

Prioritizing climate smart aquaculture (CSAq) in Myanmar

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Several aquaculture technologies could be classified as climate-smart based on their potential to increase food security, develop and enhance resilience to climate risks, and contribute to mitigation co-benefits. Climate-smart aquaculture (CSAq) technologies, however, present both trade-offs and synergies depending on the specific context where implemented. This makes it necessary to recognize the different actors, incentives, and constraints to adoption in order to identify locally appropriate interventions. Prioritization of CSAq technologies is a fundamental first step towards minimizing trade-offs and maximizing synergies. However, the indicators that farmers and experts use to prioritize aquaculture technologies, in general, and CSAq practices, in particular, are not well known. Yet an individual farmer’s choice of a technology and ultimate use will depend on the attributes favored or disfavored about the technology. We will apply an adapted CSA-RA tool combining participatory workshops, expert interviews, and farm transect walks (Mwongera et al., 2014) to assess key barriers and opportunities to CSAq adoption across landscapes in Myanmar. The following specific objectives are addressed:

- 1) Obtain a preliminary understanding of the farming systems and other important aquaculture-related features.
- 2) Identify farmers’ perceptions of weather patterns (e.g., climate variability) and its perceived impact on aquaculture.
- 3) Obtain a preliminary understanding of major challenges and constraints faced by aquaculture farmers (i.e., climate variability, fish health, markets, etc.).
- 4) Identify existing and potential climate smart aquaculture (CSAq) practices, feeding and disease management practices.
- 5) To understand the criteria farmers use to prioritize aquaculture practices.
- 6) Identify opportunities for mainstreaming CSA and potential biophysical, social, economic and/or institutional barriers to adoption.
- 7) Identify gender dynamics related to objectives 1-5.

Preparing for the CSA-RA

1. Site selection

The CSA-RA will be implemented in X district. Within the district, wards and villages will be selected based on the following criteria:

- 1) To capture variability of climate and topography—this should represent variability in farming systems.
- 2) To capture the socio-economic variability.

2. Establish contact with local authorities

Before going to the field, the team will establish contact and obtain authorization from the relevant government authorities to work at the sites and conduct interviews. In addition, the team will notify the local authorities on the CSA-RA activities and purpose.

3. Contact key informants and schedule meetings

Meetings with key informants will be scheduled before arriving at the site. Key informant interviews will be conducted with those knowledgeable about aquaculture in Myanmar and/or climate related issues in the region. This includes aquaculture and fisheries officials, district level authorities, local NGOs and farmer associations.

4. Participants for the farmers' workshop

Within the district participants for the workshops will be invited from different villages to get perspectives from different parts of the area. 30-40 farmers will be invited; efforts will be made to ensure sampled participants include youthful farmers (in this case below 30 years of age) and have a balanced gender representation.

5. Space and Time

The workshop will be held at a centrally located place that both men and women feel comfortable attending. The place should have sufficient room for all participants and the CSA-RA team—i.e., the venue should be able to accommodate 6 break-out groups and 50 people comfortably.

The time should be suitable for both male and female participants (market days, funeral days, celebration days, and other days that are not suitable for the local situation will be avoided).

6. Tools required for the CSA-RA workshops

1. Flip charts
2. Markers (many colours and enough for each group to have several)
3. Prepared charts (see specific activity needs below)
4. Prepared charts (see specific activity needs below)
5. Pens, notebooks, prepared matrices for filling out/note-taking
6. Masking tape
7. Name tags

7. Introductions to the administrative authorities

Upon arrival in the site, introduce the team and the project to the relevant authorities, discuss the planned activities and confirm that the logistics for each activity are settled.

8. Training of Enumerators for the CSA-RA

Ideally the research team would consist of 6 enumerators/facilitators (apart from the main facilitators) who have experience with field visits and holding workshops. Where possible we will recruit an equal number of male and female enumerators—ideally female enumerators will lead the women's group work.

Enumerators will need adequate training in order to collect the needed data. About a week before meeting the team for training the manual will be sent to them so that they can study and prepare questions.

One day is required for training to go over the manual and address any questions or concerns. The second day is reserved for the team to pre-test the tool; this should include doing the workshop activities.

It is important to make sure all enumerators understand how the workshops will be conducted, practice effective facilitation skills for all activities in an experiential learning process.

II. Farmer workshop

The farmers' workshop lasts approximately 5 hours. The following activities will be conducted.

1. Registration

Time: 9:15 am

Duration: 15 minutes

Facilitators: Local team/Kelvin/Nhuong

On arrival at the workshop, registration of farmers will include age, sex, level of education, village and contact information.

During registration chiefs and other leaders will be identified. This information will be communicated with the facilitator leading the introduction session 2, so he/she can acknowledge the local leaders.

(Information collected during registration will be used to place farmers into focus groups, according to gender and agro-ecological zone).

2. Introduction

Time: 9.30 am

Duration: 20 mins

Facilitator: Local team/Kelvin/Nhuong

Instructions:

1. Invite one local leader or the host to open the workshop (Welcome everybody, say a few words, and give farmers an opportunity to introduce themselves by saying their names and where they come from).
2. One person from the WorldFish team to introduce the rest of the research team.
3. Consent – read the consent loud and invite a representative among farmers to sign if they agree (See Appendix 1A for the consent). Also seek consent for taking photos.

4. WorldFish team to explain the objectives of the meeting and the agenda including expected total time for the workshop. We will also seek farmers' thoughts and what they expect at the end of the workshop.
5. Proceed to the mapping exercise.

3. Ice breaker: Mapping exercise

Time: 9.50 am

Duration: 30 minutes

The objectives of this activity are:

1. To identify agro-ecological zones (AEZs) and to obtain information on each zone that will help researchers understand farmers' prioritization and use of aquaculture practices.

Facilitator: Local team/Nhuong/Kelvin

Instructions:

1. Display a Google Earth map of the study site where all farmers can see.
2. Ask farmers to indicate on the map the different agro-ecological zones (AEZ) in the study site. Describe how they characterize each zone, e.g. is it by farming systems, fish cultured, climate, e.t.c.
3. What are the main challenges/limitations to aquaculture in each zone, e.g. access to seed, climate variability, e.t.c?
4. Have there been any changes within the agro-ecological zones as a result of climate variability e.g. changes in water availability, increased disease incidences, e.t.c?

Enumerators to take notes of the discussion

Tea break at around 10.20 am

4. Climate calendars

Time: 10.40 am

Duration: 60 minutes

This activity will be done in two groups; one group of men and one group of women. The activity will allow us to understand typical weather patterns. Furthermore, we also ask about years with abnormal weather patterns (i.e. drought and/or flooding) and how that impacts aquaculture.

Facilitator: Local team/ Kelvin/Nhuong

Materials: Tape up or lay out long paper

Instructions:

Normal Year

- Ask participants, when does the year start? Add first month (can be January or another month if they start with pond preparation or stocking that begins in another month). Add months near top of paper.
- Ask participants to add blue papers to the calendar to indicate the rainy seasons and how long they last.
- Ask participants to add red papers to the calendar to indicate the dry season and how long they last.
- Then ask for common weather events (strong winds, hail, floods, etc) and when they typically occur. Add these papers/pictures to the calendar.

Wet/flooding year

Ask participants to think of year that there was a lot of rain—maybe flooding. What year was it? Note the year and then repeat the exercise (steps 2 – 4 above). Then briefly discuss how the extra rains influenced aquaculture activities.

Guiding questions:

- Which species of fish were most affected in this year by the extra rain? How were they affected? What happened? How did farmers react?
 - 1) How were men and women affected?
 - 2) How did men and women react?
- Which fish species were least affected? Why?
- Did the excess rain in the cycle affect the next culture cycle? How? Why?

Dry/rought year

- Repeat the exercise with an extremely dry year. Be sure to note the year the farmers refer to.
- Repeat the discussion questions.
- What are the households/community coping strategies during the dry year – How and where do they obtain food?
- If time allows, continue the conversation by asking more weather-related questions:
 - 1) We have examined two types of weather events (rainy and dry), what other weather events most affect farmers? How does it affect them? How do they respond?
 - 2) Overall have aquaculture practices changed in the last 5–10 years because of changes in the weather? If yes, how and in response to what weather changes?
 - 3) Have other factors caused major changes in aquaculture practices? What has changed and why?

Needed supplies include: markers, tape, red and blue strips of paper, notebook and pen.

5. Prioritization of CSAq practices USING FARMER- IDENTIFIED INDICATORS

Time: 11.40 pm

Duration: 1hr 40 minutes

Facilitator: Local team/Kelvin/Nhuong

Objectives:

1. To identify climate change coping practices currently used by farmers.
2. To rank practices that farmers are currently using and understand farmers' criteria for prioritization.
3. To identify relevant CSAq practices that farmers are not currently using.

Note: This activity will be done with the whole group

Instructions:

- 1) Ask farmers to list and briefly describe the practices that they know or have heard about (*water management, disease management, pond management, e.t.c*).
- 2) Ask by show of hand how many farmers know or have heard about each practice (*facilitators to count by gender, i.e. how many male vs female participants*)
- 3) Ask by show of hand how many farmers are currently (*present and last season*) using the practice (*facilitators to count by gender, i.e. how many male vs female participants*)
- 4) Are there any practices that you used to practice before but you are currently not using? (*enumerator to list the abandoned practices*)
- 5) For each practice, Ask: why did you stop using the practice?
- 6) If there is a noticeable gap between awareness and use, Ask why such a gap e.g. why is it that many people know about the practice but are not currently using? (*do this for each listed practice*)
- 7) Identify any missing practices and ask if farmers are aware of these practices
- 8) For practices that farmers are not aware of, present a description of the practices AND confirm that farmers are not aware.
- 9) Add these practices to the list generated by farmers and indicate the proportion of awareness equals zero (*Now we have a master list of practices*).

Lunch break 13.20 – 14.00 pm

DIVIDE INTO GROUPS BASED ON GENDER

Time: 14.00 pm

Duration: 1hr 20 minutes

6. Generate short list of practices related to AEZ and gender

- 1) Ask farmers to select from the master list practices that they perceive as important/relevant for their agro-ecological zone (*remind them to also consider practices we described and added that they are not using*)
- 2) Ask farmers about the benefits/importance of these practices. (e.g., WHY they selected the practice as relevant for the zone)
- 3) For practices perceived to be relevant but not presently being used (*from the master list*) probe for reasons why the practices are not being used.
- 4) What would they need to implement the practices?
- 5) What do they perceive as constraints to implementation of these practices?
- 6) Are there any practices that are practiced jointly in combinations (i.e. packages)?
- 7) What are the benefits of such combinations / packages?
- 8) What do you consider when deciding whether or not to use this practice (for each practice). *Here we aim to identify barriers to adoption as well as indicators for trade-offs.*

7. Ranking / prioritization of the practices by pairwise ranking (for each AEZ and by Gender)

- Construct a pairwise matrix (each box in the matrix represents the intersection (or pairing) of two practices).
- Rank each pair. For each pair, have the group (*using a consensus-oriented discussion*) determine which of the two practices is preferred. Then, for each pair, write the preferable practice in the appropriate box. Repeat this process until the matrix is filled.
- Note the reasons for the preference for each pair of practices.
- Count the number of times each practice appears in the matrix. Rank all practices. Rank the practices by the total number of times they appear in the matrix. To break a tie (where two practices appear the same number of times), look at the box in which those two practices are compared. The practice appearing in that box receives the higher ranking.

8. Ranking / prioritization of the indicators by scoring by Gender

Instructions:

Note: (Assign 1-5 seeds for each indicator, where 1 means that the indicator is least important and 5 means that an indicator is most important)

- Using the list of indicators generated by farmers in **section 6**.
- Give each farmer 5 seeds.

- For each indicator, ask farmers to indicate by the number of seeds how important the indicator is in their agro-ecological zone.
- Look at the seeds if, there are any differences, please seek for consensus.
- Indicate against each indicator the score that farmers agreed on.

Reporting back

Time: 15:20 pm

Duration: 30 minutes

Facilitator: Local team/Nhuong/Kelvin

Each group is given time (about 15 minutes) to present their work to the larger group and then have a few questions, comments, and discussion.

Wrapping up, Thanks & Group Photo

Conclude the workshop by thanking the participants for their participation and explain next steps.

The report of the exercise will be shared widely with various stakeholders such as government, donor agencies and research organizations. This will enable them to understand opportunities and constraints in the region. A group photo can be taken and copies sent back to the community.

Key Informant Interviews

Key informant interviews will be conducted with those knowledgeable about aquaculture. We would also like to gather as much literature (including gray literature) about climate smart aquaculture (CSAq practices) and climate variability/change including climate data (i.e. precipitation and temperature) in the region.

The information gathered from each individual key informant will depend on who we are talking to and their area of expertise. These questions should be used only as a guideline. Before asking the questions, the informed consent should be read and signed.

- Organizations
 - What are the key groups/organizations that work in the area? How do they work? What is their topic/area of interest (i.e. aquaculture, agriculture, health, etc.)?
- Farming systems
 - What are the typical types (and range of different types) of farms in the area?
 - Are they specialized or diversified?
 - Subsistence or commercial?
 - Fish or crops-fish systems?
 - Monoculture or polyculture systems?
 - Integrated or non-integrated systems?
 - Farm size?
 - What is the largest aquaculture farm size (in the area)?
 - The smallest?
 - What's an average/typical size of aquaculture farm?
 - What are the main species of fish?
 - What are the important strains of fish?
 - What are some typical (and/or recommended) aquaculture management practices?
 - How have they changed over the last 10 years and why?
 - What other aquaculture practices would you like to see implemented? Why? Why are they not being used?
 - What are the major problems that farmers face? (Are they different for men and women?) How do they address these challenges? Who can overcome them, how, and why? Who cannot and why?
 - In terms of climate variability?
 - Market access?
 - Input availability? (fertilizers, chemicals)
 - Credit?
 - Land access?
 - Diseases?
 - Seed supply? What are the sources for fish seeds? What are the problems with fish seeds and seed supplies?

- How have aquaculture practices changed over the last 10 years? What changed and why?
- What are farmers' main sources of information on aquaculture production?
 - Do men and women have different sources of information?
- What are the specific post-harvest practices associated with specific species of fish?
- Land Tenure and Property Rights
 - How is the land tenure system? How is land owned or who owns land? (If collective ownership—how is land divided?)
 - How much is rented? Sharecropping systems?
 - Who owns and who rents?
 - Is farm land one contiguous piece or divided?
 - What property rights do men and women have?
 - Do both men and women own land?
 - Do widows inherit land from deceased husband?
 - Can women inherit/bequeath land?
 - If land is not owned, how is access and use determined?
 - How is land passed down from parents to children? Do girls/daughters inherit land equally with boys/sons?
 - Do men and women own land jointly?
- Pond Management Practices
 - What are the pond water management practices?
 - What kinds of pond water management practices, do you think would be beneficial? Why? Why don't they happen (what are the constraints)?
 - What are the disease management practices?
 - What kinds of disease management practices, do you think would be beneficial? Why? Why don't they happen (what are the constraints)?
 - What are the feed management practices?
 - What kinds of feed management practices, do you think would be beneficial? Why? Why don't they happen (what are the constraints)?
- Households
 - What are households like? Are there many female headed and/or child-headed households?
 - What is typical and range of family structures (i.e. monogamous, polygamous, male headed, female headed, child headed, etc.)?
 - Average size of household.
 - Migration patterns?
 - Is there migration out of the villages/site?
 - How much?
 - Where do people go?
 - What do they do?
 - Do they send remittances?
 - Are people moving into the village/site?

- Why?
 - How much?
 - Where do they come from?
 - What are they doing?
- What other activities do people do to make a living besides aquaculture?
- Markets
 - What aquaculture inputs are used? How do you get them (on-farm, neighbours, markets)? If purchased, where are they purchased? From whom? Do you trust the quality? Why or why not?
 - Do most households hire labor or use only family labor (or is there some sort of labor exchange)? If hire, how many people? For what activities? How much does a day of labor cost? Who is hired (men, women, children, from community or from outside)?