၊ သတင်းအချက်အလက်မျှဝေခြင်းနှင့် အရည်အသွေးပြည့်ဝသည့်ထုတ်ကုန်များဖြန့်ဖြူးခြင်း စသည်တို့အနေဖြင့် ယုံကြည်စိတ်ချကောင်းမွန်နေရန်လိုအပ်ပါသည်။
မြန်မာ နိုင်ငံအနေဖြင့် ငါးမွေးမြူရေးကဏ္ဍအား စဉ်ဆက်မပြတ်ဖွံ့ဖြိုးတိုးတက်စေရေးဆောင်ရွက်ရန် လိုအပ်သကဲ့သို့ ယင်းသို့ တိုးတက်လာသည်နှင့်အညီ သဘာဝပတ်ဝန်းကျင်

စီမံကိန်းဆောင်ရွက်မည့်ဒေသများ
- မြန်မာနိုင်ငံအလယ်ပိုင်းပူပြင်းခြောက်သွေ့သည့်ဒေသများ – မန္တလေး၊ မကွေးနှင့် စစ်ကိုင်း
- မြန်မာနိုင်ငံမြောက်ပိုင်း – ရှမ်းပြည်နယ်နှင့် ကချင်ပြည်နယ်

စီမံကိန်းပြီးစီးသည့် ၂၀၂၄ ခုနှစ်တွင် ရရှိရန်မျှော်မှန်းထားသည့် ရလဒ်များ
- အသေးစား ငါးမွေးမြူထုတ်လုပ်ခြင်းလုပ်ငန်းများ တိုးတက်လာခြင်း၊
- ဈေးကွက်အတွင်း ဘေးဥပဒ်မရှိသော ငါးနှင့် ငါးမှထုတ်လုပ်သည့်ကုန်ပစ္စည်းများရရှိမှု မြင့်မား လာခြင်း၊
- အဟာရဓာတ်များပြည့်ဝရေး၊ အစားအစာဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ရေသန့်၊ လက်သန့်၊ အစာသန့်၊ အိမ်သာသန့် (သန့် ၄ သန့်) (WASH) ဆောင်ရွက်မှုများ မြင့်မားလာခြင်း၊

မိတ်ဖက်အဖွဲ့အစည်းများ
- ငါးလုပ်ငန်းဦးစီးဌာန
- မြန်မာနိုင်ငံငါးလုပ်ငန်းအဖွဲ့ချုပ်
- နိုင်ငံတကာရေအသုံးချရေးစီမံခန့်ခွဲမှုသိပ္ပံ (IWMI)

စီမံကိန်းကာလ
၂၀၁၉ ခုနှစ် အောက်တိုဘာလမှ ၂၀၂၄ ခုနှစ် စက်တင်ဘာလ အထိ

ထိခိုက်မှု နည်းပါးစွာ ဆောင်ရွက်ရန်နှင့် လူမှုပတ်ဝန်းကျင်မှ ယင်းမွေးမြူရေးလုပ်ငန်းအားလက်ခံလာပြီး စီးပွားရေး အရ တွက်ချေကိုက်စေရန်အတွက်လည်း ဆောင်ရွက်ရန်လိုအပ်ပါသည်။

အမေရိကန်နိုင်ငံတကာဖွံ့ဖြိုးရေးအေဂျင်စီအနေဖြင့် မြန်မာလူမျိုးများ ဝင်ငွေတိုးပွားလာစေရေး နှင့် အာဟာရ ဓာတ်ပြည့်ဝစွာရရှိစေရေးအတွက် အသေးစား ငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ် အားဆောင်ရွက်ပေး ခြင်းဖြင့် ပံ့ပိုးကူညီပေးလျှက်ရှိပါသည်။ ဤစီမံကိန်း၏ အဓိကရည်ရွယ်ချက်မှာ ငါးထုတ်လုပ်ရေးတိုးမြင့်လာစေရန်၊ အလုပ်အကိုင် အခွင့်အလမ်းများ တိုးတက်လာစေရန်၊ အစားအစာရရှိမှုအခွင့်အလမ်းတိုးပွားလာစေရန်၊ ငါးစား သုံးမှုမြင့်မားလာစေရန်၊ အထူးသဖြင့် မိမိကိုယ်ကိုကာကွယ်စောင့်ရှောက်နိုင်စွမ်း အားနည်းသူအမျိုးသမီးများနှင့် ကလေးသူငယ်များ ငါးစားသုံးမှုမြင့်မားလာစေရန် ရည်ရွယ်ပါသည်။ ထိုသို့ပံ့ပိုးကူညီပေးခြင်းဖြင့် အသေးစား ငါးမွေးမြူရေးလုပ်ငန်းစနစ်၏ စွန့်ဦးတီထွင်ဆောင်ရွက်မှုများ ပေါ်ပေါက် လာစေခြင်း၊ အဟာရဓာတ်ပိုမိုပြည့်ဝစွာရရှိ နိုင်သည့် လူမှုစားသောက်မှုပုံစံများ ပြောင်းလဲလာစေခြင်း၊ တိုက်ရိုက်မွေးမြူခြင်း၊ ဝယ်ယူခြင်းဖြင့် အဟာရပြည့်ဝ သည့် အိမ်တွင်းထုတ်ကုန်များ ထုတ်လုပ်နိုင်သည်ကို သိရှိနိုင်ခြင်း စသည့်အကျိုးကျေးဇူးများ ရရှိနိုင်မည်ဖြစ်ပါသည်။

ရည်ရွယ်ချက်

အားလုံးပါဝင်နိုင်ပြီး စဉ်ဆက်မပြတ်ဖွံ့ဖြိုးတိုးတက်သည့် ငါးမွေးမြူရေးလုပ်ငန်း ကြီးထွားလာခြင်းဖြင့် ဝင်ငွေ တိုးပွားလာစေရန်၊ ကျန်းမာရေးနှင့်ကိုက်ညီသည့် နေထိုင်စားသောက်မှုပုံစံ ပြောင်းလဲလာစေရန်၊ ဆင်းရဲမွဲတေမှု လျော့ကျစေရန်၊ အထူးသဖြင့် ဤစီမံကိန်းအားဆောင်ရွက် ခြင်းဖြင့် မြန်မာနိုင်ငံအလယ်ပိုင်းနှင့် မြောက်ပိုင်းရှိ ကလေးသူငယ်များနှင့် အမျိုးသမီးများအတွက် အကျိုးကျေးဇူးများ ရရှိစေရန် ရည်ရွယ်ပါသည်။

ပံ့ပိုးပေးမည့် အုပ်စု

ဤစီမံကိန်းမှ ကနဦးအနေဖြင့် ပံ့ပိုးပေးမည့်အုပ်စုမှာ ဧကဝက် (၀.၅ ဧက) အောက်ရှိ အသေးစား ငါးမွေးမြူရေး လုပ်ငန်း လုပ်ကိုင်သည့်အိမ်ထောင်စုများနှင့် ဆက်စပ်ဆောင်ရွက်သူများ ပါဝင်ပြီး ယင်းစီမံကိန်းဆောင်ရွက်ခြင်း ဖြင့် အနည်းဆုံး လူဦးရေ ၁၀၀၀၀ အပေါ် အကျိုး သက်ရောက်မှု ရရှိစေရန် ရည်ရွယ်ပါသည်။ ၎င်းအပြင် နေရပ် ဆုံးရှုံးသူများ အပါအဝင် မိမိကိုယ်ကိုကာကွယ် စောင့်ရှောက်နိုင်စွမ်း အားနည်းသူ၊ မျိုးဆက်ပြန့်ပွားရေးဆောင်ရွက် နိုင်သည့် အရွယ်ရောက် အမျိုးသမီးများ၊လူငယ်လူရွယ်များနှင့် ငါးနှစ်အောက် ကလေးသူငယ်များအတွက် ပိုမို အကျိုးရှိ စေရန် ရည်ရွယ်ပါသည်။

ဆောင်ရွက်မည့် အစီအစဉ်များ

ဤစီမံကိန်းအား ငါးပေါများစွာထွက်ရှိသည့် ဧရာဝတီမြစ်ဝကျွမ်းပေါ်ဒေသမှ အလှမ်းကွာဝေးသည့် ငါးရှားပါးသည့် ဒေသများတွင်ဆောင်ရွက်မည်ဖြစ်ပြီး ဈေးကွက်စနစ်နှင့် တန်ဖိုးကွင်းဆက် အဆင့်မြှင့်တင်ခြင်းအား ယင်းဒေသဆိုင်ရာ ဈေးကွက်များသို့ ဘေးဥပါဒ်ကင်းဝေးသည့် ငါးနှင့် ငါးမှထုတ်လုပ်သည့်ကုန်ပစ္စည်းများတင်ပို့ပေးခြင်းဖြင့် ဆောင်ရွက် သွားမည်ဖြစ်ပါသည်။ ထို့အတူ အဟာရဓာတ်များပြည့်ဝရေး၊ ရေသန့်၊ လက်သန့်၊ အစာသန့်၊ အိမ်သာသန့် (သန့် ၄ သန့်) (WASH) လုပ်ငန်းစဉ်များဆောင်ရွက်ရေးနှင့် အသေးစား ငါးမွေးမြူထုတ်လုပ်ခြင်းလုပ်ငန်းများ လုပ်ကိုင်ရာ တွင် အမျိုးသမီးလုပ်သားများအနေဖြင့်လည်း ပိုမိုပါဝင်ဆောင်ရွက်လာနိုင်ရေးတို့ကိုလည်း ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။ အဆိုပါဆောင်ရွက်မည့် အစီအစဉ်တွင် အောက်ဖော်ပြပါ ကိစ္စ(၃) ရပ်အား လုပ်ဆောင်သွားမည်ဖြစ်ပါသည် –

(၁) အသေးစား ငါးမွေးမြူထုတ်လုပ်ခြင်းလုပ်ငန်းများ တိုးတက်လာစေရေးအတွက် မြေ၊ ရေ အသုံးချမှုအပါအဝင် လုပ်ဆောင်ချက်များအား မဟာဗျူဟာကျကျဆောင်ရွက်ရန်၊ အရည်အသွေးပြည့်ဝကောင်းမွန်သည့် အစာ၊ မျိုးစေ့နှင့် ကိရိယာတန်ဆာပလာများအား လွယ်လင့်တကူရရှိစေရန်၊ ထုတ်လုပ်မှုလုပ်ငန်းများအတွက် စွမ်းဆောင်ရည်မြှင့်တင်ရန်နှင့် သုတေသန ပြုလုပ်ငန်းများဆောင်ရွက်ရန်၊ အရည်အသွေးကောင်းမွန်မှု အသိအမှတ်ပြုရေး ရရှိရန်၊

(၂) ဘေးဥပါဒ်ကင်းဝေးသည့် ငါးနှင့် ငါးမှထုတ်လုပ်သည့်ကုန်ပစ္စည်းများ အလွယ်တကူ ဝယ်ယူ ရရှိနိုင်စေရန် အတွက် စျေးကွက်အခြေပြုစနစ်ဖြင့်ချဉ်းကပ်ခြင်း (Market– based system approaches) အားအသုံးပြု ဆောင်ရွက်ရန်၊

(၃) လူမှုနေထိုင်မှုပုံစံပြောင်းလဲခြင်းအစီအစဉ် (Social Behavior Change Communication (SBCC)) အားဆောင်ရွက် ပေးခြင်းဖြင့် အဟာရဓာတ်ပြည့်ဝစွာရရှိရေးနှင့် WASH လုပ်ငန်း စဉ်များဆောင်ရွက်ရေးတို့အား မြှင့်တင်ဆောင် ရွက်ရန်၊ စွမ်းဆောင်ရည်မြှင့်တင်ပေးခြင်းဖြင့် ကုန်ထုတ်လုပ်မှုအား တိုးမြင့်လာစေရန်နှင့် ဘေးဥပါဒ်ကင်းဝေးသည့် ရေထွက်အစားအစာနှင့် ငါးမှထုတ်လုပ်သည့်ကုန်ပစ္စည်းများ စားသုံးမှုမြင့်မားလာစေရေးဆောင်ရွက်ရန်၊

မျှော်မှန်းထားသည့်ရလဒ်များ

SAIL စီမံကိန်းအားဆောင်ရွက်ခြင်းဖြင့် မြန်မာနိုင်ငံရှိ အသေးစား ငါးမွေးမြူရေးလုပ်ငန်းနှင့် ဆက်စပ်လုပ်ငန်း ဆောင်ရွက်နေသူများအနေဖြင့် အကျိုးရလဒ်ကောင်းများခံစားရမည်ဟု မျှော်မှန်းထားပါသည်။ အကျိုးရလဒ်အ နဲအများရရှိမှုပေါ်မူတည်၍ ရလဒ်ငယ် (၃) ခု၊ အဓိက ရလဒ်အား ပံ့ပိုးပေးနိုင်သည့် အလယ်အလတ်ရလဒ်များ (IRs) ရရှိလိမ့်မည်ဟု မျှော်မှန်းထားပါ သည်။ စီမံကိန်းရလဒ်အနေဖြင့် အားလုံးပါဝင်နိုင်ပြီး စဉ်ဆက်မပြတ်ဖွံ့ဖြိုး တိုးတက်သည့် ငါးမွေးမြူရေးလုပ်ငန်း ကြီးထွားလာခြင်းဖြင့် အဟာရပြည့်ဝပြီး ဘေးဥပါဒ်ကင်းဝေးသည့် အစား အစာများ ပိုမိုထုတ်လုပ်လာနိုင်မည်ဖြစ်ပြီး အထူးသဖြင့် မြန်မာနိုင်ငံအလယ်ပိုင်းနှင့် မြောက်ပိုင်းရှိ မျိုးဆက် ပြန့်ပွားရေးဆောင်ရွက်နိုင်သည့် အရွယ်ရောက်အမျိုးသမီးများနှင့် ငါးနှစ်အောက်ကလေး သူငယ်များအတွက် ပိုမိုအကျိုးကျေးဇူးရရှိစေနိုင်မည်ဖြစ်ပါသည်။

အလယ်အလတ်ရလဒ် (၁) (IR1) ၊ ထုတ်လုပ်ခြင်း

ပိုမိုကောင်းမွန်သည့် မြေ၊ ရေကို အသုံးပြုခြင်းဖြင့် အသေးစား ငါးမွေးမြူထုတ်လုပ်ခြင်း လုပ်ငန်းများတိုးတက်လာ ခြင်း၊ သတင်းအချက်အလက်ရရှိမှုပိုမိုကောင်းမွန်လာစေခြင်း၊ ထည့်ဝင်ပစ္စည်း များအရည်အသွေးမြင့်မားခြင်းနှင့် အရည်အသွေးကောင်းမွန်မှု အသိအမှတ်ပြုခံရခြင်း၊

အလယ်အလတ်ရလဒ် (၂) (IR2) ၊ စျေးကွက်အတွင်း ဘေးဥပါဒ်ကင်းဝေးသည့် ငါးနှင့် ငါးမှ ထုတ်လုပ်သည့် ကုန်ပစ္စည်းများအလွယ်တကူဝယ်ယူရရှိနိုင်ခြင်း

စျေးကွက်အတွင်း ဘေးဥပါဒ်ကင်းဝေးသည့် ငါးနှင့် ငါးမှ ထုတ်လုပ်သည့်ကုန်ပစ္စည်းများ အလွယ်တကူဝယ်ယူရရှိ နိုင်ခြင်း ၊

အလယ်အလတ်ရလဒ် (၃) (IR3) ၊ အဟာရဓာတ်ပြည့်ဝစွာရရှိရေး၊ အစားအစာဘေးကင်းရေး နှင့် WASH လုပ်ငန်းစဉ် များဆောင်ရွက်ရေးတို့အား မြှင့်တင် ဆောင်ရွက်ရန်

ကျန်းမာရေးနှင့်ကိုက်ညီသည့် နေထိုင်စားသောက်မှုပုံစံပြောင်းလဲလာခြင်း၊ ဘေးဥပါဒ်ကင်းဝေး သည့် ငါးနှင့် ငါး မှထုတ်လုပ်သည့်ကုန်ပစ္စည်းများ စားသုံးမှုမြင့်မားလာခြင်း၊ WASH လုပ်ငန်းစဉ် များ ဆောင်ရွက်မှုမြင့်မားလာ ခြင်း၊ အထူးသဖြင့် မျိုးဆက်ပြန့်ပွားရေးဆောင်ရွက်နိုင်သည့် အရွယ်ရောက်အမျိုးသမီးများနှင့် ငါးနှစ်အောက် ကလေးသူငယ်များအတွက် အကျိုးကျေးဇူး ရရှိခြင်း၊

အသိအမှတ်ပြုကျေးဇူးတင်ရှိခြင်း

မြန်မာလူမျိုးများ ဝင်ငွေတိုးပွားလာစေရေးနှ အတွက် အသေးစား ငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှုအစီအစဉ်အား အမေရိကန်နိုင်ငံတကာ ဖွံ့ဖြိုးရေးအေဂျင်စီမှ ပံ့ပိုးကူညီပေးခြင်းဖြစ်ပါသည်။ ဤစီမံကိန်းသည် WorldFish ၏ ဦးဆောင်မှု ဖြင့်ဆောင်ရွက်လျက်ရှိသည့် CGIAR Research Program on Fish Agri-Food Systems (FISH) ၏ CGIAR သုတေသန အစီအစဉ်၏ အစိတ်အပိုင်းတစ်ခုအဖြစ်ဆောင်ရွက်ခြင်းဖြစ်ပြီး CGIAR Trust Fund သို့ လှူဒါန်းထားရှိသူများ၏ အထောက်အပံ့ဖြင့် ဆောင်ရွက်ခြင်းဖြစ်ပါသည်။

အသိပေးပြောကြားခြင်း

အထက်ဖော်ပြပါအချက်အလက်များသည် စာရေးသူ၏ထင်မြင်ယူဆချက်များသာဖြစ်ပြီး အမေ ရိကန်နိုင်ငံတကာ ဖွံ့ဖြိုးရေးအေဂျင်စီ၊ အမေရိကန်ပြည်ထောင်စု ၊ WorldFish၊ Fish Agri- Food Systems (FISH) ၏ CGIAR သုတေသနအစီအစဉ် (သို့မဟုတ်) CGIAR တို့၏ ယူဆချက် မဟုတ်ပါကြောင်း အသိပေးပြောကြားအပ်ပါသည်။

ဆက်သွယ်ရန်

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ရည်ညွှန်းကိုးကားခြင်း

ဤစာရွက်ထုတ်ဝေခြင်းသည် WorldFish.2020. မြန်မာလူမျိုးများ ဝင်ငွေတိုးပွားလာအတွက် အသေးစား ငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှုအစီ အစဉ် (Small – Scale Aquaculture Investments for Livelihoods). Penang. Malaysia WorldFish Fact Sheet: 2020-10. အား ရည်ညွှန်း ကိုးကားပါသည်။

ပိုမိုသောသတင်းအချက်အလက်များရယူလိုပါက www.worldfishcenter.org သို့ ဝင်ရောက် လေ့လာပါရန်။

WorldFish

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DEPARTMENT OF FISHERIES MYANMAR

MYANMAR FISHERIES FEDERATION

IWMI International Water Management Institute

CGIAR RESEARCH PROGRAM ON Fish Led by WorldFish

USAID
FROM THE AMERICAN PEOPLE

FACT SHEET
Small-Scale Aquaculture Investments for Livelihoods and Nutrition in Myanmar

Introduction

Fish provides over 60% of the animal-source food for the people of Myanmar. Capture fisheries, both inland and marine, are in decline while aquaculture production is increasing (currently about 1 million metric tons annually and predominantly from freshwater sources). In response to this growing market opportunity, planning for the supply of quality aquaculture inputs, information, microfinance, fish seed and feed need to be improved. Aquaculture has great potential to satisfy the increasing demand for fish; however in order to develop sustainable and resilient aquaculture systems there needs to be a secure water supply and land tenure, as well as inputs, information delivery and quality product distribution. It is essential that Myanmar develops a sustainable aquaculture industry that minimizes potential environmental impacts and ensures aquaculture practices are socially acceptable and economically sound. The Small-Scale Aquaculture Investments for Livelihoods and Nutrition in Myanmar project, funded by the United States Agency for International Development (USAID), aims to increase fish production, labor productivity, food availability and fish consumption, especially for women and young children from vulnerable households. It will provide opportunities for entrepreneurial activities in small-scale aquaculture systems and promote social behavioral change that results in improved nutrition, direct home production and market purchases toward nutritious-conscious household decisions.

Goals

Inclusive and sustainable small-scale aquaculture growth to increase income and dietary diversity, and to reduce poverty among beneficiary populations, especially women and children, in central and northern Myanmar.

Target group

The project's targets primarily include small-scale aquaculture households (with ponds less than half an acre in size), and associated value chain actors. The targeted number of individuals will be at least 10,000 for the life of project. The project will also integrate vulnerable groups including internally displaced people, women of reproductive age, youths and children under 5 years old.

Geographical Coverage

- Central Dry Zone: Mandalay, Magway and Sagaing
- North: Shan and Kachin

Expected Impacts by 2024

- Increased small-scale aquaculture production
- Increased access to food-safe fish and fish products in the markets
- Improved nutrition, food safety and WASH practices

Partners

- Department of Fisheries
- Myanmar Fisheries Federation
- International Water Management Institute

Timeframe

October 2019 to September 2024

Intervention pathways

The project will ensure that fish production in areas distant from the Ayeyarwady Delta will provide fish closer to fish deficit areas while promoting market systems and value chains to deliver food-safe fish and fish products to local markets. This will be accompanied by nutrition and water, sanitation and hygiene (WASH) activities integrating gender to ensure a more holistic approach that comprehends various aspects of small-scale aquaculture. The following three dimensions will be approached through intervention pathways:

1. Increase small-scale aquaculture production through strategic activities including improved land and water use, increased access to high quality inputs (feed, seed and equipment), capacity development and research into production, and access to credit.
2. Develop and use market-based system approaches to increase access to food-safe fish and fish products.
3. Deliver enhanced nutrition and WASH practices via social behavior change communication activities, and develop capacities for improved production, processing and consumption of food-safe aquaculture and other fish-based products.

Anticipated results

The project envisioned results that benefit communities associated with small-scale aquaculture in Myanmar. The project anticipates results at the impact level along with three sub-results, intermediate results (IRs), contributing into the main result.
Project result: Inclusive and sustainable aquaculture growth to improve nutrition and food security, especially for women of reproductive age and children under 5 in central and northern Myanmar.

IR 1: **Production**: small-scale aquaculture production increased by improved land and water use, and increased access to information, high quality inputs and credit.

IR 2: **Increased access to food-safe fish and fish products in the markets**: Access to domestic markets increased for small-scale aquaculture and a consistent supply of food-safe fish and fish products ensured.

IR 3: **Improved nutrition, food safety and WASH practices**: Improved dietary diversity and consumption of safe fish products and increased access to WASH practices, especially for women of reproductive age and children under 5.

Acknowledgments

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Disclaimer

The opinions expressed here belong to the authors and do not necessarily reflect those of the United States Agency for International Development, the United States Government, WorldFish, the CGIAR Research Program on Fish Agri-Food Systems or CGIAR.

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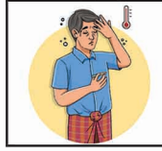
ဂင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
အသေးစား ငါးမွေးမြူရေးနည်းပညာဆိုင်ရာ အဓိကအချက်များ
ကိုရိုနာဗိုင်းရပ်စ်ရောဂါ(COVID - 19) မှ ကာကွယ်ပါ

ရောဂါကူးစက်နိုင်ခြေရှိသည့် နည်းလမ်းများ

- အသက်ရှူလမ်းကြောင်းမှတစ်ဆင့် တိုက်ရိုက်ဂင်ရောက် ကူးစက်ပျံ့နှံ့စေခြင်း။
- အရာဝတ္ထုများ၌ ထိကပ်နေသော ရောဂါပိုးများအား လက်နှင့် ကိုင်တွယ်ထိတွေ့ရာမှ ကူးစက်ခြင်း။
- လွန်ခဲ့သည် (၁၄)ရက်အတွင်း ရောဂါကူးစက်ပျံ့ပွားနေသည့် နိုင်ငံများသို့ ခရီးသွားခဲ့ခြင်း (သို့မဟုတ်) ကိုရိုနာဗိုင်းရပ်စ်ရောဂါဖြစ်ပွားသည်ဟု အတည်ပြုခံရသူနှင့် အတူနေထိုင်ခဲ့ခြင်း။

သံသယဖြစ်ဖွယ် ရောဂါလက္ခဏာများ



ဖျားခြင်း
(၃၈ ဒီဂရီစင်တီဂရိတ်/ ၁၀၀.၄ ဒီဂရီဖာရင်ဟိုက်အထက်ရှိခြင်း)

ချောင်းဆိုးခြင်း

အသက်ရှူမဝခြင်းနှင့် အသက်ရှူရခက်ခဲခြင်းများ

ကာကွယ်နိုင်ရန် နည်းလမ်းများ

ဖျားနာနေသူများနှင့် အနီးကပ်ထိတွေ့ခြင်းမှ ရှောင်ကြဉ်ပါ။

ထိတွေ့လေ့ရှိသော အရာဝတ္ထုများနှင့် မျက်နှာပြင်များကို မကြာခဏ သန့်ရှင်း၍ ပိုးသတ်သန့်စင်ပါ။

နှာချေ၊ ချောင်းဆိုးသည့်အခါ နှာခေါင်းနှင့် ပါးစပ်ကို လုံခြုံအောင် ဖုံးအုပ်ပါ။ တစ်ရှူးအသုံးပြုပါက အမှိုက်ပုံးထဲသို့ စနစ်တကျ စွန့်ပစ်ပြီး လက်ကိုစနစ်တကျ ပြန်လည် ဆေးကြောပါ။

ကျန်းမာရေးအတွက် ဆေးကုသမှုခံယူရမည့် အချိန်မှလွဲ၍ သင်နေမကောင်းလျှင် အိမ်မှာနေပါ။

သင်၏ မျက်လုံးများ၊ နှာခေါင်းနှင့် ပါးစပ်တို့ကို လက်ဖြင့် ထိတွေ့ခြင်းမှ ရှောင်ကြဉ်ပါ။

သင်၏လက်များကို မကြာခဏ ဆပ်ပြာနှင့် ရေဖြင့် အနည်းဆုံး (၂၀)စက္ကန့်ကြာအောင် စနစ်တကျဆေးကြောပါ။

စနစ်တကျလက်ဆေးနည်း

1 လက်ဖဝါးခြင်း ပွတ်ပါ

2 လက်ဖမိုးခြင်း

3 လက်ခေါက်ချိုး

4 လက္ခဏာများကို ကုတ်ခြစ်ပါ

5 လက်ချောင်းများကြား

6 လက်မများ

7 လက်ကောက်ဝတ်အထိ ဆေးပါ

8 ရေဖြင့် သေချာစွာ ဆေး၍ ခြောက်အောင် သုတ်ပါ

ကိုးကား_ကျန်းမာရေးနှင့် အားကစားဝန်ကြီးဌာန

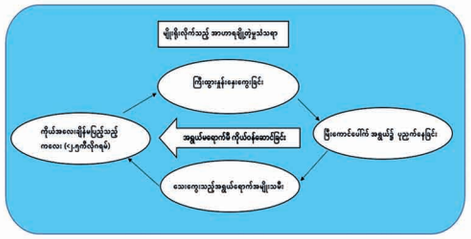
ဂင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
အသေးစား ငါးမွေးမြူရေးနည်းပညာဆိုင်ရာ အဓိကအချက်များ
အာဟာရနှင့် ရေ၊ တစ်ကိုယ်ရေသန့်ရှင်းရေးနှင့် ပတ်ဝန်းကျင်သန့်ရှင်းရေးဆိုင်ရာ အကြောင်းအရာများ

အခြေခံအစားအစာအုပ်စု၊ အာဟာရပြည့်ဝမျှတစွာ စားသုံးခြင်း

- နေ့စဉ် အစားအစာအုပ်စုစုံလင်စွာ စားသုံးခြင်းသည် မိသားစုအတွက် ကောင်းမွန်သော အာဟာရကို ရရှိစေသည်။
- ကျန်းမာရေးကောင်းမွန်စေရန် ဈေးနှုန်းချိုသာပြီး အလွယ်တကူရရှိနိုင်သည့် ဗီတာမင်များနှင့် သတ္တုဓာတ်များ ကြွယ်ဝသော အစားအစာများကို အသုံးပြုပါ။ (သစ်သီးဝလံ၊ ဟင်းသီးဟင်းရွက်နှင့် အသား၊ ငါးများ)
- ကလေးငယ်များ ဖွံ့ဖြိုးတိုးတက်စေရန်အတွက် အာဟာရကြွယ်ဝသော အရိုးပါစားသုံးနိုင်သည့် ငါးငယ်ကလေးများကို (ဦးခေါင်းနှင့် အရိုးပါ) စားသုံးခြင်းဖြင့် ဗီတာမင်အေ၊ သံဓါတ်၊ ကယ်လစီယမ်၊ ဗီတာမင် B-12 စသည့် အာဟာရဓါတ်များကို ရရှိနိုင်ပါသည်။

မျိုးရိုးလိုက်သည့် အာဟာရချို့တဲ့မှု သံသရာ

- မွေးကင်းစနှင့် ကလေးငယ်များကို ကောင်းစွာကျွေးမွေးပြုစုခြင်း၊ မီးမဖွားမီ ဆေးပေးခန်းသို့သွား၍ စောင့်ရှောက်မှုခံယူခြင်း၊



ကလေးများကို ကာကွယ်ဆေးမှန်မှန်ထိုးပေးခြင်း၊ မိသားစုဝိမံကိန်းကျဉ်သုံးခြင်းနှင့် အထူးသဖြင့် အပျိုပေါက်အရွယ် အမျိုးသမီးများအား အစာအုပ်စုစုံလင်စွာ စားသုံးစေခြင်းသည် မျိုးဆက်တစ်ခုမှ တစ်ခုဆီသို့ ဆင်းသက်နိုင်သော အာဟာရ ချို့တဲ့မှုသံသရာကို ချိုးဖျက်နိုင်ရန်အတွက် အရေးကြီးပါသည်။

- ကလေးငယ်ကို မိခင်ကိုယ်ဝန်ဆောင်နေစဉ်၊ နို့တိုက်ကျွေးချိန်နှင့် ဖြည့်စွက်စာကျွေးစဉ် ကာလ အတွင်း ကောင်းမွန်သော အာဟာရထောက်ပံ့ရန်အတွက် မိခင်၊ ဖခင်နှင့် အဘိုးအဖွားများသည် အရေးပါသော အခန်းကဏ္ဍတွင် ပါဝင်သည်။

- ကလေးငယ်၏ ကာယနှင့် ဉာဏပိုင်းဆိုင်ရာ ဖွံ့ဖြိုးမှု၊ ခန္ဓာကိုယ်သန့်စွမ်းမှုများနှင့် ကိုယ်ဝန်ဆောင် မိခင်များအနေဖြင့် ကိုယ်ဝန်ဆောင်နေစဉ်တွင် ရောဂါများကို ကာကွယ်ရန်အတွက် နေ့စဉ်စားသုံးသော အစားအစာများတွင် အိုင်အိုဒင်းဆား သင့်တင့်သော ပမာဏကို အသုံးပြုရန် အကြံပြုသည်။

ပင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
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အာဟာရနှင့် ရေ၊ တစ်ကိုယ်ရေသန့်ရှင်းရေးနှင့် ပတ်ဝန်းကျင်သန့်ရှင်းရေးဆိုင်ရာ အကြောင်းအရာများ

နို့တိုက်ကျွေးခြင်းနှင့် ဖြည့်စွက်အစာကျွေးခြင်း

- မိခင်နို့သည် ကလေးအတွက် အကောင်းဆုံးဖြစ်ပြီး (၀)လမှ (၆)လအတွင်း ကလေးငယ်အတွက် လိုအပ်သည့်တစ်ခုတည်းသော အစာအာဟာရဖြစ်သည်။
- ကလေး(၆)လအရွယ်ရောက်သောအခါ အရည်အသွေးကောင်းမွန်သော ဖြည့်စွက်အစာများကို မှန်ကန်သော အကြိမ်ပမာဏနှင့် ကျွေးရမည်။
- မိသားစုဝင်များသည် နို့တိုက်မိခင်များကို အိမ်မှုကိစ္စများ၊ ချက်ပြုတ်ပေးခြင်းများနှင့် ၎င်းတို့၏အလုပ်အကိုင်များတွင် ကူညီပေးခြင်းဖြင့် မိခင်များမှ သူတို့၏ ကလေးငယ်အား နို့တိုက်ချိန်ပိုရနိုင်သည်။

ငါး၏ အာဟာရတန်ဖိုး

- အရိုးပါစားရှင်းရသော ငါးငယ်များသည် အာဟာရကြွယ်ဝသော ငါးများဖြစ်ပြီး (ဥခေါင်းနှင့် အရိုးများပါ စားသောအခါ) ကြီးမားသော ငါးမျိုးစိတ်များထက် အာဟာရတန်ဖိုး ပိုမိုများပြားသည်။
- မိခင်များ၊ ဖခင်များနှင့် စောင့်ရှောက်သူများသည် ကလေးငယ်များအတွက် နှစ်သက်နိုင်သည့်နည်းများဖြင့် အာဟာရကြွယ်ဝသော ငါးကလေးများကို အမျိုးမျိုးချက်ပြုတ်ကျွေးရန် တိုက်တွန်းပါသည်။

ကန်ဘောင်တွင် ဟင်းသီးဟင်းရွက်များ စိုက်ပျိုးခြင်း

- အထူးသဖြင့် ကလေးငယ်များနှင့် မျိုးဆက်ပြန့်ပွားနိုင်ရေးဆောင်ရွက်နိုင်သည့် အရွယ်ရောက်အမျိုးသမီးများအတွက် အာဟာရပြည့်ဝပြီး ကျန်းမာရေးနှင့် ကိုက်ညီသော အစားအစာများ တိုးပွားလာရန်အတွက် ဗီတာမင်အေနှင့် သံဓါတ်ကြွယ်ဝသော အရောင်ပါအသီးအနှံများနှင့် ဟင်းသီးဟင်းရွက်များကို ကန်ဘောင်တွင် စိုက်ပျိုးပါ။

ပင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
အသေးစား ငါးမွေးမြူရေးနည်းပညာဆိုင်ရာ အဓိကအချက်များ
အာဟာရနှင့် ရေ၊ တစ်ကိုယ်ရေသန့်ရှင်းရေးနှင့် ပတ်ဝန်းကျင်သန့်ရှင်းရေးဆိုင်ရာ အကြောင်းအရာများ

ပတ်ဝန်းကျင် သန့်ရှင်းရေး

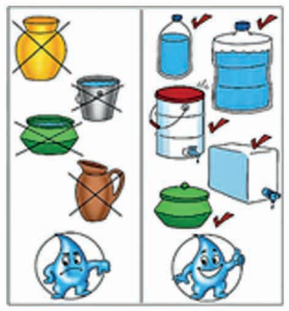
- မွေးကင်းစနှင့် ကလေးငယ်များကို အာဟာရချို့တဲခြင်းနှင့် အသက်ပါဆုံးရှုံးစေနိုင်သော ဝမ်းလျှောဝမ်းပျက်ရောဂါကဲ့သို့သော ရောဂါများကို ကာကွယ်ရန်၊ အိမ်နှင့် အိမ်ပတ်ဝန်းကျင်သန့်ရှင်းရေးကို ထိန်းသိမ်းရန်အတွက် ယင်လုံအိမ်သာများ ဆောက်လုပ်ပါ။

စနစ်တကျ လက်ဆေးခြင်း

- ဝမ်းလျှောဝမ်းပျက်၊ အူရောင်ငန်းဖျားနှင့် ကာလာဝမ်းရောဂါတို့မှ ကာကွယ်ရန် လက်များကို ဆပ်ပြာနှင့် စနစ်တကျဆေးကြောရန် အလွန်အရေးကြီးသည်။ အထူးသဖြင့် အိမ်သာအသုံးပြုပြီးနောက်၊ အစားအစာပြင်ဆင်ခြင်း မပြုလုပ်မီ၊ ကလေးငယ်၏ အညစ်အကြေးများကို သန့်စင်ပြီးနောက်၊ အစာအစားမီနှင့် မိသားစုနှင့် ကလေးငယ်အား အစားအစာကျွေးခြင်း မပြုလုပ်မီ အချိန်များတွင် လက်ကို သေချာစွာ ဆေးကြောရပါမည်။

ကောင်းမွန်စွာ အစားအစာကိုင်တွယ်ခြင်းနှင့် သိုလှောင်ခြင်း

- ဖျားနာမှုမှကာကွယ်ရန် သန့်စင်သောရေကို သောက်သုံးပါ။ ရေထည့်ထားသည့် အရာဝတ္ထုများကို အချိန်တိုင်းဖုံးအုပ်ထားခြင်းဖြင့် သန့်ရှင်းအောင်ထားရှိပါ။
- အစားအစာများကို ထည့်သိုရာတွင် ကျန်းမာရေးကို အန္တရာယ်ဖြစ်စေနိုင်သော မစင်၊ အင်းဆက်ပိုးများ၊ တိရိစ္ဆာန်များနှင့် ပိုးသတ်ဆေးများမှ ကင်းဝေးသည့် သန့်ရှင်းသော ပန်းကန်ခွက်ယောက်များနှင့် အခြားမီးဖိုချောင်ပစ္စည်းများကို အသုံးပြုပါ။
- ကျန်းမာရေးအတွက် အန္တရာယ်ဖြစ်စေနိုင်သော ကပ်ပါးပိုးများကို သေစေနိုင်ရန်အတွက် အစားအစာ ချက်ပြုတ်ရာတွင် သင့်တော်သော ကြာချိန်၊ အပူချိန်တို့ဖြင့် အမြဲချက်ပြုတ်ပါ။



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ပင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
အသေးစား ငါးမွေးမြူရေးနည်းပညာဆိုင်ရာ အဓိကအချက်များ

၄.၂ ငါးမွေးမြူစဉ် ကြုံတွေ့နိုင်သော အခက်အခဲများနှင့် ဖြေရှင်းနိုင်သည့် နည်းလမ်းများ

အခက်အခဲများ	ဖြေရှင်းရမည့်နည်းလမ်းများ
ကန်ရေထဲတွင် အောက်ဆီဂျင် လျော့နည်းခြင်း (ငါးများသည် ကန်ရေပြင်အပေါ်သို့ တက်၍ အောက်ဆီဂျင် ရယူခြင်း)	• ကန်ရေကို လှိုင်းထအောင် ပြုလုပ်ပေးခြင်း။ (လက်ဖြင့်ရေပွယမ်းခြင်း၊ ရိုက်ခတ်ခြင်း) • ပြင်ပမှ သန့်ရှင်းသော ရေကို သွင်းယူခြင်း။ • ငါးအစာကျွေးခြင်း၊ ဓာတ်မြေဩဇာထည့်ခြင်းကို ရပ်ထားပါ။
ကန်၏ ရေမျက်နှာပြင်တွင် အနီရောင်လွှမ်းခြင်း	• ကောက်ရိုး(သို့)ငှက်ပျောလက်ကို ကြိုးပြုလုပ်၍ အနီရောင် အလွှာကို ဖယ်ရှားခြင်း။ • ဝ.၀၁ ဇကာအတွက် ယူရီးယား (၁၀) ကျပ်သားကို တစ်ရက်လျှင် ၂ကြိမ်ခန့် (သို့) ကျောက်ချဉ် (၆) ကျပ်သား သုံးရမည်။
ကန်၏ ရေမျက်နှာပြင်တွင် အစိမ်းရောင်လွှမ်းခြင်း	• ကောက်ရိုး(သို့)ငှက်ပျောလက်ကို ကြိုးပြုလုပ်၍ အစိမ်းရောင် အလွှာကို ဖယ်ရှားခြင်း။ • အစာကျွေးခြင်းနှင့် ဓာတ်မြေဩဇာ အသုံးပြုခြင်းကို ရပ်ထားပါ။ • ဇီဝဗေဒဆိုင်ရာထိန်းချုပ်မှုအတွက် ကန်ထဲကို ငွေရောင်ငါးကြင်း ငါးကြိုးများ ထည့်ပေးထားပါ။
ကန်ရေ နောက်ကျိခြင်း	• ဝ.၀၁ ဇကာအတွက် ထုံး(၃၀)ကျပ်သား သုံးရမည်။ • ဝ.၀၁ ဇကာအတွက် ဂျစ်ဆမ်း(၉၄)ကျပ်သား သုံးရမည်။ • ဝ.၀၁ ဇကာအတွက် ကောက်ရိုးခြောက်(၁)ပိဿာ (သို့) (၂)ပိဿာ သုံးရမည်။

၅) ငါးဖမ်းဆီးခြင်း

- ငါးကြိုးများကို ရွေးချယ်ဖမ်းဆီးခြင်းနှင့် အရွယ်ကြီးသော ငါးသားပေါက်များ ကန်ထဲသို့ ပြန်လည် ထည့်သွင်းခြင်းကို ပြုလုပ်ရမည်။ ထိုမှသာ ကျန်ရှိသော ငါးငယ်များ ပိုမိုမြန်ဆန်စွာ ကြီးထွားစေမှာ ဖြစ်သည်။
- ငါးအစာ၊ မြေဩဇာများ ပယ်ယူရန် ငွေရရှိခြင်း။
- မိုးခေါင် ရေရှားခြင်းနှင့် ရေကြီးခြင်းကဲ့သို့သော သဘာဝဘေးအန္တရာယ်များဖြစ်ပွားခဲ့လျှင် ဆုံးရှုံးမှုကို နည်းစေပါသည်။
- လူမှုဖူလုံရေးအတွက် အဟန့်အတားများကို လျော့ကျစေပါသည်။

ပင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
အသေးစား ငါးမွေးမြူရေးနည်းပညာဆိုင်ရာ အဓိကအချက်များ
ကိုဗိုနာဗိုင်းရပ်စ်ရောဂါ(COVID - 19) မှ ကာကွယ်ပါ

ရောဂါကူးစက်နိုင်ခြေရှိသည့် နည်းလမ်းများ

- အသက်ရှူလမ်းကြောင်းမှတစ်ဆင့် တိုက်ရိုက်ဝင်ရောက် ကူးစက်ပျံ့နှံ့စေခြင်း။
- အရောပတ္ထုများ၌ ထိကပ်နေသော ရောဂါပိုးများအား လက်နှင့် ကိုင်တွယ်ထိတွေ့ရာမှ ကူးစက်ခြင်း။
- လွန်ခဲ့သည် (၁၄)ရက်အတွင်း ရောဂါကူးစက်ပျံ့ပွားနေသည့် နိုင်ငံများသို့ ခရီးသွားခဲ့ခြင်း (သို့) ကိုဗိုနာဗိုင်းရပ်စ်ရောဂါဖြစ်ပွားသည်ဟု အတည်ပြုခံရသူနှင့် အတူနေထိုင်ခဲ့ခြင်း။

သံသယဖြစ်ဖွယ် ရောဂါလက္ခဏာများ

ချားခြင်း
(၃၈ ဒီဂရီစင်တီဂရိတ်/ ၁၀၀.၄ ဒီဂရီဖာရင်ဟိုက်အထက်ရှိခြင်း)

ချောင်းဆိုးခြင်း

အသက်ရှူမဝခြင်းနှင့် အသက်ရှူရခက်ခဲခြင်းများ

ကာကွယ်နိုင်ရန် နည်းလမ်းများ

များနာနေသူများနှင့် အနီးကပ်ထိတွေ့ခြင်းမှ ရှောင်ကြဉ်ပါ။

ထိတွေ့လေ့ရှိသော အရာပတ္ထုများနှင့် မျက်နှာပြင်များကို မကြာခဏ သန့်ရှင်း၍ ပိုးသတ်သန့်စင်ပါ။

နှာချေ၊ ချောင်းဆိုးသည့်အခါ နှာခေါင်းနှင့် ပါးစပ်ကို လုံခြုံအောင် ဖုံးအုပ်ပါ။ တစ်ရွာအသုံးပြုပါက အဖိုက်ဝပုံထဲသို့ စနစ်တကျ စွန့်ပစ်ပြီး လက်ကို စနစ်တကျ ပြန်လည် ဆေးကြောပါ။

ကျန်းမာရေးအတွက် ဆေးကုသမှုခံယူရမည့် အရိပ်နှိမ့် လွှဲ၍ သင်နေမကောင်းလျှင် အိမ်မှာနေပါ။

သင်၏ မျက်လုံးများ၊ နှာခေါင်းနှင့် ပါးစပ်တို့ကို လက်ဖြင့် ထိတွေ့ခြင်းမှ ရှောင်ကြဉ်ပါ။

သင်၏လက်များကို မကြာခဏ ဆပ်ပြာနှင့် ဆေးြေကာ သန့်ရှင်းအောင် စနစ်တကျ ဆေးကြောပါ။

စနစ်တကျလက်ဆေးနည်း

1 လက်ဖဝါးခြင်း ပွတ်ပါ

2 လက်ဖမိုးခြင်း

3 လက်ခေါက်ချိုး

4 လက္ခဏာများကို ကုတ်ခြစ်ပါ

5 လက်ချောင်းများကြား

6 လက်မများ

7 လက်ကောက်ဝတ်အထိ ဆေးပါ

8 ခြေဖြင့် သေချာစွာဆေး၍ ခြောက်အောင်သုတ်ပါ

ကိုးကား_ကျန်းမာရေးနှင့် အားကစားဝန်ကြီးဌာန

ပင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
အသေးစား ငါးမွေးမြူရေးနည်းပညာဆိုင်ရာ အဓိကအချက်များ

၁) ငါးသားပေါက်မထည့်မီ စီမံဆောင်ရွက်မှု

၁.၁ ကန်ဘောင်နှင့် ကန်အောက်ခြေပြင်ဆင်ခြင်း

- ကန်အောက်ခြေရှိ မြေသားအနက်ရောင်များကို ဖယ်ရှားခြင်းဖြင့် ကန်ဘောင်ကို ခိုင်ခန့်အောင် ပြုလုပ်ရမည်။
- သစ်ပင်၊ ချုံပုတ်များနှင့် သစ်ရွက်များကို ဖယ်ရှားရမည်။

၁.၂ သားစားငါးရိုင်းများကို ဖယ်ရှားခြင်း

- ကန်အောက်ခြေကြမ်းပြင်ကို အခြောက်ခံခြင်း။
- ပိုက်စိတ်ဖြင့် ဆွဲ၍ ငါးရိုင်းများကို ဖယ်ရှားခြင်း။
- ငါးရိုင်းသတ်ဆေး ရိုတီနန်း(ဝ.၀၁ ဇက၊ ရေအနက် ၁ပေအတွက် (၂)ကျပ်သား၊ လက်ဖက်ဓေ့ (၀.၀၁ ဇက၊ ရေအနက် ၁ပေ အတွက် (၄၇)ကျပ်သား သုံးရမည်)။

၁.၃ ထုံးသုံးခြင်း

- မဖောက်ထုံးကို ရေနှင့် ဖျော်ပြီး ကန်အောက်ခြေကြမ်းပြင်နှင့် ကန်ဘောင်ကို ပက်ဖြန်းပေးပါ (ဝ.၀၁ ဇက အတွက် (၆၃)ကျပ်သား)
- ထုံးသုံးခြင်းဖြင့် ကပ်ပါးကောင်၊ ရောဂါပိုးများနှင့် ဘတ်တီးရီးယားများကို ဖျက်ဆီးပေးခြင်း၊ (PH) ချည်ဖန်နှုန်းကို တိုးပွားစေခြင်းနှင့် ရေသြဇာဖြစ်ထွန်းမှုကို အထောက်အကူပြုသည်။

၁.၄ ဓာတ်မြေဩဇာ အသုံးပြုခြင်း (ကန်ထဲသို့ ရေဖြည့်ပြီးနောက်)

- ဝ.၀၁ ဇက အတွက် တီစူပါ(၁၀)ကျပ်သား၊ ယူရီးယား(၁၀) ကျပ်သားနှင့် သဘာဝမြေဩဇာ (၃၀သားနှင့် ၈၀ကျပ်သား) အသုံးပြုရမည်။
- ၎င်းဓာတ်မြေဩဇာကို ထုံးအသုံးပြုပြီး (၅)ရက်ကြာပြီးနောက် အသုံးပြုရမည်။

ပင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
အသေးစား ငါးမွေးမြူရေးနည်းပညာဆိုင်ရာ အဓိကအချက်များ

၂) ငါးသားပေါက်ထည့်သွင်းရာတွင် စီမံဆောင်ရွက်မှု

၂.၁ ကျန်းမာသန်စွမ်းသော ငါးသားပေါက်၏ လက္ခဏာများ


- တောက်ပသော အရောင်အဆင်းရှိခြင်း၊ ခန္ဓာကိုယ်တွင် အကြေးခွံစုံလင်စွာ ရှိခြင်းနှင့် ပါးဟက်နှင့် ကိုယ်ပေါ်တွင် အနီရောင် အစက်အပြောက်များ မရှိရပါ။

၂.၂ ငါးသားပေါက်ထည့်သွင်းရာတွင် သတိပြုရမည့် အချက်များ(ငါးမှဲ/ ငါးဖျန်း)

- ငါးသားပေါက်သယ်လာသော အိုး၊ ပုံး၊ ပလပ်စတစ်အိတ်များကို ကန်ရေ မျက်နှာပြင်တွင် မိနစ်(၂၀)ခန့် မျှောထားပါ။
- သားပေါက်ထည့်ထားသောအိတ်ကို ဖြည်းညည်းစွာဖောင်းပြီး ငါးသားပေါက်များကို အလို အလျောက် ရေပြင်သို့ ကူးခတ်သွားစေရမည်။

၂.၃ ငါးကန် ၀.၀၁ ဧကအတွက် ငါးသားပေါက်ထည့်သွင်းမှု ပုံစံ

ငါးမျိုးစိတ်	ရေလွှာအလိုက် နေထိုင်မှုပုံစံ	အရွယ်အစား (လက်မ)	၀.၀၁ ဧကတွင် ထည့်သွင်း ငါးကောင်ရေ				
			ပုံစံ(၁)	ပုံစံ(၂)	ပုံစံ(၃)	ပုံစံ(၄)	ပုံစံ(၅)
ငါးခေါင်းပွ/ ငွေရောင်ငါးကြင်း	ရေပေါ်	၅ - ၆	၈	၈	၈	၈	၈
ငါးမြစ်ချင်း	ရေလယ်၊ ရေအောက်	၆ - ၈	၁၂	၂၅	၆	၂	
ငါးကြင်း/ ရွှေပါ	ရေအောက်	၆ - ၈	၄	၄	၆		
မြက်စားငါးကြင်း	ရေလွှာအစုံ	၆ - ၉	၄			၄	
ထိုင်းငါးခုံးမ	ရေပေါ်၊ ရေလယ်	၂ - ၃	၁၅		၄၀		
ငါးရူ/ ငါးကျည်း	ရေအောက်	၅ - ၆					၂၂
တီလားငီးယား (Mono Sex)	ရေလွှာအစုံ	၃ - ၄				၁၀၀	
ငါးတန်	ရေလွှာအစုံ	၄ - ၅					၈၀
စုစုပေါင်း			၄၄	၃၆	၆၀	၁၁၄	၁၀၀

မှတ်ချက်။ ။ ပုံစံ ၁ - ၂ တွင် ငါးဘဲဖြူငါးကို အကောင် ၈၀ - ၁၀၀ ထည့်မွေးနိုင်ပါသည်။

ပင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
အသေးစား ငါးမွေးမြူရေးနည်းပညာဆိုင်ရာ အဓိကအချက်များ

၃) ငါးသားပေါက်ထည့်သွင်းပြီးနောက် စီမံဆောင်ရွက်မှု

၃.၁ ဓာတ်မြေဩဇာ အသုံးပြုခြင်း

- ကန်၏ ရေအရောင်သည် အစိမ်းရောင် သို့မဟုတ် အညိုရောင် ဖြစ်သင့်သည်။ ကန်ရေ အလွန်ကြည်နေလျှင် ငါးများစားသုံးရန် သဘာဝအစားအစာဖြစ်သော (အပင်မျှောလေးနှင့် အကောင်မျှောလေးများ) မရှိခြင်းကို ဆိုလိုသည်။
- သဘာဝအစားအစာတိုးပွားရန် အောက်ပါအတိုင်း မြေဩဇာ အသုံးပြုရမည်။
  - ✔ ၀.၀၁ ဧကအတွက် တီရူပါ(၆)ကျပ်သား၊ ယူရီယား(၆)ကျပ်သားနှင့် သဘာဝမြေဩဇာ(၃)ပိဿာ အသုံးပြုရမည်။
  - ✔ ၀.၀၁ ဧကအတွက် ထုံး(၁၂)ကျပ်သားကို ဓာတ်မြေဩဇာမသုံးခင် (၂ - ၃)ရက် အလိုတွင် သုံးရမည်။

၃.၂ အစာကျွေးခြင်း

- ငါးအစာကို (၃% မှ ၁၀%)အထိ တစ်နေ့နှုံး (၂)ကြိမ်ကျွေးရမည်။
  (နံနက် ၉ - ၁၀ နာရီ၊ ညနေ ၄ - ၅ နာရီ)
- အစာကျွေးနှုန်းသည် ငါး၏ ကိုယ်ခန္ဓာအလေးချိန်၊ အရွယ်အစားပေါ် မူတည်သည်။
- လစဉ် ငါးနမူနာကောက်ယူပြီးမှ အစာကျွေးနှုန်းကို ပြောင်းလဲကျွေးရန် လိုအပ်သည်။

ဥပမာ။ ။ နေ့စဉ်အစာကျွေးနှုန်း = (ပျမ်းမျှ ငါးအလေးချိန် x ကန်ထဲရှိ စုစုပေါင်းငါးကောင်ရေ x ၃%)

ပျမ်းမျှ ငါးအလေးချိန် (၁)ကျပ်သား x ကန်ထဲရှိ စုစုပေါင်း ငါးကောင်ရေ (၁၀၀၀) x ၃% = ၃၀ ကျပ်သားသည် တစ်နေ့ကျွေးရမည့် အစာပမာဏဖြစ်သည်။ (နံနက်ပိုင်း - ၁၅ ကျပ်သား၊ ညနေပိုင်း - ၁၅ ကျပ်သား ကျွေးရမည်)



ပင်ငွေတိုးပွားလာစေရေးအတွက် အသေးစားငါးမွေးမြူရေးလုပ်ငန်း ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်
အသေးစား ငါးမွေးမြူရေးနည်းပညာဆိုင်ရာ အဓိကအချက်များ

၃.၄ အစာမှ ငါးအသားတိုးပြောင်းလဲခြင်း အချိုး (FCR) ဆိုသည်မှာ အဘယ်နည်း။


အစာမှ ငါးအသားတိုးပြောင်းလဲခြင်း အချိုး (FCR) = ကျွေးလိုက်သော အစာစုစုပေါင်း (၁၂၀ ပိဿာ) / စုစုပေါင်း ငါးအလေးချိန် (၄၀ ပိဿာ) = ၃(ရလဒ်)

ရလဒ် - ၃ သည် ငါးအသား(၁)ပိဿာရအောင် အစာ(၃)ပိဿာ ကျွေးရသည်ကို ဆိုလိုသည်။ ထိုသို့ဆိုလျှင် ငါးမွေးမြူခြင်းသည် လက်ရှိရှုံးနေပြီဖြစ်သည်။ အစာ(၃)ပိဿာသည် **၃၀၀၀** ကျပ် ပေးရသည်။ ငါး(၁)ပိဿာသည် **၂၈၀၀** ကျပ်ပြန်ရသည်။
(ရလဒ်သည် - ၂ ကျော်လျှင် ရှုံးသည်) ရလဒ်၏ ကိန်းကဏ္ဍာန်းငယ်လေ အမြတ်များလေလေ ဖြစ်သည်။ ဤအကြောင်းအရာသည် အစာနှင့် ငါး တန်ဖိုးနှိုင်းယှဉ်ခြင်းသာ ဖြစ်ပါသည်။ အခြားကုန်ကျစရိတ်တွေ အများကြီးရှိပါသည်။
ဥပမာ - ငါးသားပေါက်ဈေး၊ လုပ်သားခ စသည်တို့ ဖြစ်သည်။

၄) အထွေထွေ စီမံဆောင်ရွက်မှု

၄.၁ ကန်အောက်ခြေကို ချိန်းကြိုးဆွဲခြင်း


- ကန်အောက်ခြေမှ အန္တရာယ်ရှိသော ဓာတ်ငွေ့များကို ဖယ်ရှားပေးသည်။
- ချိန်းကြိုးဆွဲစဉ် ငါးများလျင်မြန်စွာ ကူးခတ်ခြင်းကြောင့် ကျန်းမာသန်စွမ်းသည်။
- အစာစားနှုန်း တိုးလာပြီး ငါးကြီးထွားနှုန်း မြန်ဆန်လာသည်။

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