WorldFish

July, 2022

Resilient Aquatic Food Systems Initiative Launch in Zambia

work package 5 Technologies Assessment

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Citation
This publication should be cited as: WorldFish. 2022. Resilient Aquatic Food Systems Initiative: WorkPackage 5 Technologies Assessment. Penang, Malaysia: WorldFish. <Publication No>.

About WorldFish
WorldFish is an international, not-for-profit research organization that works to reduce hunger and poverty by improving fisheries and aquaculture. It collaborates with numerous international, regional and national partners to deliver transformational impacts to millions of people who depend on fish for food, nutrition and income in the developing world. Headquartered in Penang, Malaysia and with regional offices across Africa, Asia and the Pacific, WorldFish is a member of CGIAR, the world's largest global partnership on agriculture research and innovation for a food secure future.

Acknowledgments
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Table of contents

1. Introduction 3

1.1 Meeting Objectives 3

2.2 Expected outcomes 3

2. Session 1: Welcoming Remarks and Launch 4

2.1 Remarks by Dr David Chikoye, One CGIAR Country Representative in Zambia 4

2.2 Remarks by Private sector representative Fisho Mwale –Chairperson for Aquaculture Development Association of Zambia 4

2.3 Overview of Resilient Aquatic Foods Systems (RaqFS) Initiative –Acting Director Sustainable Aquatic Food Systems, Dr Edward Allisson 4

2.4 Speech by the Ministry of Fisheries and Livestock Permanent Secretary, Dr Anna Songolo 5

3. Session 2 The Role of Partners 7

3.1 The Role of the Private Sector and Universities in the Resilient Aquatic Food Systems Initiative 7

3.2 The Role of government departments and NGOs in the Resilient Aquatic Food Systems Initiative ..... **Error! Bookmark not defined.**

4. Session 3: WorkPackages ..... **Error! Bookmark not defined.**

4.1 Group discussions to review work packages ..... **Error! Bookmark not defined.**

4.1.1 Work Package 1: AquaData ..... **Error! Bookmark not defined.**

4.1.2 AquaPlans (add more notes and work plan/activities) ..... **Error! Bookmark not defined.**

5. Annexes 25

Annnex 1: Agenda 25

Annex 2: Participants List 26

1. Introduction

The Resilient Aquatic Food Systems Initiatives (RAqFS) focuses on research-for-development to catalyze the scaling of transformative innovations, policies and approaches to support aquatic foods in delivering more sustainable and healthy diets and livelihoods within planetary boundaries by 2030. RAqFS works through five Work Packages bundled together to deliver socio-technical innovations and policy actions that deliver benefits to all five One CGIAR Impact Areas. Apart from WP1 (which includes Kenya and Malawi), RAqFS works mainly in Bangladesh, Cambodia, Ghana, India, Myanmar, Nigeria, Solomon Islands, Timor-Leste and Zambia.

The RAqFS Initiative seeks to achieve five Initiative outcomes: as follows:

1. Scaling partners and stakeholders in 11 countries use data to inform at least five evidence-based investments supporting AqFs transformation.
2. Secure rights bring livelihood benefits for 100,000 small-scale actors in AqFs in Asia-Pacific and more nutritious diets for 700,000 people.
3. GESI strategies to enhance food, livelihood, and water use outcomes in multifunctional land- and waterscapes adopted by stakeholders in two Asian and two African countries.
4. At least two tilapia, carp and catfish strains demonstrate increased productivity (+30%) and better environmental performance (-25% GHG emission reduction) in one African and two Asian countries.
5. Aquatic food system labs in three countries increase national innovation systems' ability to identify, evaluate and scale socio-technical Innovations Packages.

This report focuses on a workshop conducted to conduct a scaling readiness assessment for five innovations that were identified for scaling in Zambia under WorkPackage 5 during the launch of the Resilient Aquatic Food Systems Initiative.

1.1 Meeting Objectives

From the 5th of December to the 8th of December 2022, The Resilient Aquatic Food Systems Initiative hosted a stakeholders workshop at Fringilla Lodge in Chisamba (See Annex 1 for workshop Agenda). The workshop had the following objectives.

1. To conduct a scaling readiness assessment of technologies to be scaled and discuss with stakeholders.
2. Prioritize two technologies and develop concept notes with stakeholders

Participants in the workshop included men and women smallholder fish farmers, artisanal fishers, representatives of Chiefs, government staff from relevant ministries, District Extension Officers from the Department of Fisheries, the Private Sector and both local and international NGOs (See Annex 1 for agenda and Annex 2 for list of participants)

2.2 Expected outcomes

1. A workshop report
2. An initial scaling readiness assessment for the identified technologies
3. A scaling concept note for at least one of the technologies and detailed notes on other technologies that can be easily drafted into a concept note.

2. Session 1: Welcoming Remarks and an introduction to the program

2.1 Welcoming remarks Dr Victor Siamudaala

Dr Siamudaala welcomed all workshop participants and emphasized that their contributions would be critical in deciding which technologies could be scaled out and how the scaling-up process could be accomplished.

2.2 Remarks by the Golden Valley Agricultural Research Trust (GART) representative

The GART representative discussed the organization's role in scaling various agriculture research technologies in Zambia. He emphasized the importance of partnerships in achieving Fisheries and Aquaculture productivity through research and capacity building. He stated that GART and WorldFish had signed an MoU to collaborate on Fisheries & Aquaculture research and training. GART emphasized its role in stimulating demand-driven and adaptive research to provide science-based practical solutions to problems faced in the sector and contribute to sustainable development and nutrition. Lastly, he talked about the role GART was playing in setting up a physical lab and an innovation platform. GART is setting up a lab to showcase integrated agriculture aquaculture, including pig-fish integration, chicken-fish integration, a climate-smart fish smoking kiln demonstration, and demonstrations on good management in aquaculture and biosafety.

Reactions/Comments to the remarks

- Interesting to hear the consideration of a climate-smart smoking kiln demonstration. There is a lot of wastage of fish when delivering to markets. There are also many trees being cut to smoke fish. A climate-smart smoking kiln that uses less firewood is a welcome innovation.
- Exciting for farmers that the high cost of feed to be tackled with integration at a certain percentage
- It is interesting that the platform is also considering the aspect of consumption/nutrition, not only the business aspect.

2.3 Remarks by the representative of the Director of Fisheries – Mr Martin Mwale

Mr Mwale emphasized the collaborative relationship between WorldFish and the Department of Fisheries. Also, he highlighted the need to ensure that developed technologies do not stay on shelves but that they are scaled out and promoted for smallholder farmers to benefit. He gave an example of the inclusive business models promoted by WorldFish and asked whether the models have made sure that quality seed and feed were available to farmers. He wondered what financial institutions such as the Citizen Economic Empowerment Commission and Musika were doing to ensure that the Inclusive Business Models are financed and sustainable. He also asked what was being done to ensure that fish powder was available for consumption in the first 1000 days of life and among the elderly. He welcomed value addition and processing technologies as key to reducing post-harvest fish loss. He also called for the media to ensure the goal of climate

information services is actualized, to provide information to farmers, making it easy to make informed, evidence-based decisions

Reactions/Comments to the remarks

- Climate change – need to put in place mechanisms to conserve water considering climate change in aquaculture.
- Excited that this time around, value addition is at the center of discussions
- The need for efficient water use. We need to talk about integrating fish also with crops like vegetables. We also need to start talking about aquaponics and other bio-crop and aquaculture technologies that can help conserve water.
- Need for insurance products to protect smallholder farmers.
- Farmers appealed for fish feed companies to have stockists in all districts to make the fish feed more accessible. Also, they asked if the feed could be made available to stockists at wholesale prices.
- Others, like Musekese (a private company), have fingerlings that they cannot sell due to low demand, yet the common refrain is that farmers do not have seed. We need to invest ICTs so farmers and hatchery operators can easily link up to buy seeds.
- GART is central, but many smallholder farmers cannot travel. There is a need to package these technologies and disseminate them via media platforms.

2.4 Presentation on Resilient Aquatic Food Systems Initiative by Dr Siamudaala

Dr Siamudaala introduced the RAqFS initiative to the participants. He reiterated the importance of Aquatic Foods since they provide micronutrient rich-foods to 3.3 billion people worldwide. He also highlighted the economic contribution of Aquatic Food Systems to the global economy. Approximately 800 million people depend on small-scale fisheries and aquatic foods for their livelihoods. He outlined and explained the five work packages that make up the Resilient Aquatic Food Systems Initiative, including AquaData; Aqua+Partners; AquaPlans; AquaGenetics; Aqualabs. He mentioned that the RAqFS initiative is implemented in 11 countries, including Zambia, from 2022 to 2031. The RAqFS launch in Zambia marks the first three years of implementation. During this period, Zambia will only focus on three work packages (AquaData, AquaPlans and AquaLabs), with the rest being added in later years. The three work packages reflect the importance of inland resources. He also gave a brief summary of programs that WorldFish has implemented in Zambia.

Reactions/Comments to the remarks

Question: Are specific areas targeted for operations, or will implementation sites for WP5 be countrywide?

Answer: Areas of implementation are limited by available resources. However, during the scaling readiness assessment we will conduct, we can suggest areas we think will be appropriate to scale the technologies.

Question: How will the work package interface with the ministry

Answer: Mr Mwale- Information access is key to farmers dotted countrywide in 160 districts. The government is working on a platform where information can be disseminated to farmers, including information on inputs and markets. WF is working with the government to pilot an app called BUNA that can be integrated into the platform being developed by the government. The platform and App can be assessed by farmers and will have information on where to find feed, seed, markets and information on diseases. Students who have been having challenges accessing data and reference materials will have access through the platform. The platform will be public so that everyone will have access with no restrictions. It will be good to see publications from students on the platform as well for farmers and investors to make decisions

Question: WP4- Genetic Improvement program- How far has the genetic improvement program gone? When can we expect the new, improved breeds?

Answer: WorldFish's role is to provide technical advice; the government owns the program, and there are the only ones that can comment on the project so far.

Answer: Mr Mwale – Program has progressed well, and WF is doing a tremendous job. So far, the program is on generation 1, going into the second generation next season. A New EU-funded project called Zambia Aquaculture Program where O.machrochir is being targeted in the Northern Region at Misamfu Research Station. This is being done because of recent discussions on the nile tilapia not being allowed countrywide. We need to protect our indigenous fish species.

Question: Can you please explain how work package 3 works

Answer: Work Package 3 on aquaplanes seeks to streamline aqua foods in landscape planning in different geographies of the country. However, initially, it will focus only on Kafue flats.

Question: How do we work to reduce the carbon footprint

Answer: The idea is to co-develop climate-smart technologies and reduce carbon-foot print within the country in terms of all components of the value chain, i.e. re-circulatory aquaculture system, solar-tent driers.

3.1 Presentation of technologies identified for scaling – Dr Netsayi Noris Mudege.

She presented that the previous workshop had identified the following five technologies for scaling in Zambia:

1. Fish powders for nutrition
2. Integrated fish-crop-livestock farming
3. Inclusive Business Models (including ICTs for markets and out-grower schemes)
4. Climate Smart Information Systems for aquaculture and fisheries
5. Value addition – Using efficient smoking kilns, Solar driers, gas-based driers

She presented details about the technologies (see Annex 3 - Technologies)

3. Session 2 Scaling readiness assessment

3.1 Presentation of technologies to be assessed and presentation of the assessment tool.

Dr Netsayi presented about scaling, defining what scaling is and the issues that need to be considered when conducting a scaling readiness assessment (See Annex 4 Scaling) and the two tools that groups used during the assessment (Annex 5 and Annex 6).

Figure 1: A group discussing fish powder and nutrition

3.2 Results of the assessment

3.2.1 Fish Powders for nutrition

Innovation: Fish powder for Nutrition

Objectives

- ❑To increase availability of fish powder
- ❑Increase access to fish powder and fish powder products
- ❑Promote access and consumption of fish and fish powder for better nutrition and healthy outcomes
- ❑Improvement of livelihoods

Who is involved

- ❑**Food processor** –Sylvia Food Solutions, SEBA Foods, COMACO NOVA TECH, Tigre Feeds etc
- ❑**Fish breeders**-Mukasa Fish Farm, Msekese, NARDC, GART, Palabana etc
- ❑**Fish producers-Mukasa Fish Farm, MPENI Farms, YALELO etc**
- ❑Regulators
  - ❑GRZ-Line Ministries, (MoH, MOA, MFL,MoFNP, MGEE,MWDS, MLGRD
  - ❑Statutory bodies-ZABs, NFNC, Police, WARMA, Zambia Weights & Measures, CCPC,

Who is involved

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Who is involved

- ❑Support Services-Business network, Academia, research e.g.
  - ❑NATSAVE and other financial institutions-Loans, Financial literacy and saving products
  - ❑Research institution and academia-e.g IAPRI & Other and information generation
  - ❑Developmental partners for TA e.g. World Fish, FAO, GIZ etc
  - ❑Farmer associations and cooperatives-NAZ, Manufactures of association of Zambia etc
  - ❑Academia-Mulungushi Universty, LMMU, UNZA NRDC etc

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linkages and information flow among actors

- ❑Informal arrangements mainly between the producer and consumer
- ❑There is information on availability of market and market price
- ❑The majority of actors not integrated-
  - ❖Awareness of the product
  - ❖Most actors come on board when there is an adverse with regards to the product and during the routine monitoring visits
  - ❖Traders getting what is available also depending on the available market
- ❑The enforcement is usually reactive-demand driven
- ❑The innovation is still at infancy stage
- ❑Promotion and awareness of the innovation to the government

How influential are they?

Stakeholder/Actor	Influence Success of the Innovation	Influencing failure of the innovation	Rating	
Government (Line Ministries) (F)	Formulation of deliberate policies to promote, adoption and implementation of the innovation	-Failure to implement the policy -Over regulation (Taxes and levies)	0	
Food processor (F)	• Production of quality product, clear labelling and Package • Promotion of the product and good pricing	• Luck of marketing and advertising • Over pricing		
Fish breeders/ producers (IF)	Quality and quantity of the fish	• Over pricing and poor quality • Financial support to the Breeders/ producers to upscale the innovation		

How influential are they contd ?

Stakeholder/actor	Influence Success	Influence Failure
Consumers (Industrial and Domestic)	• Providing positive Feedback on the quality of the product • Increasing consumption of the product at household level	Promotion negative experience with the product
Support Services- Business network, Academia, research, Banks etc	• Provision of well researched data/information on the benefits and other information about the product • Favourable financial support to producers to scale upscale the innovation	• Lack of data/information on the benefits and other information about the product • Low financial muscle/ of the producers to scale up the innovation
Traders	• Promotion high production of the product • Bulk buying of product	Failure to explore unexplored markets and products

W

Stakeholder/actor	Why do we think they have positive influence	Influe
Government (Line	Influence policy direction	-Failure to implement the policy -Over regulation (Taxes and levies)
Food processor	• Production of quality product, clear labelling and Package • Promotion of the product and good pricing	• Luck of marketing and advertising • Over pricing
Fish breeders/ producers	Quality and quantity of the fish	• Over pricing and poor quality • Financial support to the Breeders/ producers to upscale the innovation

Goals of different actors

ACTORS	GOAL
GOVERNMENT	Improvement of nutrition status through diversified diets from locally available foods
Breeder/Farmer/Food processor	Improved access to organized market and financial returns
Consumers-Industrial/Trader	Income generation
Consumer-Domestic	Improved nutrition status
Support Services-Business network, Academia, research, Banks	Support the attainment of the following innovation goals: • Increase availability of fish powder • Increase access to fish powder fish powder products • Improvement of livelihoods • To have a financially literacy fisher population for improved income and reduce vulnerability.

DAY 2

CORE INNOVATIONS

Definition of core innovation

- Fish powder production

✓Processing of fish into powder, packaging it and making it available for domestic and industrial use - improved nutrition

Should core innovations/technologies be scaled in this context and Why? (1)

❑Yes is should be scaled up

Reasons for scaling up:

✓To increase access to fish

✓Fish is highly nutritious (rich in calcium, protein , vitamin A, omega 3 fatty acids, iron etc)

✓It easier to store and distribute

✓Prolonged shelf life

✓Easier and simpler to prepare

✓Increased revenue for the producers

Should core innovations/technologies be scaled in this context and Why? (2)

✓ To reduce post harvest loses (wastage)

✓To meet the potential high demand for fish powders

Where should this technology be scaled out

- Fishing communities where there is high fish production (fish farmers)
  - ✓Siavonga
  - ✓Itezhi-tezhi
  - ✓Chiengi
  - ✓Mpulungu
  - ✓Samfya
  - ✓Nchelenge
  - ✓Sinazongwe
  - ✓luangwa
- High density urban areas
  - ✓Lusaka
  - ✓Kitwe
  - ✓Kabwe
- Among fish traders
- Needy specific areas
  - ✓SUN districts
  - ✓Refugee camps
  - ✓Schools with School feeding programs

Intended scaling up outcomes

- Improved nutritional status
- Increased income
- Improved livelihood
- Increased availability and access to fish powders
- Reduced postharvest loses

Intended scaling up outcomes cont'd

- Contribute to stunting reduction and all forma of malnutrition
- Contribute to Zero hunger
- Contribute to the sustainable development goals (SDG 1,2, 3 and 4 etc)
- Reduced poverty

Complementary innovations

- By-products that can be made from the fish powder

✓Cookies

✓Instant porridge

- Packaging –innovations for improved shelf life of the fish powders
- Equipment for milling (small scale and large scale)- TDAU, CAMCO etc to fabricate equipment for fish milling
- Equipment for drying solar dryers, smokers etc
- Innovations in aquaculture for increased production of fish to meet scalig up demands

- Business development innovations (issues of marketing)
- Financial inclusion innovations

Bottle necks

	Bottlenecks
Innovation Landscape	- Poor access to finance - Low demand for the fish powder - Lack of organised market - Lack of information/awareness on the use of fish powder - Limited raw materials (small fish) to meet the demand - Regulation which may hinder the availability of the raw material during certain periods (fish ban) - Lack of processing equipment
Intervention landscape	- Huge presence of non-profit making interventions which can hinder sale by organisations making fish powder for fish - Competing uses of the product (cannibalism) - Counter-party risk: too many organisations working together but non seen to actually make serious effort

Stakeholder landscape	-Stakeholder interests may not be in line with the goal of the core innovation -Lack of existing system for monitoring the progress of the innovation -failure for stakeholders to work together -counter-party risk: stake holders failure to fulfil what they are obliged to do

Stakeholders necessary to engage in the scaling up and why

- Consumers-Industrial and domestic
- Supportive services
- Traders
- Developmental partners
- The media

3.2.2.Integrated fish-crop-livestock farming

1) **Integration**

Innovations
Fish cum poultry (fish, pigs)
Fish cum horticulture (garden, fruits)
Fish cum rice
Aquaponics

Reasons for scaling
Efficient utilization of resources promotes sustainability, lower cost, minimized losses, and good resilience as far as shocks are concerned from climate change.

Contribution

Poverty reduction, income generation, wealth creation, nutrition, food security, production and productivity in terms of increase, answering to vision 2030, increasing GDP, 8th national development plan, national fisheries & aquaculture policy, national livestock development policy, national policy on the environment, SDGs (1, 2, 3, 8, 14, 13, 15 & 4) & world aquaculture society which will be hosted in November 2023.

Complimentary technologies

GIP for fish and animals, animal health, availability/introduction of dam liners, tanks, age maturing crops, improvement housing for poultry, improved livestock markets & improved extension and advisory services.

Bottlenecks

Innovations, limited knowledge, inadequate resources, land issues in terms of accessibility, climate change, animal diseases, cultural issues, conflicting messages & farmer fatigue.

Stakeholders and reasons

Stakeholders: DOF, Vet, livestock, department of agriculture, relevant associations, CPs, NGOs, farmers, regulators, service providers, traditional leaders, local authorities, research and academia, MET, & financial institutions.

Reasons: Technical support, custodian of policy, money issues, complimentary efforts, provide markets, land issues & local development.

Feedback

- Water quality is important for farmers to improve productivity, gain money, and improve their livelihood. Integration is important. Harvest rice while waiting for fish and poultry while waiting for fish. So it should be encouraged.
- Question: What new implementation system can farmers accept now since integration is not new?

Answer: As you are implementing, look at your region and research what crops and livestock can be done in that region. Integration should be realistic.

- Kafue fisheries stand out as one sophisticated farm in terms of integration, so the challenge has been area integration is being done, what has been missing, and what level of information is there to get what is more meaningful. Change of responsibilities regarding government policies.

3.2.3 Climate-smart information for Aquaculture and Fisheries

Innovation

Climate-smart information systems.

This includes the generation, analysis & dissemination of the CIS system. It should be adapted, promoted & adopted to efficiently use CIS.

Use of CIS

To repackage information to make it user-friendly.

Technologies

Reasons for technologies promote adoption and make CIS user-friendly.

Technologies scaled up throughout the chain from generation through analysis to dissemination.

Outcomes

- Awareness & adoption of CIS technologies.
- Facilitate the application of early warning systems on climate

Which innovation is useful?
Generation, analysis & dissemination are all very important
Complimentary innovations
Create Platforms that include all stakeholders in promoting the innovation technologies.
Improve on data/information analysis.
Bottlenecks
Lack of skilled manpower, financial constraints, lack of modern facilities, stakeholder conflicts, competition among stakeholders & lack of consistency and sustainability of some of these stakeholders.
Stakeholders

- Government ministries to oversee policies and administration
- Financial institutions to support financially
- Farmer organizations to create
- Media to help in dissemination
- Research institutions to help climate modelling
- Training institutions to train farmers

Feedback
Q: What is meant by conflict among stakeholders, and what is the solution?
A: Stakeholders relay contradicting information in different formats to the same farmer, which may confuse farmers. This conflict can be resolved by creating a platform for stakeholders to work together.

3.2.4 Value Addition

2) **Value addition**

Innovations
Electrical industrial machine dryer, smoking kilns, solar drier, sun drying, cold storage, fillet making & canning.
Technologies
Value addition from fish waste such as organic feeds and fertilizer, farm waste to make briquettes for driers, and use of CIS.
Scaling
Electrical, and industrial smokers can be scaled to enable mass production, mass preservation & reduction of labour in urban areas where there is mass production of fish.
Smoking kilns are user-friendly in rural and urban areas.
Solar drier is scalable due to its abundance of sunlight, climate-smart, and low setup cost.
Sun drying is scalable because it's readily available, so many small-scale players can use it. Climate-smart too.
Fillet-making will enable diversity.
Cold storage supports all technologies above because it helps reduce fish wastage & preservation and planning. It also enables access to fish markets.
Canning is not scalable because technology has yet to be adopted.
Outcomes

Minimize spoilage, prolong life shelf of products, enable farm market reach, maximize profit, reduce labour intensity, create employment, diversify products, improved nutrition & food safety, low cost of production, enable stable supply chains and CIS technology adopted.

Bottlenecks

Load shedding, insufficient resources, harmful to the environment where charcoal and firewood are used, regulations.

Stakeholder

DOF, NGOs, microfinance, Local government, Green economy & Ministry of SMEs.
All these are involved in policy regulations, support services & finance services.

Feedbacks

Q: The presentation seemed small/local. If thinking internationally, what are we going to include?
A: Electrical, industrial smokers included.
Q: How do electrical industrial smokers work with load shedding?
A: Being implemented somewhere already, so we use alternatives for power sources.
Q: In line with reasons for scaling, what's the Potential & demand and to what extent?
A: Prolong shelf life & demand is there. We already have a deficit of fish and smoked fish in the country.

- Suggestions on packaging and innovation

3.2.5 Inclusive Business Models

Step 1: Characteristics of the innovations

Resilient Aquatic Food Systems for Healthy People and Planet

- Reach out to the base of the pyramid in the fisheries and aquaculture values
- Reaching out to small business those without aquaculture facilities etc.
- There may be those that we can not reach because they are too spread out and those whose capacity we need to strengthen, technical and financial

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What innovations are we trying to scale and why? What is the scaling context?

Resilient Aquatic Food Systems for Healthy People and Planet

- Inclusive Business Models (SMES) –
- Using the Business Model Canvas tool – with 9 components:

What is the innovation package

Resilient Aquatic Food Systems for Healthy People and Planet

- Core innovation - Inclusive and comprehensive business Model using the Business Model Canvass –
- What value in this business model bringing. (Value proposition). If not bringing value it may not be sustainable or adopted for the market....Need to understand what partnerships we are bringing on board. How do we get the value achieved. At what costs (budgetary aspects come in). It needs to generate income
- Customers segment, value propositions, client relationships, revenue streams, key activities, key resources, key partnes and revenue
- Also use the business canvass model on the farmer – so that we analyse also whether farmers are making money and if there are any gaps its is clear where the gaps are coming from

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- **Developing specific inclusive business models for each node – e.g. Agro dealers, hatcheries. We shall apply the Business Model Canvas on the Hatcheries, Agro-dealers, etc.**

What is the innovation package

- **Complementary innovations** Innovations working with SMES to
  - Developing models for inclusive outreach- e.g bringing hatcheries to southern province
    - De-risking actors to come
    - Market analysis research
  - Build the skills and capacity of SMES on business management
  - Aquaculture skills training- incentives for SMES to provide training and extension
  - Business mentorship component
  - Mentors attached to the Inclusive business models
    - Business Incubation (e.g. Bongo hive, Agbait)
    - Capital One
    - Some mentorship can be done across but there could be more targeted mentoring and coaching. Attaching someone to that business who can mentor and coach (hand holding)

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What is the innovation package

- **Complementary innovations** Innovations working with SMES to
  - Developing models for inclusive outreach- e.g bringing hatcheries to southern province
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Resilient Aquatic Food Systems for Healthy People and Planet

Areas that are suitable for aquaculture – we already have an ecosystem in these areas to support

Smallholder aquaculture

- **Northern, Luapula, Muchinga (Aquacultures) Southern Province (a lot of small scale cage farmers – no access to fisheries)**

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Scaling outcomes

Resilient Aquatic Food Systems for Healthy People and Planet

-Increase in capacity for farmers to produce more.

-Increased production to meet increased demand in the ecosystem.

-Increased profitability for farmers, agro dealers, hatcheries and other players in the value chain.

Resilient Aquatic Food Systems for Healthy People and Planet

- **Core innovation - Inclusive and comprehensive business Model using the Business Model Canvass – This innovation will contribute to various institutions and to the national or international development objects(SDGS)**

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Complimentary Innovations

Resilient Aquatic Food Systems for Healthy People and Planet

Development of a comprehensive inclusive business model for each player. i.e

-Agro Dealers

-Hatcheries

-SMEs

-Farmers

-Training and mentorship to archive sustainability of the business and the farmer

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Bottlenecks

Resilient Aquatic Food Systems for Healthy People and Planet

Innovation Landscapes

- **Inclusive business models – how do we synergize with or improve the other innovations**
- **Competing aquaculture interventions that affect business negatively and confuse the farmers**
- **Someone is promoting commercial feeds another traditional feeds**
- **Link to CEEC – can be positive and sometimes negative**
- **Ministry should map the gaps – coordination – some farmers getting free feed without ponds – giving fish feed to chickens and making loss.**
- **Local SMEs know their local areas – when rivers drive out. They know where the people are located. What capacity do they**
- **Week due diligence on loans as they may be given to people without ponds then they sell**
- **WARMA – need to check the water source**

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Bottlenecks Cont...

Resilient Aquatic Food Systems for Healthy People and Planet

Intervention Landscapes

- Anybody can sell Niloticus around the country but growing is restricted only to Lusaka, Copperbelt and Southern Province; thereby creating challenge for the sell of indigenous fish on the market.
- Compromised quality of fingerlings from some hatcheries.
- Un even geographical location of hatcheries with many located only in Southern, Lusaka and Copperbelt. [Whereas areas like Central, Luapula, Northern and Muchinga have less to no hatcheries.
- Lower productivity of Niloticus as compared to Makrocha. Need for DoF to urgently intervene in this area, there will be need to implement the genetic improvement program.
- Councils should create a by law in the areas where production of Niloticus is forbidden to regulate the sell of Niloticus.

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Bottleneck Cont..

Resilient Aquatic Food Systems for Healthy People and Planet

Stakeholder Landscapes

- Over regulation of SMES and high taxation
- Duplicating of effort among regulators
- The sub sector urgently needs to be coordinated e.g. Musekese can have 400,000 fingerlings but they may have access to markets for their fingerlings.

Stakeholders that need to be Engaged..

Resilient Aquatic Food Systems for Healthy People and Planet

- Regulatory Bodies;
- Hatcheries;
- Agro dealers;
- BDS Service Providers
- Off Takers
- Financial and Insurance Institutions.

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4. Session 3 Field visit

The team visited GART to visit the site of the physical lab. The site is still being constructed, but Dr Muyunda from GART explained to the visitors what the centre will be like.

4.Session 3 Field visit

On the 8th of December, WF met with partners, including African Parks and Kasanka Trust to develop a concept note on Strengthening Resilience of Landscapes for Integrated Development (STRELID): a case of the Bangweulu wetland

On the 9th of December, WorldFish met with partners, including CARITAS Zambia, Sylva Foods and the University of Bergen, to further develop the fish powder concept note.

1. Annexes

Annnex 1: Agenda

Resilient Aquatic Food Systems (RAqFS) Initiative
Work Pakage5: Aqualabs
Innovation Platform Workshop

Venue: Fringilla Lodge, Chisamba

Dates: 5th to 6th December, 2022

Objective: To discuss available and potential innovations for the aquaculture industry in Zambia

Agenda

Day1: 5th December, 2022

Time	Content	Facilitator
08:30 – 09:00	Registration	Mercy
09:00 – 09:10	Welcoming & opening remarks	Victor Siamudaala
09:10 – 09:30	Introductions	Lizzy Muzungaire
09:30 – 09:45	Remarks by GART	Martin Muyunda
09:45 – 10:00	Remarks by DoF	Mr Mwale
10:00 – 10:20	Overview of the WP5 of resilient Aquatic Food Systems and workshop objectives	Victor Siamudaala
10:20 – 10:30	Q & A: Overview of the RAqFS	
10:30 – 11:00	**Health Break**	**Agness**
11:00 – 11:20	-Presentation of the technologies identified for scaling	Netsayi Mudege
11:20 – 13:00	Mapping exercise for stakeholders related to each of the technologies (Group work)	TBA
13:00-14:00	**Lunch**	**Agness**
14:00 – 15:00	Plenary	MC
15:00 – 15:45	Scaling Readiness Assessment of the technologies (group Work)	TBA
15:45 – 16:00	**Health Break**	

16:00 – 17:00	Scaling Readiness Assessment of the technologies (Group work)
16:30	End of Day1

Day2: 6th December 2022

Time	Content	Facilitator
08:30 – 09:00	Registration	Lizzy & Agness
09:00 – 12:00	Presentation of scaling readiness for the five technologies	
12:00: 13:00	General feed-back and logistics for the GART Tor and day 3	Martin Muyunda
12:30	Travel back to Fringilla	
13:00-14:00	**Lunch**	
14:00- 14:45	Welcome to GART	Martin Muyunda
14:45 – 16:45	Tour of AquaLabs at GART	Sula Katongo & Reuben Musosha
16:45- 17:00	Plenary session on site tour	
17:00	**Closing remarks break**	

Annex 2: Participants List

Annex 3: Technologies presentation

Annex 4 Scaling Readiness

Annex 5: Assessment Tool 1

Annex 6: Assessment Tool 2

WorldFish

About WorldFish

WorldFish is an international, not-for-profit research organization that works to reduce