FRIEDENSAU INSTITUTE FOR EVALUATION

FIFE

END-TERM EVALUATION REPORT

AQ TEVET PROJECT, ZAMBIA

WorldFish

April 2022

ATTRIBUTION:

This work is a product of an evidence-based end-term evaluation conducted on behalf of WorldFish Zambia, by the Friedensau Institute for Evaluation (FIFE)

ABOUT FIFE:

The Friedensau Institute for Evaluation (FIFE) is an interdisciplinary, self-governing evaluation and research-consulting institute located in Germany at Friedensau Adventist University (FAU). We conduct programme, project and strategy evaluations, feasibility studies, strategic planning facilitation, and project planning strategies for development and humanitarian aid organisations. Since 2010, we have worked with religious and non-religious-based non-profit organisations, industry associations, international organisations, and private institutions. We research and develop evaluation methods and models, carry out evaluations and contribute to networking and knowledge transfer for NGOs, philanthropic groups and foundations, social support businesses, corporate bodies, governments and UN agencies.

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Cover page picture: ©FIFE_field picture, a farmer feeding his fish_Zambia 2022

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PHOTOS

LIST OF ABBREVIATION

AQ TEVET	Aquaculture Technical Education, Vocational, and Entrepreneurship Training for Improved Private Sector and Smallholder Skills
ASTC	Aquaculture Skills Training Centre
COMESA	Common Market for Eastern and Southern Africa
FGD	Focus Group Discussions
FIFE	Friedensau Institute for Evaluation
GDP	Gross Domestic Product
KII	Key Informant Interviews
MOA	Ministry of Agriculture
MFL	Ministry of Fisheries and Livestock
NORAD	Norwegian Agency for Development Cooperation
NRDC	Natural Resource Development College
RISDP	Regional Indicative Strategic Development Plan
SADC	South African Development Community
SMEs	Small and Medium-sized Enterprises
UNESCO	United Nations Educational, Scientific and Culture Organization
7NDP	7th National Development Plan

EXECUTIVE SUMMARY

The Aquaculture Technical, Vocational, and Entrepreneurship Training for Improved Private Sector and Smallholder Skills (AQ TEVET) project aims to "increase the number of human resources working for the private sector, and the number of smallholder commercial fish farmers with enhanced aquaculture knowledge and up-to-date practical skills to help sustainably grow the sector and make it more inclusive."

It was implemented between June 2018 and December 2021 and funded by the Norwegian Agency for Development Cooperation (NORAD).

The project's primary objective was to develop the aquaculture knowledge and practical skills of students and smallholder commercial fish farmers (especially women and female youth) in technical education, vocational, and entrepreneurship training to enable them to find gainful employment in the private sector.

There were two components of the project. The first component was implemented in Lusaka in partnership with the Natural Resources Development College (NRDC) and BluePlanet. It focused on improving and upgrading aquaculture TEVET institutions in Zambia by improving the fisheries/aquaculture curriculum, providing training tools, establishing an online training platform, and enhancing the internship programme at NRDC. In the second component, WorldFish partnered with Musika and focused on improving the livelihoods of rural smallholder commercial fish farmers (women, men, and youth) in the Luapula and Northern Provinces. WorldFish supported these farmers with market opportunities and extension support services and linked them to input and output markets within the aquaculture value chain.

This field-based, external, and independent final evaluation study assessed the project's achievement against its objectives, outcomes, and outputs. The evaluation study employed a mixed-method design encompassing qualitative and quantitative. Data collection instruments were Key Informant Interviews (KII), Focus Group Discussions (FGD), observations, survey questionnaires, and desk review. Results from these methods were triangulated during analysis and report writing.

The evaluation found that the project was relevant to the needs and priorities of the targeted actors – students and smallholder farmers. The project's policies, design, and objective fit the need for more skilled aquaculture professionals, input and output markets for smallholder farmers and improved knowledge and skills on aquaculture in Zambia. The project appropriately bridged the gap between farmers and access to training, input *(seeds and feed)* and output *(off-takers)* markets. It was, however, not appropriate for addressing farmers' need for access to financial services for aquaculture businesses.

Results also show that the AQTEVET project fits strategies and programmes number 1, 3 and 5 of the 7th National Development Plan of Zambia and the measures outlined in the Second National Agricultural Policy of 2016.

On effectiveness, the evaluation results show that the five (5) activities implemented by the AQTEVET comprehensively achieved the project objectives. The project successfully upgraded the fisheries and aquaculture curriculum at NRDC (including short and long-term courses and entrepreneurial training), provided an online training platform, established an aquaculture training centre, and improved the student internship programme. Specifically, the project restructured the fisheries and aquaculture internship programme to

include more years (strengthen practical skills) and improved coordination of matching efforts through database development. In addition, the above-achieved activities have attracted the expected interest from other institutions to adapt or modify these outcomes. The project was also successful in linking ten students to financial institutions (National Savings & Credit Bank (NATSAVE) and Agora Microfinance Zambia (AGORA)) through business plan development and presentation to these financial institutions. None of the students, though, secured access to finance from the financial institution to establish their aquaculture business as targeted by the project. There had been no follow up by the project to that effect.

In the second component, the project was effective by creating linkages between private sector actors and smallholder farmers by engaging two private companies (Aller Aqua and Novatek) and six small and medium-sized enterprises (Kasama Food Basket, EvaMuta Enterprises Limited, Kasakalabwe Multipurpose Cooperative Society (Kasakalabwe), ADSEK Enterprise Limited (ADSEK), Hopeways and General Dealers (Hopeways), and Triple Blessings Centre (Triple Blessings)). These linkages have effectively brought input and output markets and training/extension services to farmers but not access to financial inputs for farmers. The findings also show an increase in farmers' knowledge of aquaculture farming practices on pond construction, fish management practices, fish farming management, and biosecurity. For example, on pond construction and flood prevention, a majority (82.7%) of the farmers revealed they now know that pond size determines the number of fish to stock and harvest; eighty-one percent (81.3%) said they know that the walls of their ponds should be raised to avoid collapse during flooding; eighty-four percent (84.1%) stated they know their ponds should have both inlet and outlet. Nonetheless, some farmers have not received full training on aquaculture.

The two provinces have significantly improved access to inputs (seeds and feed) and off-takers (output market). However, the challenge is that, despite acquiring the knowledge and having access to input, many farmers (72%) are yet to put the acquired knowledge into practice. Many farmers (especially female farmers) do not have access to financial inputs (loans) to buy feed and other inputs.

Findings from the evaluation indicate the comprehensiveness of the project design, government interest in aquaculture, buy-ins, the willingness of project partners to invest, and the motivation of the implementation team, which has contributed significantly to the project's achieved results. The project was challenged by a short implementation time, the 2018-2019 drought and the Covid-19 pandemic, delay in getting key partners to deliver on time, the dependency mindset of farmers, and the project design's lack of gender-specific support for women. Even though the project sought to increase women's participation in aquaculture in the targeted provinces by 40%, there were no specific project support packages for women to overcome women's challenges such as lack of access to land, finance and traditional roles. Nevertheless, the project has raised women's interest in the aquaculture business through training and linkages to input and output markets.

AQTEVET project's effective implementation of activities has enhanced aquaculture training among TEVET institutions in Zambia. In addition to NRDC, Kasaka Fisheries Training Institute (KFTI) has modified its curriculum due to the project. Other institutions have also shown interest in upscaling the project's outcomes. We also found that the project's effect has contributed to a significant increase in student enrolment (from 58 students in 2019 to 169 students as of 2022) in the Fisheries and Aquaculture study programme at NRDC. Graduating students show confidence in their training due to the project because it has changed students' perspectives of the study programme by highlighting the aquaculture aspect in the programme title and strengthening its content. The project has also generated government (NRDC) and private sector actors' interests and investments in aquaculture in Zambia. Private sector businesses are expanding in the targeted

region by investing in the aquaculture value chain's input and output market outlets. Smallholder farmers' knowledge of aquaculture practices has also increased significantly due to the training and extension services through the AQTEVET project initiatives, especially in the areas of pond construction and fish management.

WorldFish implemented the AQTEVET project efficiently regarding cost-effectiveness and timing. The project successfully achieved many results in a very short time without overspending. The project covered all its component costs through prudent financial controls and provided value for money with the achieved results. This was also partly possible because of investments from key private sector partners.

On sustainability, the evaluation found the AQTEVET results have a high possibility of sustaining its effects. The project's intervention package at the NRDC has a realistic sustainability strategy to support the results when well implemented. However, the successful implementation of the sustainability strategy still depends on the pro-activeness of crucial personnel (head of the Fisheries and Aquaculture Department and the college principal) at NRDC.

The increase in farmers' knowledge of aquaculture through the training provided by the project can sustain their aquaculture businesses when they apply the training. Yet, without the financial inputs to support their aquaculture business, many farmers may resort to traditional (feeding) practices, which will make the project's current results unsustainable. This is because inputs – particularly commercial feed – are expensive for smallholder farmers. Also, the established linkages between the six private sector actors that the project worked with and smallholder farmers can be sustainable as long as these private sector actors see it profitable to invest in smallholder aquaculture and continue to provide the needed services.

Overall, this evaluation finds the AQTEVET project's achieved results highly commendable. Considering the findings of this evaluation, it is clear that the AQTEVET project succeeded in its primary intention and can be undoubtedly evaluated as a successful project. Therefore, the recommendations below are additional incentives to think about in replicating the AQTEVET project in another context or extending the current project.

RECOMMENDATIONS

Timing	⇢ In a similar project, WorldFish should plan for a minimum of a 5-year implementation timeline. This can avoid rushed implementation of project activities.
Improve visibility	⇢ WorldFish should develop a visibility strategy for all its projects in Zambia to enhance the organisation's good work. A well designed and implemented visibility strategy can increase the presence and goodwill of WorldFish and its donors in project areas as well as attract new partners.
Impact studies needed	⇢ There will be a need for a comprehensive impact study to capture the AQTEVET project's short- and long-term impacts. It should be done at a reasonable interval after the project has ended.
Disseminate and share lessons learned	⇢ The lessons learned from the project studies should be strategically shared with relevant and central actors (e.g., TEVET Coordinator at MOFA) that are in a position to extend and apply the AQ TEVET strategies in other institutions and rural fish farming communities.
Create financial input linkages	⇢ WorldFish should use its credibility and influence to explore and establish mechanisms for financial input linkages between financial institutions and smallholder farmers.
Women-focused activities and advocacy	⇢ As many women prefer joining cooperatives to individual fish farms, future projects should consider encouraging the establishment of more women cooperatives. Supports in pond construction, access to fingerlings, and access to financial inputs should be part of such gender-focused activity.

Part 1

Introduction and Evaluation Approaches

1. INTRODUCTION

In January 2022, WorldFish contracted the Friedensau Institute for Evaluation (FIFE) to evaluate the Aquaculture Technical, Vocational, and Entrepreneurship Training for Improved Private Sector and Smallholder Skills (AQTEVET) project implemented in Zambia.

The AQTEVET project was a 3.5-year project (June 2018 to December 2021) implemented in the provinces of Lusaka, Northern and Luapula, Zambia, with funding from the Norwegian Agency for Development Cooperation (Norad). It aimed to "increase the number of human resources working for the private sector, and the number of smallholder commercial fish farmers with enhanced aquaculture knowledge and up-to-date practical skills to help sustainably grow the sector and make it more inclusive."

The project's primary objective was to develop the aquaculture knowledge and practical skills of students and smallholder commercial fish farmers (especially women and female youth) in technical education, vocational, and entrepreneurship training to enable them to find gainful employment in the private sector. The project had two (2) components;

1) To improve and upgrade aquaculture TEVET institutions in Zambia by improving the fisheries/aquaculture curriculum, providing training tools, supporting online training platforms, and enhancing internship programmes. Under this component, the project partnered with the Natural Resources Development College (NRDC) and BluePlanet Academy (BluePlanet) to undertake project activities.
2) To improve the livelihoods of rural smallholder commercial fish farmers (women, men, and youth) through AQ TEVET, offering them entrepreneurship skills and supporting them with market opportunities and extension support services. Under this component, the project also sought to support commercial actors' capacity development within the aquaculture value chain to deliver sustainable and profitable pro-poor, gender- and youth-responsive market services to the smallholder sector. Here, WorldFish partnered with Musika. Through Musika, the project partnered with two private sector actors – Aller Aqua Zambia (AAZ) Limited and Novatek Animal Feed Limited (Novatek) to undertake activities under this component.

This field-based, external, and independent final evaluation study aimed to assess the project's achievement against its objectives, outcomes, and outputs. Specifically, this evaluation;

- assessed the project's performance in terms of outcomes and impact generated;
- identified factors leading to the attainment or non-attainment of the planned project results;
- elaborated on strengths, weaknesses, best practices, and generated lessons learned to further WorldFish's future project developments;
- offered recommendations to respond to the general assessment criteria for future interventions;

This report, therefore, includes information on the context, stakeholders, the evaluation approach, methodology used, and the evaluation results. It also provides recommendations for the key stakeholders of the AQTEVET project.

2. EVALUATION FRAMEWORK AND APPROACHES

To capture the nuances within the two components of the project as required by the Terms of Reference (ToR), we used a cause-effect framework. With this framework, FIFE examined the internal and external factors that influenced the AQTEVET project implementation and measured the performance of project activities, with less emphasis on long-term impacts[1]. The evaluation framework was also informed by complexity and system thinking conceptual framing. The following approaches were used in the evaluation.

Co-design approach: In this approach, the evaluation team worked closely with WorldFish on field logistics design, access to participants and other actors and input on data collection instruments. One reason for using this approach was to give back ownership of the evaluation process to WorldFish.

Outcome-based approach: this approach follows the conceptual thinking of Outcome Harvesting (Wilson-Grau & Britt, 2013) and is inspired by Outcome Mapping (Earl, Carden, & Smutylo, 2002). As a retrospective approach, we used the outcome harvesting approach to collect evidence of change. We assessed the various contributors and their contributions to the identified changes resulting from the project.

Participatory Learning Approaches (PLA): This approach contributed to critical reflection and empowerment of the beneficiaries through performance ranking, satisfaction matrices, impact ranking exercises, and wellbeing ranking that provide information on how and on what decisive factors are, that beneficiaries and other stakeholders perceive as changes over time.

OECED-DAC Standards: Evaluation questions, analysis and writing of the evaluation report followed the OECED-DAC evaluation approach. The key evaluation questions were:

- Relevance: To what extent was the project relevant?
  - Were the program design policies fitting to meet the needs of the target groups?
  - To what extent did the project objectives and design respond to the final beneficiaries' needs and priorities?
- Coherence: How does the project align with national standards, policies, and structure?
  - How does the project align with the Zambian governments' policies and administrative structure?
- Effectiveness: How effective were the project delivery mechanisms?
  - How comprehensive were the project objectives achieved?
  - What factors influenced the achievement or non-achievement of the project's objectives?
- Efficiency: To what extent was the project implementation efficient?
  - Were the objectives of the project achieved on time?
  - Was the project implemented most efficiently?
- Visibility: Was communication and dissemination of project outputs adequate?
- Impact: to what extent did the project contribute to the intended impact?
  - What has been the effect (positive and negative) of the intervention on beneficiaries?
- Sustainability: How sustainable are the project benefits?

[1] Long term impacts could not be measured at this juncture - immediately after the completion of the project.

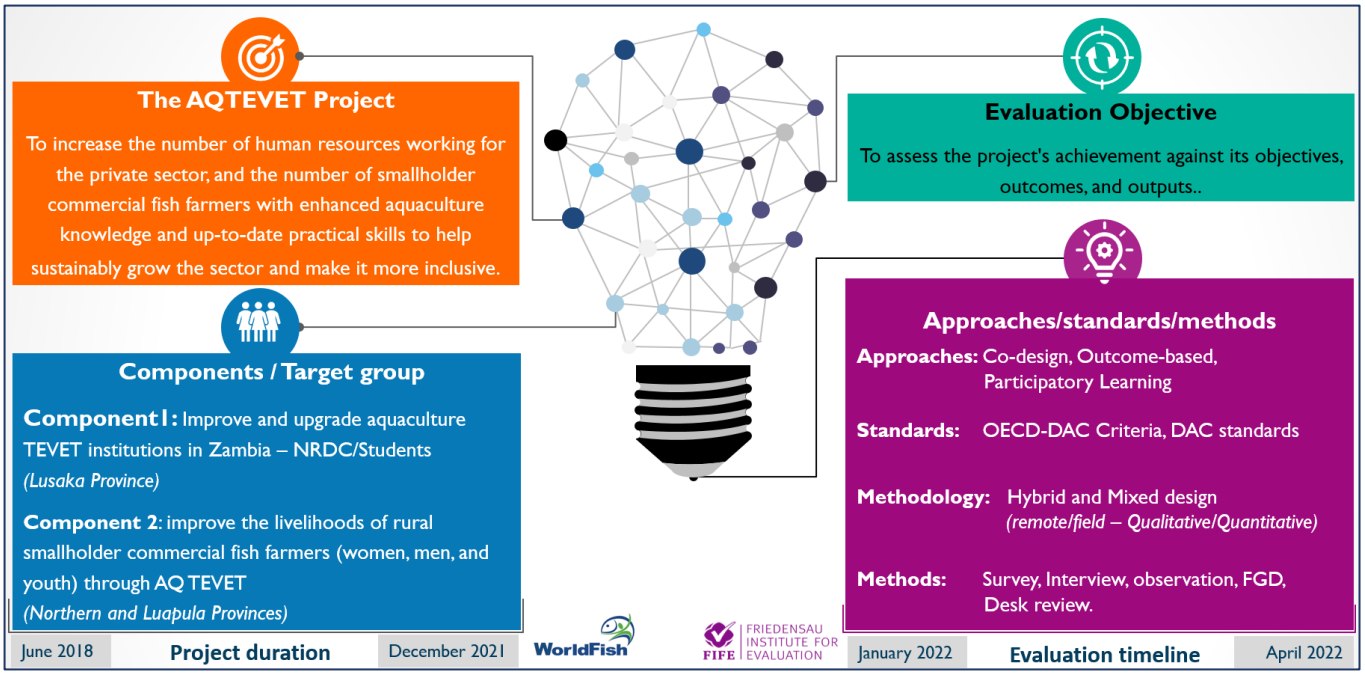

Figure 1: End-term Evaluation Framework

3. EVALUATION METHODOLOGY

The study employed a mixed-method design encompassing qualitative and quantitative approaches. Primary data collection instruments were Key Informant Interviews (KII), Focus Group Discussions (FGD), observations, and survey questionnaires. In addition, the evaluation team used desk review to collect secondary data from project documents and other literature sources. Results from these methods were triangulated during analysis and report writing.

3.1 SAMPLING

FIFE's sampling strategy for evaluating the AQTEVET project was multi-staged, using stratified, simple random sampling of respondents for survey questionnaires (quantitative data collection) and purposive sampling techniques for KII interviewees (qualitative data collection).

In component 1, the study sampled all the 41[2] students who have been fully trained with the upgraded curriculum, have completed their studies and awaiting their graduation ceremony. This sampling was purposive because students who had been introduced to the AQTEVET project's activities under component 1 were prioritised.

For component 2, individual smallholder farmers were sampled from the list of the five Small and Medium-scale Enterprises (SMEs) – Kasakalabwe Multipurpose Cooperative Society (Kasakalabwe), ADSEK Enterprise Limited (ADSEK), Hopeways and General Dealers (Hopeways), Triple Blessings Centre (Triple

[2] Only 14 students responded to the survey.

Blessings) and Aller Aqua Zambia (AAZ) – that received project support. Besides the linkages of farmers to the SMEs, gender was another factor that the sampling considered.

Sample sizes were calculated on the male and female samples of each of the five SMEs using an 85% confidence level (Z-Score = 1.44) and a 5% margin of error. Using Excel's simple random sampling formula, a simple random sampling technique was then used to sample the number of respondents according to the sample size. In total, 358[3] smallholder farmers were sampled (107 female, 251 male).

Again, for component 2, focus group discussants were purposely and conveniently sampled from farmer cooperatives in Luapula and Northern provinces.

Furthermore, the evaluation team used purposive sampling to identify key informants for interviews for both components. These interviewees were drawn from the two project components and were in the best position and role to answer specific evaluation questions relating to the project.

3.2 DATA COLLECTION

In addition to the lead and country consultants, ten enumerators with an agricultural-related bachelor's degree qualification (including aqua-culture, agri-business and agro-economics) were hired for data collection. With the COVID-19 pandemic in mind, FIFE implemented a semi-remote data collection design for the evaluation study. It consisted of both on-the-field face-to-face and remote data collection (using virtual platforms like Zoom or WhatsApp). Field data collection took place between 1st and 11th February 2022.

The lead consultant trained all enumerators on the evaluation's background, objectives, and relevance to ensure that the team becomes engaged and motivated.

FIFE did not assume that enumerators understand questions in the same way. Even relatively straightforward questions or items could be interpreted differently, mainly when working with people with different levels and types of experience. Thus, the training was highly interactive and conducted before data collection began. The training included orientation and a reminder on quantitative and qualitative research, including techniques for interviewing respondents and facilitating FGDs, taking notes, and asking probing questions. In the first week of field data collection, the team started in the Northern Province (Kasama). After Kasama, the team split into two. One group went to Luwingu district (Northern Province) and the other to Mansa district in Luapula Province.

The qualitative data were collected via face-to-face interviews (Kasama, Mansa and Lusaka) and online (Zoom) interviews. Notes (in the case audio recording was not possible) and audio recording were used to capture the interviews. The audio interviews were then transcribed.

3.3 DATA ANALYSIS

FIFE analysed two data sets in this study; quantitative (survey) and qualitative (KII and FGD). Data analysis and interpretation drew on all data sources' triangulation to complement and provide a holistic view of the project.

FIFE adopted a meta-analytical approach to review all project documents and achievement results extensively. FIFE used the Statistical Package for Social Sciences (SPSS) to analyse the quantitative data sets and MAXQDA for the qualitative data. Specifically, the team employed descriptive and inferential statistics for quantitative analysis and a mixture of thematic and content analysis for the qualitative data.

[3] The evaluation team reached 214 smallholder farmers (55 female, 159 male) for this study.

FIFE then triangulated the results from these analyses to provide an all-inclusive and validated final evaluation result. The evaluation data analysis followed two conceptual assessments (cause-effect/ OECED-DAC reflections). Our research results and discussions were thus framed to answer the two underpinning conceptual evaluation questions and in line with the evaluation Matrix. The analytical framework followed a cause-effect and general reflections using the OECED-DAC standards.

3.4 LIMITATIONS AND RISKS

Limitation

In addressing the evaluation question and covering the two components of the project, time remained a major limiting factor for collecting the available data, analysing and writing this report. The study evaluation activity plan allocated 12 days for field data collection based on the limited timeline agreed on with WorldFish. Coupled with the distance to cover from Lusaka to Kasama and then to Mansa, the twelve days data collection period was a tight schedule. As a mitigating strategy, FIFE hired five additional enumerators at its own cost, bringing the number of enumerators to ten to expedite the research process and mitigate the time press.

On the field in Kasama and Mansa, the coordination from WorldFish regarding access to farmers was less than adequate. Based on the list of farmers provided to the evaluation team, 358 farmers were sampled. This also accounted for the hiring of extra enumerators. Getting to the field, access to these farmers became problematic because the WorldFish coordinator also relied on SMEs and cooperative heads to gather farmers together. This limited the study regarding efficiency. For example, there were several instances where enumerators and consultants were taken to people who were not fish farmers and or were unaware of the AQTEVET project. It increased the cost of transportation and wasted important human resources (enumerators). This explains the inability of the evaluation to meet the initially planned sample size.

Another limitation concerns the number of students who participated in the evaluation. During the field visit, the cohort of students who had fully been introduced to the AQTEVET project activities had completed their studies and were not on campus. This meant the evaluation team could not reach them for face-to-face interviews. To mitigate the challenge, self-completed online questionnaires were developed for the students. Out of the 41 students who were contacted, only 14 responded. This follows repeated reminders through Whatapp chats, phone calls and emails.

Risk

The Covid-19 pandemic threatens every activity that requires social interactions. It was not different for this field study. Aside from the risk of enumerators contracting the virus, they also posed a risk to respondents. As a mitigating risk approach, all enumerators were trained on the proper use of face masks and the importance of keeping the required 1.5 metres of social distance when interviewing respondents. All enumerators and the field coordinator were provided with FFP face masks. The entire evaluation team were tested for Covid-19 before heading to the field. Every member of the evaluation team tested negative.

Part 2

Evaluation Findings

4. EVALUATION FINDINGS

4.1 SMALLHOLDER FARMERS RESPONDENTS

A total of 54 members (37 female, 17 male) from 6 fish farming cooperatives took part in 6 FGDs. Two (2) of the cooperative groups were women cooperatives (Table 1).

No.	Name of Cooperative	Location	Number of participated
1	Ing'anda Yamano ve	Chisanga village/Kasama	9 (5 Male and 4 Female)
2	Kafula Muyonga	Kasakalabwe	8 (5 males and 3 female)
3	Kalele Women's Club	Chintukulwe village/Luwingu	10 (Female)
4	Kasakalabwe Multi-purpose cooperative Society	Kasakalabwe	10 (1 male and 10 Female)
5	Pibilibile	Shimulamba Village/Kasama	9 (6 Male and 3 Female)
6	Riverside Women's Club	Nsombo area/Luwingu	8 (Female)

Table 1: List of Cooperatives for FGD

In the evaluation survey, 214 smallholder farmers participated: 77% in Northern Province and 23% in Luapula Province (Table 3). The largest proportion of farmers surveyed was from the Luwingu district, followed by Kasama and Mansa. The highest percentage of farmers (74%) were men (Table 2).

Province	Frequency	Percent
Luapula	50	23.4
Northern	164	76.6
Total	214	100.0

Table 3: Farmers' Demographics - Province

Sex	Frequency	Percent
Female	55	25.7
Male	159	74.3
Total	214	100.0

Table 2: Table 1: Farmers Demographics - Sex

Overall, the largest percentage (63%) of the farmers were aged between 35 and 64 (Table 4). Farmers below 24 years had the lowest rate (10%) of the distribution. The result corresponds with the national demographics of Zambia, which shows that younger age groups are more likely to contribute to parents' farms while in school or learning a trade. Meanwhile, older farmers (65 years and above) constituted 12% of the farmers in this survey.

All the farmers in the two provinces were actively involved in fish farming but at different stages. A majority (63%) of the respondents mentioned they own, on average, between 1 to 2 ponds ranging from 10m X 10m to 20m X 20m). Most of the respondents' ponds (62.2%) were constructed between 2018 and 2021 (Table 5).

Age	Frequency	Percent
18-24	20	9.3
25-34	33	15.4
35-44	44	20.6
45-54	48	22.4
55-64	43	20.1
65 and over	25	11.7
below 18	1	.5
Total	214	100.0

Table 4: Farmers' Demographics - Age

Year of First Fishpond Construction	Frequency	Percent
Before 2017	64	30.9
2017	14	6.5
2018	25	11.7
2019	35	16.4
2020	34	15.9
2021	39	18.2
2022	1	.5
Total	212	100.0

Table 5: Farmers First Fishpond Construction

It is interesting to observe that 51% of these ponds were constructed during the project's lifespan (2019-2021). This increased number of ponds, compared to the pre-2007 (31%) ponds, shows that a significant number of new smallholder farmers have joined fish farming as a result of the project. The findings could also mean that before the project, some farmers had ponds that were poorly constructed, and because of the project, they have constructed new 'improved' ponds. This interpretation supports the baseline study that found that many farmers had poorly constructed fishponds.

The smallholder farmers in this evaluation come from large households. Close to 50% of the farmers have a household composition of 5-7 members, with an average of 4 children. A significant number of farmer households (23%) have not received income from selling fish. These are farmers who are either new to fish farming or are yet to sell some of their harvests. Others do not make any income from their fish farms because they usually consume their harvests.

In Table 6, close to 80% of the farmers are linked to different cooperatives. The largest percentage of farmers are linked to Triple Blessing (41%), followed by Kasakalabwe (14.5%) and Hopeways (14%).

A little over 20% of the farmers have no cooperative linkages, and 14% have no affiliation with an agro dealer. In terms of agro-dealers, most of the farmers (35%) are affiliated with Triple Blessings, followed by Novatek Animal Feed (15%) and Hopeways (14%).

Cooperative linkages	Frequency	Percent
ADSEK	1	.5
Triple Blessings Centre	88	41.1
Hopeways farmer training List	30	14.0
Kafula Muyonga Cooperative	3	1.4
Kasakalabwe Multi-Purpose Cooperative Society	31	14.5
None	46	21.5
Pibelibe Multicooperative Society	12	5.6
Tengelo Chinasha Cooperative	3	1.4
Total	214	100.0

Table 6: Farmers' Cooperative Linkages

4.2 STUDENT RESPONDENTS

Overall, 14[4] students (completed their studies and awaiting graduation), out of the 41 students who have been trained using the upgraded curriculum, responded to the online survey. Many (64%) of the students come from the Lusaka Province. There was an equal distribution between males (50%) and females (50%). The highest percentage (71%) of students were 18-20 years old.

[4] Students were on vacation during the evaluation field work. Thus, the evaluation team could not reach students face-to-face. The team resorted to online survey through email contacts provided by the school.

4.3 RELEVANCE

The extent to which the AQTEVET project is suited to students' priorities, smallholder farmers, and the entire aquaculture industry in Zambia

Despite aquaculture being one of the fastest-growing food systems globally, production in Zambia (the sixth largest producer of farmed fish in Africa) remains less than optimal (Avadí et al., 2022; Kaminski et al., 2018; Kruijssen et al., 2018). The sector's potential for growth, with the suitable agro-ecological conditions to cultivate the industry, is critical to Zambia's developing economy, given the agriculture sector's potential contribution to the national Gross Domestic Product (GDP) (Kaminski et al., 2018; Mulenga et al., 2020). Further, considering the overexploitation of wild fish stock, the impact of climate change on fisheries and the Zambian Government's drive to limit fish imports that are at 52%, aquaculture is currently earmarked to meet increasing local and international demand for fish products (European Commission, 2018; Kefi & Mofya-Mukuka, 2015).

In Zambia, aquaculture mainly focused on tilapia production. Zambia is the biggest producer of tilapia in the South African Development Community (SADC), and some of the largest freshwater commercial farms in Africa operate in Zambia (Kefi & Mofya-Mukuka, 2015). In the 1980s, the farmed fish production was approximately 750 tonnes, of which 76% was produced by private (commercial) large-scale farmers-namely intensive pond-based rearing units and cage culture. The latter part of the 750 tonnes of fish was made by Government fish culture stations (12. 5%) and produced by small-scale rural fish farmers (11.5%) (Genschick et al., 2017). Aquaculture production in Zambia has increased from 750 tonnes in 1980 to approximately 20,000 tonnes in 2014 and 30,000 tonnes in 2016 (European Commission, 2018). The value chain actors responsible for this growth are large and medium-scale fish farms - specifically cage farms.

EQ1. Were the program design policies fitting to meet the needs of the target groups?

Despite these increases in fish production over the years, Zambia's aquaculture industry is still in its infancy due to several factors. Historically, aquaculture programming was spearheaded by Zambia's Government and donors to impact livelihoods and nutrition (Genschick et al., 2017). This drive impacted limited investments by value chain actors for enterprise upgrading and limited new entrants into the value chain, specifically in a context where the wild fish stock was in abundance and fishing in water bodies was the low-cost fish production and supply option. Additionally, smallholder producers (9,615 households in Zambia) (Ministry of Livestock and Fisheries, 2019) face challenges related to production capabilities (knowledge gaps), production capacities, as well as value addition and marketing skills (Kaminski et al., 2018). More specifically, they lack access to extension services and, at the same time, possess limited financial capital to enhance production (facilities) or engage in value addition to improve the profitability of their enterprises. Further, they generally lack the social capital and marketing skills to penetrate broader markets or engage in commercial markets. Aside from this, smallholder producers face supply-side challenges regarding restocking fish stock to access a consistent supply of quality fingerlings, besides lacking efficient quality and affordable feed supply channels and cold storage facilities (European Commission, 2018).

AQTEVET project aimed at developing the aquaculture knowledge and practical skills of students and smallholder commercial fish farmers (especially women and female youth) in technical education, vocational, and entrepreneurship training to enable them to find gainful employment in the private sector. Noticing the critical role of the aquaculture sector in the Zambian economy and the challenges, the entirety of the AQTEVET was relevant to addressing the gaps in the industry.

The evaluation ascertained that the AQTEVET project used a macro and micro-level intervention approach to become relevant to the sector. First, by focusing on improving students' employability in the aquaculture sector (component 2), the project constituted a macro-level approach to addressing the need for skilled aquaculture officers for small- and large-scale aquaculture entities in Zambia. According to the registrar of the Natural Resource Development College (NRDC);

> *"There is already fish farming in Zambia, but not to the scale we want. There are questions about why we were not making the programme succeed. One of the findings was that we were not meeting the farmers and the industry needs" (Comp I _KII_NRDC, Pos. 2)*

Thus, the project's activity of introducing an upgraded curriculum, providing an online training platform, developing short courses on aquaculture, establishing the aquaculture field straining centre (ASTC), and rolling out an improved internship program fit to meet the need for skilled graduates for the aquaculture industry.

The project has also served to be relevant for other educational institutions by becoming a model for aquaculture education in the region. The adoption of the aquaculture curriculum and signing up to the online training platform by other educational entities both in Zambia and neighbouring countries meet the needs of these secondary beneficiaries.

At the micro-level (component 2), the project's policy targets individual fish farmers who are core to the aquaculture supply chain by linking them to established private companies.

> *"They [private companies] felt the areas [Northern and Luapula provinces] were risky to invest…the provision of technical information to the farmer by the private actor solves a need. When we look at the off-takers, it would be challenging, but with the SMEs, they sized up to the demands and supply. The SMEs in these linkages are also investing" (Comp2_KII_ Musika, Pos. 3)*

It is this evaluation's assessment that the AQTEVET policy to meet farmers' need for accessible and quality fingerlings and feed, training/extension services and output market was based on a commercial model. It was based on bringing commercial knowledge and linkages closer to farmers to increase farmers' productivity. On the one hand, this explains why WorldFish's approach differs from other NGOs who are pre-occupy with giving handouts to farmers rather than establishing these critical but unavailable value chains and linkages within the aquaculture sector in Zambia. On the other hand, farmers who are expecting to receive direct handouts in terms of free feed and fingerlings find this approach unattractive if not confusing in relation to what other organisations provide. It is, however, important to recognise that although the project's policy (theory of change) meets the needs of farmers and the entire sector, the affordability of inputs remains a critical factor for fish farmers.

EQ2. To what extent did the project objectives and design respond to the final[5] Beneficiaries' needs and priorities?

COMPONENT 1

This evaluation found that, before proposing the AQTEVET project to the NRDC, the school's fisheries programme had very low enrolment, and the school was considering discontinuing the study programme.

"At the time, the student enrolment in the programme was very low. We were considering closing the programme, but WF came in with different proposals" (Comp I _KII_NRDC, Pos. 2)

It means that despite having a fisheries department, the school was not meeting the needs of students by equipping them for the aquaculture sector. Among other factors, we found the inadequacy of practical aquacultural skills in the old curriculum of the fisheries programme a significant reason behind the low interest in the study programme.

"When this programme was developed, it was more biased to capture fisheries, but with time we realised employers were complaining that we needed to teach AQ. They said our students have basic AQ knowledge but no hatchery management skills. Therefore, for our students to be marketable and deliver this project was relevant, and it also reduces costs on employers to train them." (Comp I _KII_ NRDC, Pos. 2)

As an essential part of meeting the needs of students for the job market, practical skills in aquaculture are a crucial factor. In the survey results from students, all the 13 respondents who answered the question on the adequacy of practical skills confirmed that they had received adequate practical skills for their career (Figure 2).

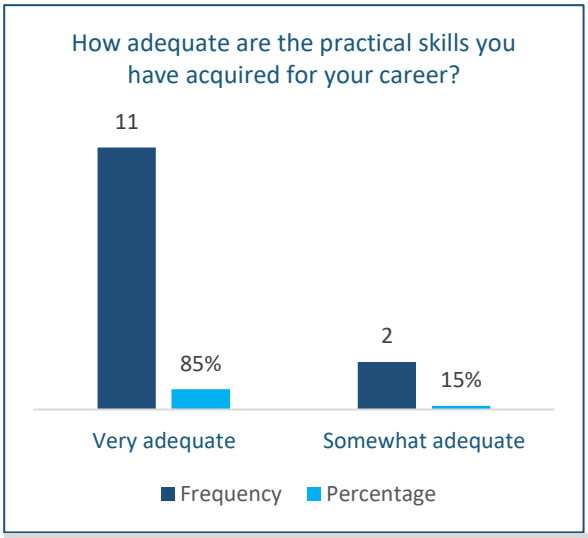

Figure 2: Students - Adequacy of Acquired Skills

Amid the Covid-19 pandemic, the evaluation found the project's introduction of an online training platform in collaboration with BluePlanet relevant.

Students were able to access schoolwork and training from their homes.

A lecturer at the NRDC recounts the relevance of the online training platform;

It was helpful for virtual learning, especially during COVID 19; we have been sending students to work when students are at home. We needed to keep them busy with work – have them watch videos and answer questions. It helped us keep in touch with students...On my part as a lecturer, this makes my life easier. My imagination is not their imagination, and I use the videos as a reference, and this makes it easier to teach. It is also easier for students to relate to what I am talking about when they remember the video. (Comp I _KII_ NRDC, Pos. 2)

All the student respondents (14) also confirmed that the online platform was relevant for their studies. Together, the improved curriculum, the e-training platform, and the ASTC (with hatchery and ponds) provided by the project indicate that the project achieved its relevance by equipping students with the adequate facilities and tools to accomplish the need for practical aquaculture skills among students.

[5]The project has two final beneficiaries: NRDC Aquaculture students and smallholder farmers are the primary beneficiaries, while the NRDC and aquaculture enterprises (contracted SMEs and Private companies) are the secondary beneficiaries.

The fisheries study programme's name has been changed to "Fisheries and Aquaculture" from "Fisheries." The implementation of the project, as the result shows, also met the needs of NRDC to attract more students, especially female students, to the department and thereby saving the study programme.

COMPONENT 2

To assess the relevance of the training, the evaluation asked farmers to identify the kind of support they received from the AQTEVET project. Results on the nature of support received revealed that farmers received training and were linked to input and output markets. The findings (**Figure 3**) show training and extension services as the highest (50%) support that farmers have received through the project. The remaining mentioned services (linkages) are less than 30%. Although they have received the training and extension services, many farmers have yet to implement this training. Also, the high cost of inputs and the fact that some farmers are yet to harvest and sell their fish are responsible for the low results. This also explains why the link to input markets (seeds, feeds, fingerlings) was 28%, and the link to output markets (selling fishes) was only 21%.

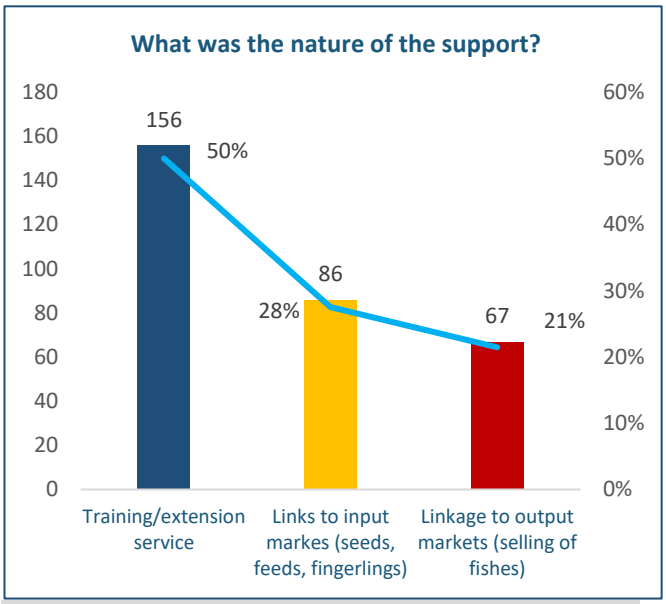

Figure 3: Farmers - Nature of Support Received

A technical assessment of the content covered in training and extension services and confirmed by the farmers (**Figure 4**) found the content to be highly relevant for aquaculture support.

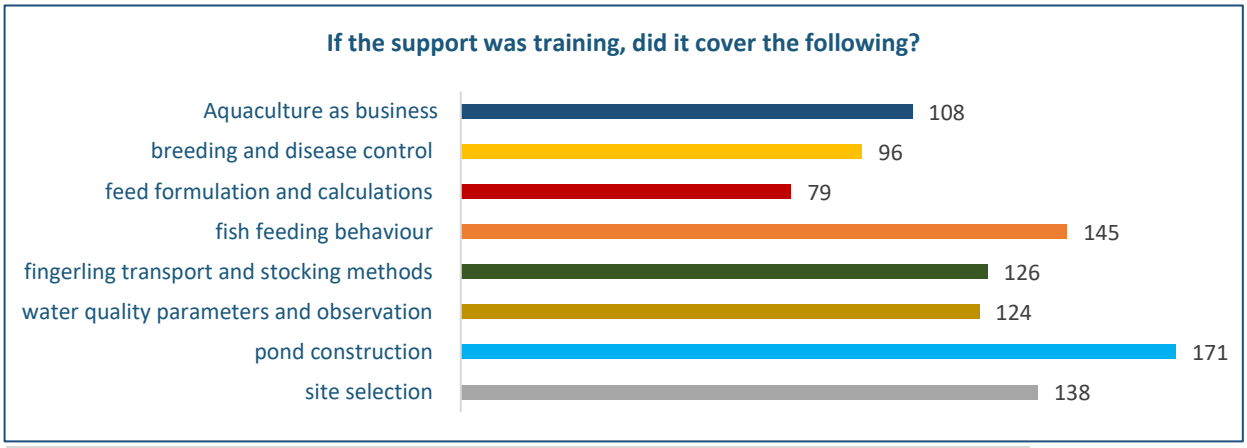

Figure 4: Farmers Training Content

Cooperative group members in FDGs also mentioned and explained the nature of support received. For instance, demonstration ponds and field days were also mentioned by cooperative groups under Kasakalabwe. They also show a more in-depth understanding of the training they received. For example, the Pibilebile group (under Kasakalabwe) mentioned:

"Making standard ponds, including measuring and setting ponds, pond fertilisation stocking density, feeding regiments from starter to grower and weather sensitivity, growing fish as a business, sex-reversed fish stocking, measuring fish for sale using a scale as opposed to just bundling fish, record keeping, protecting fish from predators and also securing the ponds with wire, building footbaths to kill germs that could affect fish" (Comp2_Farmers FGD)

In addition, some of the targeted SMEs (for example, Kasakalabwe and Hopeways) affirmed receiving paid radio airtime programmes to market their products and services, motorbikes and tilapia better management practices training manual including maps showing the distribution of smallholder farmers in the two provinces and greenhouses as part of the project's support. The facilities and materials provided through the project to the SMEs were relevant for undertaking extension services, producing fingerlings for easy access to farmers, and enhancing the aquaculture value chain.

Also, mentioned market access was not emphasised but mentioned as future activity, as most discussants in the FGDs had not harvested fish. In one case where fish had been harvested, the local demand was only sufficient to offload fish in farmers' locality without the need for an external output market.

The evaluation found the activities under component 2 (especially training and extension services) of the AQTEVET to be relevant as they addressed the needs of farmers. For example, individual farmer respondents mentioned that the training and extension services covered site selection, pond construction, water quality parameters and observation skills, fingerling transportation and stocking methods, fish feeding behaviour, feed formulation and calculations, breeding and disease control, and aquaculture as a business (**Figure 4**).

The technical assessment of the content of these pieces of training confirmed a high relevance for improving fish farming. This was also confirmed by farmers when they were asked to indicate how relevant the support from the project is to their aquaculture practices. More than 90% of the 182 farmers who responded to this question affirmed that support from the AQTEVET project was relevant to small-scale fish farming (**Figure 5**). According to the farmers, due to the project's interventions, they have access to inputs (feed, fingerlings), improved yields and improved knowledge about fish farming. Novatek and Aller Aqua have established their presence in the two provinces expanding their market and customer base (fish farmers).

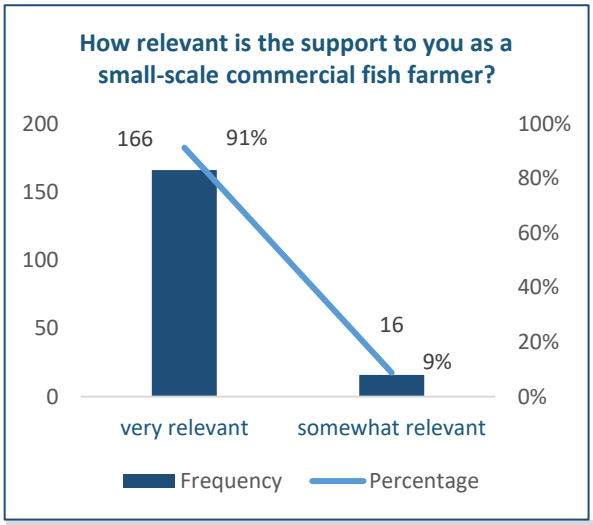

Figure 5: Farmers - Relevance of Support Received

Overall, the project successfully met the needs and priorities of the various targeted actors. The needs assessment was thorough and identified the challenges and gaps facing the aquaculture industry in Zambia. Hence, the project's policies, design, and objective fit well with the need for more skilled aquaculture professionals, input and output markets for smallholder farmers and improved knowledge and skills on aquaculture in Zambia. These are very significant needs that the project addressed. It, however, was not relevant to the need for access to financial support to invest in aquaculture farming regarding the second component. The evaluation results pointed to the burden of smallholder farmers to afford the cost of improved ponds construction and the cost of buying commercial feeds. Even though financial and investment needs still challenge the aquaculture industry, the training and extension services activated via the AQTEVET project and the established linkages must be considered significant.

4.4 COHERENCE

The compatibility of the intervention with internal standards and other interventions of the implementing agencies and external International and national standards, policies, regulations, guidelines, and structure

The Zambian Government's current economic growth and development plan is enshrined in the Seventh National Development Plan (2017 – 2021). The plan departs from sectoral-based planning to an integrated (multi-sectoral) approach under the theme "Accelerating development efforts towards Vision 2030 without leaving anyone behind" (MOFA, 2016). The formulation of the plan was guided by the National Planning and Budgeting Policy of 2014, while the Decentralisation Policy of 2014 provided the principles of implementation. Further, the formulation of the policy was informed by the need to harness the demographic dividend, given Zambia's youthful population. Based on the theme, the goal of the 7NDP is to create a diversified and resilient economy for sustained growth and socio-economic transformation driven, among others, through agriculture. The realisation of this goal is dependent on achieving several development outcomes. These outcomes include economic diversification and job creation, reduction of poverty and vulnerability, reduced developmental inequalities, enhanced human development, and the creation of a conducive governance environment for a diversified and inclusive economy. The policy focuses on inclusive development and achieving more with fewer resources through integrating and coordinating developmental efforts. It takes into account regional and global development agendas, such as the Regional Indicative Strategic Development Plan (RISDP), which is a comprehensive development and implementation framework guiding the regional integration agenda of the Southern African Development Community (SADC) over fifteen years (2005-2020), African Union Agenda 2063, Sustainable Development Goals (SDGs) and the Common Market for Eastern and Southern Africa (COMESA) protocols.

The 7NDP concedes that the fisheries industry is underdeveloped in Zambia, leading to the depletion of fish stocks, consequently affecting many livelihoods. The policy further stresses the need for "increased investment in fish farming technologies, sustainable management of capture fisheries and strengthening fisheries training and research" (7th-National-Development-Plan-Zambia, P. 3: 8)

EQ3. How does the project align with the Zambian governments' policies and administrative structure?

Analysis of the AQTEVET project reveals its consistency with the 7NDP. The project aligns with the following strategies and programmes under the national development policy;

- Strategy 1: Improve production and productivity
  - → Programme: e) Aquaculture development
- Strategy 3: Enhance agriculture value chains
  - → Programmes: d) Value chain linkages promotion.
- Strategy 5: Enhance investment in agricultural infrastructure
  - → Programmes: a) Livestock and fisheries breeding and service centres development
    g) Research and extension infrastructure development.

The AQTEVET project design also fits policy objective 1 (to increase agricultural production and productivity) of the Second National Agricultural Policy of 2016. Specifically, the project aligned with measures on fisheries. These are

Measure no.1: Promote and diversify production of farmed-fish species;
Measure no.3: Promote access to fish seed (increase production of fingerlings, increase the number of operational fish hatcheries, establish community fish seed production centres);
Measure no.4: Promote aquaculture development;
Measure no.5: Promote the establishment of Aquaculture Parks;

(Second-National-Agricultural-Policy-2016, P. 18: 1763)

In addition, the evaluation found the AQTEVET project activities as fitting to broader development policies aimed at improving livelihood, education, trade, and poverty reduction. The project's conceptualisation and implementation also aligned with UNESCO's strategy for technical and vocational education and training (2016, 2021)[6] and the Sustainable Development Goals[7].

The AQTEVET project enjoyed significant linkage to several development policy directives. These alignments put the project under political and government support and collaboration. The project addressed several national policy recommendations and strategies in both components. This outcome further justifies the project's relevance within national and global development policy initiatives.

[6] Enhance the relevance of TVET systems of Member States and "equip all youth and adults with the skills required for employment, decent work, entrepreneurship and lifelong learning."
[7] SDG1 (No Poverty), SDG4 (Quality Education), SDG5 (Gender Equality), SDG8 (Decent Work and Economic Growth), and SDG10 (Reduced Inequalities)

4.5 EFFECTIVENESS

The extent to which the intervention achieved, or is expected to achieve, its objectives and its results, including any differential results across groups.

EQ4. How comprehensive were the project objectives achieved?

The objective of the AQTEVET project was to develop the aquaculture knowledge and practical skills of students and smallholder commercial fish farmers (especially women and female youth) participating in technical, vocational, and entrepreneurship training to enable them to find gainful employment in the private sector. To achieve this objective, the project adopted a bi-component parallel implementation approach. Five project activities were developed and grouped into two components.

ACTIVITY 1: TRAINING STUDENTS FROM THE NRDC USING THE UPGRADED CURRICULUM, TOOLS, AND ONLINE TRAINING PLATFORM.

- **Expected Key outcome 1**: enhanced knowledge base of students from the TEVET institute trained.
- **Indicators:** (i) Up-to-date curriculum (both long- and short-term courses), training tools, and online training platform developed (ii) number of students trained using the upgraded curriculum.

NRDC is the main secondary beneficiary of project activity 1. Hence, this evaluation's interest was to ascertain the rationale for the project to select NRDC and not KFTI (a typical TEVET institution). The evaluation results justified that at the time of the project, KFTI was yet in the process of getting a TEVET accreditation and was thus not elevated to the level of a TEVET institution. Also, NRDC has a TEVET accreditation and offers both TEVET and diploma certificates in fisheries. Besides, since most of the graduates from NRDC directly enter the job market and government institutions, choosing NRDC constitutes an effective option.

→ ***Upgraded aquaculture curriculum***

In January 2020, the new aquaculture curriculum was developed as an outcome of the project and was implemented and used at NRDC. The endorsement of the new curriculum followed a consultation process with key stakeholders, including the Ministry of Agriculture (in charge of NRDC) and NRDC leadership and training officers. The upgraded curriculum was introduced to 33 first year and 36 second-year students (a total of 69) in 2020. As of this evaluation, 169 students had been introduced to the upgraded curriculum. The number represents 125% progress made against the target of training 135 students by the end of the project in 2021. Student respondents in this evaluation affirmed the involvement of some students in the curriculum development process. For example, 85% (11) of the 14 respondents answered affirmatively (Figure 6).

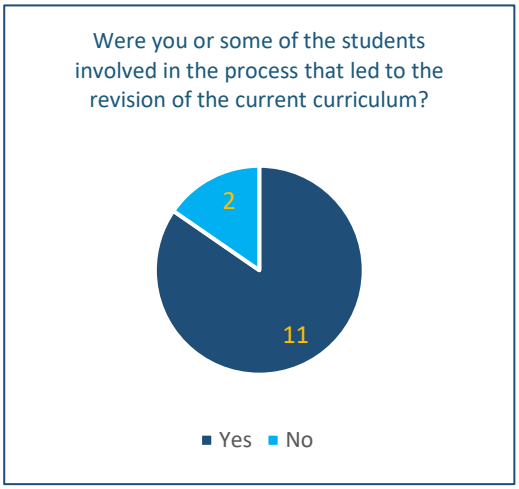

Figure 6: Students – Curriculum Development Involvement

The upgraded curriculum provides a comprehensive overhaul of aquaculture education and training in Zambia. It is a very significant achievement of the project worth commending. The entire fisheries department's programme has seen a facelift through the upgraded curriculum. An excellent outcome of the upgraded curriculum is focusing on

short-term and long-term training. This curriculum approach provides comprehensive and convenient training mechanisms for different groups of trainers. We also found the adaptable nature of the curriculum as an important factor in its comprehensive and extensive reach.

→ *Online training platform*

Besides upgrading the curriculum, the project also developed and established an online training platform. The project contracted BluePlanet to develop the online aquaculture training platform, and the project set up a computer lab at NRDC. The content of the platform, based on a curriculum written by BluePlanet (in consultation with NRDC), is made up of short videos, dialogues, and pictures. The curriculum for the training platform covers many aspects of aquaculture from facility design, pond construction, stocking, feeding, water quality management, pond hygiene, fish welfare, and the biology of farmed fish.

Our findings show that the online training platform at NRDC, by its design and objective, is highly suitable for academic training purposes but less ideal for smallholder farmers.

"In Total, it is beneficial for academics but might not be ideal for practical farmers."
(Comp I _KII_BluePlanet, Pos. 1)

This is because of the language, as many farmers are illiterate and may not comprehend English. The platform also requires modern technologies (computers and smartphones with internet connectivity), which many farmers might not have. Should NRDC intend to use the platform to offer short courses to smallholder farmers, it will require that the language used for videos and illustrations on the platform be translated into local languages. Nonetheless, the platform is an important education tool the project provided for students' training. The evaluation results show that all the 14 student respondents (100%) mentioned that they are aware of the existence of the online training platform and have been introduced to it. About 93% (13) of the student respondents also expressed their satisfaction with the training platform. The inclusion of the online platform in the assessment of this evaluation adds to the long-sightedness of the project in terms of design and implementation.

NRDC has further scaled up access to the online training platform to students in seven out of the nine programmes currently offered at the college by introducing, for example, an introductory aquaculture course in these programmes. All the students who undertake this course from other study programmes will access the online training platform. This evaluation commends this upscaling as it contributes to the project's goal of enhancing knowledge of aquaculture. It also shows that the college is using the training lab to its fullest capacity, which can attract proper attention in maintaining its functionality.

→ *Aquaculture Skills Training Centre (ASTC)*

The skills training centre was another successful outcome of the AQTEVET project launched in December 2020. It was part of the project's design to strengthen practical learning for students. The facility (see Photo A, Photo B, Photo C, Photo D) of the centre is made up of

- a four-room building (housing a hatchery, feed formulation room, storage room, and an office),
- fishponds (6 nursery ponds, 4 production ponds, 4 brood-stock ponds, 1 sedimentation pond
- ablution facilities (for biosecurity).

NRDC provided the land for the facilities and reconstructed a borehole for water supply. The hatchery has an all-year production capacity of about 1,000,000 fingerlings. The project also stocked the facility with 5,000 fingerlings for four ponds and 16 bags (50kg) of start-up feed.

Photo 1: ASTC Billboard


Photo 2: Aquaculture Skills Training centre (ASTC)


Photo 3: ASTC Fishponds


Photo 4: ASTC Hatchery - FIFE consultant (left), NRDC Lecturer (right)

→ ***Students trained using the upgraded curriculum.***

The upgraded curriculum was rolled out in 2020. At this evaluation, only one cohort had fully gone through the entire upgraded curriculum (including the e-platform and training centre). This was only possible because some courses were swapped for the 41 second-year students (as of 2020). Although these students were in their second year, all their first-year courses (except two) qualified them for the new curriculum. The two remaining courses were then swapped - one course originally for the first-year level was taken to the second year and vice versa. This cohort completed their studies in December 2021 and is awaiting their graduation ceremony in 2022. In addition, twenty-three (23) third-year students were partially trained with the e-platform and at the skill training centre before completing their studies in 2020 (**Figure 7**).

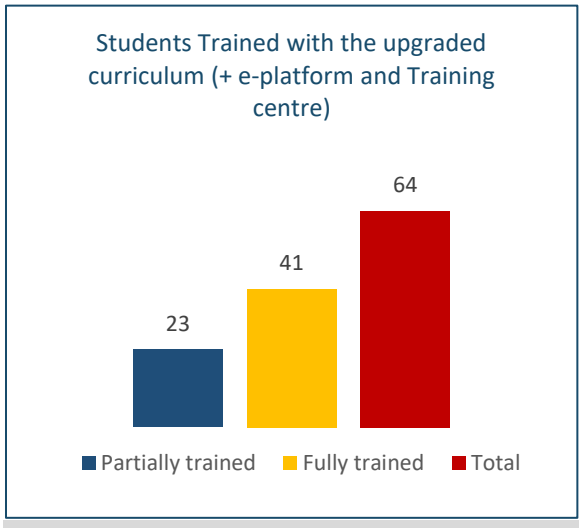

Figure 7: Students Trained with Upgraded Curriculum

"We participated in the review by providing feedback and guidance that was done by consultants from the University of Stirling; developed short courses (did part of those); a computer lab was put up for those who have no phone or laptop to do online training; an AQ skills training centre (ponds, hatchery) was installed. It was the initial idea to have a greenhouse at the ponds, but the budget could not allow it" (Comp I _KII_ NRDC, Pos. 2)

In the quotation above, a lecturer at the Basic Sciences and Fisheries Department explains what the project offered and the role of NRDC in the process. A technical evaluation of project Action 1 indicated that the project was successfully and effectively comprehensive because the project's design considered several aspects of the necessary infrastructure and systems to enhance the training of students in aquaculture.

Activity 2: Students from the NRDC Gain Practical Skills through Internships Specifically Tailored to Address the Needs of the Private Sector.

- **Expected Key outcome 2**: Enhanced practical skills of students from the TEVET institute gained from internships specifically tailored to address the needs of the individual private company
- **Indicators:** (i) Internship program plan developed and piloted (ii) Number of student internships carried out with private companies.

Internships are central to the NRDC fisheries and aquaculture study programme. Before the AQTEVET project, the department struggled to compile a database for attachment placements. The main challenge was reliance on "middlemen" and government officials. The AQTEVET eliminated the "middlemen" challenge by introducing a platform (a database with aquaculture-related organisations and their contacts) and expanding internships to include first-year students. The internship strategy/guide/manual was drafted in 2020 and implemented for the first time in 2021. The reinforced internship programme has made internships mandatory for first and second-year students.

Meanwhile, third-year students can still utilise the internship strategy and get internship placements. Such placements are not mandatory, and the students do not get grades. It is allowed to bridge students to employment opportunities. It improves the previous internship arrangement, which only allowed second-year students for internships. Training officers from NRDC conduct field visits to observe students during internships, usually between December and February. The AQTEVET project employed six interns for smallholder farmers in the Luapula and Northern provinces. At the time of this evaluation, the evaluation team met two of these students doing their internship with two SMEs – Kasakalabwe and Hopeways. All 14 (100%) surveyed students mentioned they had undertaken internships.

All training officers of NRDC do supervision of internships under the new internship strategy implemented by the project. It means that training offers from other study programmes can supervise fisheries and aquaculture interns. It is how the old internship strategy worked. However, it could be productive if only trainers from the Basic Sciences and Fisheries Department or persons with aquaculture backgrounds could supervise interns under the new internship strategy developed by the project.

"In terms of following up on students who are on attachment, we want to see follow-ups done by the training officers from the fisheries department only for a focused type of follow up for the technical relevance. Now we have training officers from all departments doing the follow-up, but we want to see only the training officers from the fisheries department doing that." (Comp I _KII_NRDC, Pos. 2)

But, it is also understandable for budgetary and logistical constraints if the training offers fisheries and aquaculture training officers alone cannot supervise all the student interns. Therefore, should the old

supervision approach continue, the department should develop clear and detailed guidelines for training officers who will supervise fisheries and aquaculture student interns.

ACTIVITY 3: STUDENTS FROM THE NRDC FIND GAINFUL EMPLOYMENT WITH COMPANIES OPERATING IN THE AQUACULTURE VALUE CHAIN OR SET UP THEIR AQUACULTURE-RELATED BUSINESSES, AND PROSPECTIVE STUDENTS ARE ENCOURAGED TO APPLY TO THE FISHERIES AND AQUACULTURE PROGRAMME AT THE NRDC.

- **Expected Key outcome 2**: Increased opportunities for students to find gainful employment with private companies or set up their aquaculture-related businesses
- **Indicators:** (i) Number of plans to link students to financial institutions (and % funded)

Project activity 3 had two objectives;

- to increase students' opportunities (especially women and female youths) to find gainful employment with private companies operating in the aquaculture value chain,
- to equip students with entrepreneurial skills to set up their aquaculture related businesses.

Although this project activity follows a comprehensive and effective design, implementation and verification of its effectiveness are lacking. The evaluation attributed this to three factors.

First, as of this end-term evaluation, only one student cohort that benefited (partially) from the AQTEVET project had graduated from the programme. The second cohort from the program that fully benefited from the upgraded curriculum (+ e-platform and training centre) completed in 2021 and is awaiting their graduation ceremony in 2022. It makes it challenging to assess the effectiveness of this project activity fairly.

Secondly, data on the job placement of graduates from the NRDC study program is not available. An internship review form and a gender and youth responsive marketing strategy have been developed and approved. Indeed, the evaluation found the responsive marketing strategy has successfully highlighted the space in aquaculture for women and youth. Through social media posts, advertisements (radio, flyers and billboards), and TV talk shows – the marketing strategy has contributed to an increased interest of females in aquaculture studies. However, this evaluation did not get clear existing data evidence to this effect.

Thirdly, the timing for expecting results under project activity 3 is not yet mature. The indicator for the project activity will require time and budgetary allocation for collecting regular data on the state of graduates after completing the study programme.

Besides the difficulty associated with verifying the effectiveness of project activity 3, the evaluation team identified two graduates from the study programme who were undergoing internships at Kasakalabwe in Northern Province and Hopeways in Luapula Province, respectively. The evaluation team learnt that these two SMEs were finalising an employment contract to hire these graduates.

In linking students to financial institutions, the project provided 10 students with mentorship and dialogue sessions where two financial institutions (the National Savings & Credit Bank (NATSAVE) and Agora Microfinance Zambia (AGORA)) guided the students on available financial portfolios and how to access these finances. The students were trained to develop business plans which they pitched to NATSAVE and

Agribusiness Incubation Trust and got comments and recommendations to improve their business plans. None of these business plans, however, received funding. As of this evaluation, no graduate from the NRDC fisheries and aquaculture programme has been able to access business start-up funds from any financial institution. The evaluation also found that besides this initial linkage between students and financial institutions that was initiated by the project, there was less effort on the part of the project to follow up on this activity and has been less effective in implementing this particular objective.

Activity 4: Scaling the upgraded fisheries/aquaculture package for adoption/modification by other TEVET institutes in Zambia.

- **Expected Key outcome 2**: TEVET institutes in Zambia adopt/modify the curriculum, training tools, online training platform, and internship program for integration within their institutions
- **Indicators:** (i) Number of TEVET institutes that adopt/modify the curriculum, training tools, online training platform, and internship program for integration within their institutions

The AQTEVET project has been highly successful in drawing the attention and interests of other educational (including TEVET) and non-educational institutions alike, both in Zambia and outside Zambia, to the upgraded aquaculture curriculum. For instance, KFTI, which was invited to participate in the early stages of curriculum development, has successfully developed its curriculum by modifying the AQTEVET project's NRDC upgraded curriculum. It has since 2020 rolled out its new curriculum. Besides Kasaka, other institutions are showing strong interest in the AQTEVET project outcomes. Desk review of project documents indicated that Mulungushi University and Copperbelt University had expressed interest in reviewing their aquaculture training programme to improve their fisheries and aquaculture study programme. A Memorandum of Understanding (MOU) has already been signed between Mulungushi University and WorldFish.

Photo 5: Entrance, Kasaka Fisheries Training Institute

The AQTEVET project's interventions in NRDC also have interested institutions outside Zambia. For example, a Zimbabwean private commercial fish farm called Lake Harvest has adopted the project's innovations, worked with BluePlanet to revise their Standard Operating Procedures (SOP), and converted the SOP into an animated course hosted by the BluePlanet Academy. The company uses the online platform to train its staff. Also, because of the AQTEVET project, BluePlanet has scaled up its online platform to Skretting.

Again, WorldFish hosted a dissemination meeting for the AQTEVET project with partners and stakeholders from Zambia and other neighbouring countries in the Southern Africa Region. After the meeting, several universities expressed interest in adopting the project's interventions that have been implemented in NRDC. For example, in collaboration with Chinhoyi University of Technology (CUT) in Zimbabwe, NRDC, and

BluePlanet, WorldFish has submitted a proposal to implement similar interventions from the AQTEVET project at the CUT.

The evaluation found this successful outcome of the project compelling in this regard. Thus, the project's objective to scale up the upgraded fisheries/aquaculture package for adoption/modification by other TEVET institutes has been effectively and successfully achieved. It displays the extended reach of the project. However, with the AQTEVET project ending, WorldFish may have to seek another funding mechanism (including co-funding with these institutions) to scale up the curriculum and the online platform to other institutions.

Activity 5: Private sector Linkages with and TEVET Provided to Smallholder Commercial Fish Farmers.

- **Expected Key outcome 2**: Enhanced organisation of farmers trained on TEVET and provided services by the private sector
- **Indicators:** (i) Number of farmers organised and trained on TEVET by the private sector (ii) Number of farmers organised and provided services by the private sector

The objective of this project activity was to develop the capacity of 10 commercial private sector companies operating along the aquaculture value chain to deliver sustainable and profitable inputs and outputs services, including training and technology transfer to 1,000 smallholder farmers.

To achieve this objective, WorldFish partnered with Musika to support the project by identifying and bringing on board private companies and actors in the aquaculture value chain in Zambia. This was important because the large private companies in the aquaculture value chain mainly operate in southern Zambia. Before the project, Novatek, for example, was not operating in the Luapula and Northern Provinces.

The project had successfully brought on board feed milling companies Novatek and AAZ to invest in smallholder aquaculture in northern Zambia. With this result, the project successfully achieved its objective of getting private sector value chain actors to the two regions.

After getting these two companies on board, the project also identified and brought three SMEs – Triple Blessings, Hopeways and Kasakalabwe. The project also supported Hopeways and Kasakabwe with hatcheries, while Triple Blessings serves as an off-taker. WorldFish also trained these SMEs to provide extension services and training to smallholder farmers and then linked with the two private companies to distribute fish feeds to the farmers.

"WorldFish linking them to me and other necessary actors was helpful as before they [farmers] had nowhere to get inputs or sell their fish". (Comp2_KII_SME, Pos. 4)

The most significant result from these linkages between the SMEs and the private companies was that it enabled investment in the aquaculture sector in the Luapula and Northern Provinces. While the two companies established shops and branches in the two provinces, they also invested in training farmers who buy feed from them. These innovative linkages by the project are worth commending because they effectively improved extension services to smallholder fish farmers. Extension services in aquaculture

remain very low, especially in the two-targeted regions. Hence, for the project to intervene in this aspect of the industry is a huge achievement.

The two private companies[8] and the three SMEs bring the number of commercial private sector actors directly supported and linked together by the project to five, representing 50% achievement of the targeted ten private actors. However, because of these linkages, the evaluation found that about 19 additional networks of SMEs have been brought on board by the two private companies and are delivering inputs and output services, including training of farmers. For example, in 2020, Novatek established partnerships with 5 SMEs (Kasama Food Basket, EvaMuta, Kasakalabwe, ADSEK and Hope Ways) as last-mile distributors of Novatek feeds in the two provinces.

"I was dealing with only Agro imports without the fish products. It is only WorldFish who came on board and helped me through teachings and sensitisation. It gave me enough motivation, and I also started helping my fellow farmers to teach them how to take their business seriously, especially fish farming." (Comp2_KII_SME, Pos. 5)

Such linkages enable farmers in remote parts of the provinces to access feed and be part of the aquaculture value chain. As part of the project activity, WorldFish successfully got subsidised commercial feeds from the private companies for SMEs, who then sold the feed to smallholder farmers at reduced prices. We found that the approach motivated SMEs and supported them to raise capital, which they used to continue ordering commercial feeds to sell.

"They gave us the opportunity to order feed at a 30 percent discount. That feed which we ordered on discount, I was even the best beneficiary because I ordered many…So with that 30 percent, it helped me sell our fish feeds to our farmers at a very good price. Most of them I used to get them at free transport. I offer free transport so they can make a profit at the end of the day". (Comp2_KII_SME, Pos. 3)

The project achieved the linkages of actors in the aquaculture value chain to provide input, output, and training services to smallholder farmers. It has led to over 1,717 farmers (78% male; 22% female) being trained (**Table 7**), representing an increase of 172% of the targeted 1,000 trained farmers.

Number of farmers trained		
	Number	Percent
Male	1,346	78%
Female	371	22%
Total	1,717	100%

Table 7: Number of Farmers Trained

Province				
	Number	Percent	Females	Female %
Northern	1090	63%	292	79%
Luapula	627	37%	79	21%
Total	1717	100%	371	100%

Table 8: Farmers Trained in Provinces

A higher percentage (63%) of the farmers trained are in the Northern Province (Kasama, Luwingu, Mbala, Mporokoso, and Mungwi districts), while the remaining are from Luapula Province (Kawambwa, Mansa and Samfya districts) (see **Table 8**).

Individual farmers' survey results[9] confirm that 73% (214) farmers have received training on pond construction, quality fingerlings, fish farm management, and biosecurity management. Apart from training

[8] Later in the evaluation, we learned about a third company – Zhongkai – that the project partnered to test distillers grain from cassava to be used as fish feed. This partnership however did not yield any result and was discontinued. It also did not contribute in any way to the project activities and achievements. Therefore, we do not include this partnership in our assessment of the project, although other project documents counts this partnership 6 (60%) out of the targeted 10 private sector actors.

[9] Detailed results can be found under Enhanced knowledge of aquaculture farming practices, access to input and output market among smallholder fish farmers on page 29.

on pond construction, which only a few respondents have not been trained on, many farmers have not been trained on quality fingerlings and business management and biosecurity (see **Figure 8**).

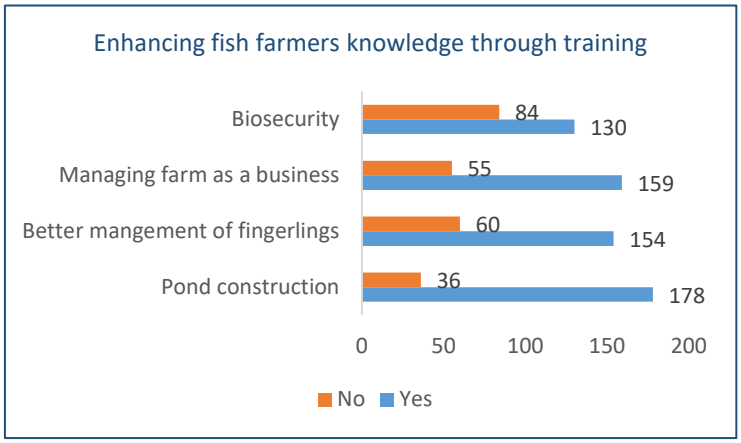

Figure 8: Farmers responses on type of training received

Compared to other training topics, 130 respondents, representing 61% (the lowest), have received biosecurity training.

During this evaluation, it was possible to find some farmers who had not completed the entire training cycle. This is because the extension/training visits are conducted in phases and sometimes require farmers to undertake some activities (for example, constructing ponds) on their farms before moving to the next training stage (for example, fertilisation and stocking). As a result, we found many farmers who have not been able to progress in their training. Also, some training is based on demonstrations, and when farmers miss these demonstrations, they are more likely to mention that they have not received that training even though the project records that the training has taken place. Another issue we experienced was that some farmers would intentionally say they have not received any training hoping that the research team is from another organisation and can offer them the training in addition to financial support.

GENDER

The project performed less to enhance female participation in the aquaculture industry in Zambia. On the one hand, the project's advertisements, especially for component 1, successfully created awareness for more women's participation. Specific activities included

- deliberate gender balance at every activity (i.e. when selecting trainees for mentorship, student profiles and all other activities)
- use of females on adverts/billboards/all adverts
- use of female voice over on e-platform

Such activities put women at the forefront of aquaculture education as they encouraged women to enrol in the study programme at NRDC (female enrolment increase to 50% by 2021).

And while the evaluation found the above activities commendable, the project, on the other hand, could have deliberately supported poorer female students with materials and possibly offered some form of scholarship support to hardworking female students.

"Everyone is trying to get scholarships to train in fish farming, but the project could not meet that. There are many ladies who want to study but cannot afford it. (Comp I _KII_NRDC, Pos. 2)

In component 2, the project offered training to both men and women. Yet, the result shows that women are more interested in cooperatives than doing individual farms because of the labour and financial cost involved in fish farming. The project could have considered that women face challenges (access to land,

financing, traditional roles) that inhibit equal participation in the sector. Supporting women with ponds, fingerlings or access to loans could have enhanced women's role in the sector. Women, however, are paid more for fish they sell to off-takers as part of the project's initiatives.

VISIBILITY:

The AQTEVET project has generated ample visibility among aquaculture stakeholders in Zambia. Under component 1, several online blogs, articles, social media posts and publications were produced and made available in the public domain, including billboards and a TV talk show.

Radio programs were also used for aquaculture training in the Northern and Luapula Provinces under component 2 of the project.

The project was ineffective in its visibility efforts regarding the branding of facilities and project-related items (motorbikes, fishponds, hatcheries, greenhouses) under component 2. For example, even though all the motorbikes had Musika stickers, there was no visible connection between these items and WorldFish. The low visibility for WorldFish in the project activities makes it difficult for beneficiaries to associate results with the project results or WorldFish. For example, many respondents mentioned that they do not know WorldFish but Musika or the other SMEs who were linked to them. To affirm itself as providing leadership and technical guidance to the aquaculture sector in Zambia, WorldFish should give visibility to the facilities and materials that the AQTEVET project has provided to beneficiaries.

EQ5. What significant factors influenced the achievement or non-achievement of the project's objectives?

The aggregate of all the five project activities undertaken to achieve the project objectives shows the AQTEVET project achieved the project objectives significantly. The project scored 100% in activities 1, 4, and 5 and less than 100% in achieving objectives under activities 2 and 3 (**Figure 9**).

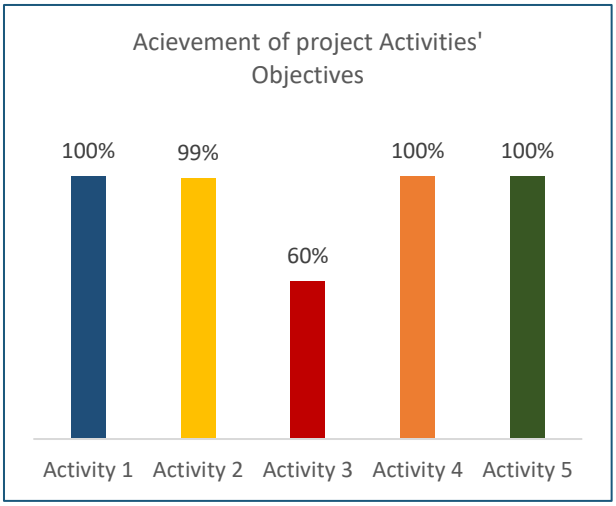

Figure 9: Achievements of Project Activities

Under activity 2, the evaluation found that although the project has successfully implemented an internship programme, the supervision approach for the upgraded internship program remains weak. We see the "old" system whereby lecturers from all the other departments of NRDC supervise aquaculture interns ineffective for the focused-type internship programme that the project has developed. It depends on NRDC based on its human, financial and logistical resources to improve the supervision of aquaculture student interns.

The objective of linking third-year students to a financial institution to support aquaculture businesses was achieved under activity 3. Still, the activity could not successfully lead to any student accessing business start-up funding. It is also too soon to assess the project result on this activity because only a few students have so far graduated after the project had been completed. A follow-up impact study may

be needed to capture the performances of NRDC graduates who have been trained with the upgraded curriculum.

FACTORS CONTRIBUTING TO THE ACHIEVEMENT OF RESULTS

→ *The comprehensiveness of project design*

The AQTEVET project's conceptualisation and design correspond well to the contexts and realities in the Zambian aquaculture sector. This factor contributed significantly to the project's proposed solutions' effectiveness in meeting the sector's problems, gaps, and challenges. The realistic project design can also be attributed to the extensive needs assessment conducted before the project's implementation.

→ *Government Interest in aquaculture in Zambia*

The project was in tune with government development direction and policy recommendations. As a result, it was easier for the project to attract by-ins from various actors and stakeholders. Also, WorldFish already saved enough time from the otherwise very short implementation timeline by identifying the most relevant stakeholders to partner with for the AQTEVET project.

→ *Buy-in from NRDC Management*

The college's management was cooperative and swift in pushing the project. For example, the evaluation found that the manager from the NRDC site decided not to take the $60,000 budgeted for the project's activities in NRDC. The manager knew that the amount would not be able to meet the project's target because of government bureaucracies and related expenses (sitting allowances). To avoid wasting the money on bureaucracy, the NRDC manager asked WorldFish to use the funds to implement these activities for the college.

> *The manager that we found at that particular time, we saluted him because if it was someone else, they were going to get over-excited, get the funds and start telling us stories. They were clever enough as what ended up happening was that the budget was over short. We had a lot of budgets overrun, which, in our case, we could quickly run back to the donor for reinforcement, so that was another big blessing. (WF _KII, Pos. 8)*

The initiative-taking decision and support for the project's activities by the NRDC management contributed to the project achieving its results.

→ *Private actors' willingness to invest*

The second component of the project hinged on finding private companies and SMEs willing to take the risk of investing in the Northern and Luapula Provinces to bring commercial feeds, structured market and extension support closer to farmers. It was the primary determinant of the success or failure of the project. Therefore, the coordination and linking of these actors, which resulted in achieving the project result, was based on the acceptance of these private actors to participate, invest in the goal of the project, and expand in the two provinces, although *"they felt the areas were risky to invest" (Comp2_KII_ Musika, Pos. 3).*

→ *Professional and motivated team:*

The evaluation team also attributes the effective achievement of project results to the effectiveness of the WorldFish project team. The professionalism, staff composition, and structure accounted hugely for the project's achievements. The project assigned qualified coordinators for the two components, recruited qualified fish scientists, established a satellite office in Kasama and followed the implementation with extensive monitoring and evaluation. Such an implementation strategy provided the space for the

responsible staff under each component to focus on the project activities. In this, the motivation of the entire project staff was a key factor for the achieved project successes.

Factors contributing to the non-achievement of results

→ *Time*

The three and half years duration for the project was definitely a very short time for the project to experience impact and provide adequate results. For example, in component 1, the timing for implementing the upgraded curriculum and all the other activities was very short for the project to yield results within the project's lifespan. The time constraints of the project were observed during the field visit for this evaluation. Despite the project's success in putting in place the necessary linkages and facilities, the project still lacks awareness and sensitisation.

→ *2018-19 Drought and Covid-19*

The 2018/2019 drought in Zambia had several effects on the country, including inconsistencies in power supply – and low power/load shedding. This affected feed producers because they relied on electricity for production. Maize production decreased across the country, affecting low feed production for private companies.

"Most firms had to readjust and re-strategize to stay afloat. Interest rates were also high." (Comp2_KII_ Musika, Pos. 3)

The outbreak of the Covid-19 pandemic delayed the project significantly. First, the aquaculture industry (feed production) was affected because of trade restrictions. This made it difficult for the project to convince private actors in the aquaculture value chain system to, during the challenges, expand and invest in new provinces. It took time and effort, and in the end, only two companies agreed to the project. The pandemic also restricted mobility, made monitoring visits challenging, and delayed project activities like farmer training.

→ *Late buy-ins.*

It took a long time for Musika to convince the private companies to invest in the North. Coupled with the 2018 – 19 drought and the Covid-19 pandemic, these private sector companies were reluctant to invest in the two provinces on the caution of risk.

→ *Lack of financial linkage*

Aquaculture is an expensive venture, especially at the initial stage. Thus, the project's focus on training and input/output linkages without financial linkages fails to achieve greater results. The evaluation results indicated that many farmers complained about the expensiveness of commercial feed and pond construction. Without linkages to access finance, many farmers are unable to put their acquired knowledge from the training into practice. For example, during the interviews with farmers, many mentioned going back to the traditional way of feeding fish because they could not afford commercial feeds. This is particularly the case for many female fish farmers.

→ *Farmers' Dependency Mindset*

The AQTEVET project's design and theory of change are contrary to the experiences of small-scale fish farmers. Many of these fish farmers are used to organisations giving them free fingerlings, feed, and

financial support for their fish farms. This practice by some NGOs and other organisations has created a high dependency of farmers on the organisation providing those inputs and support. Thus, the AQTEVET approach of providing training and linkages falls short of farmers' expectations, thereby leading to some farmers refusing to continue training from the project.

→ ***Lack of gender provisions***

Although the project's fundamental goal involves attracting women into the aquaculture sector, a critical analysis of the project's second component finds no intentional approach to encourage women's involvement. Training is offered across the board and left up to interested women to participate. Yet, cultural and financial constraints continue to negatively affect the equal participation of women in the aquaculture sector.

4.6 IMPACT

The extent to which the intervention has generated or is expected to generate significant positive or negative, intended, or unintended, higher-level effects.

The AQTEVET project aimed to "increase the number of human resources working for the private sector, and the number of smallholder commercial fish farmers with enhanced aquaculture knowledge and up-to-date practical skills to help sustainably grow the sector and make it more inclusive". However, despite showing signs of achieving short and long term intended and unintended impacts, the project's implemented activities are still in their initial states. This evaluation exercise assesses that the impacts expected from the project are not yet available, and thus, evaluating impact was not possible. This is because although the three and half years of the project's implementation are short and with the effect of the Covid-19 on the project, the impact incubation time was very short. Nevertheless, the project has led to significant changes in the lives of beneficiaries. Although we could not equate these changes to impacts, they were worth assessing. This section of the report focuses on immediate changes observed by beneficiaries. Therefore, the use of impact in this section should not be understood in terms of short or long-term impacts.

EQ6. What has been the effect (positive and negative) of the intervention relating to the situation of the beneficiaries (persons & institutions)?

→ ***Enhanced aquaculture training among TEVET institutions***

The upgraded curriculum, training for lecturers, and the availability of training tools and facilities have positively affected the delivery of aquaculture training. Results from evaluation interviews show that aquaculture training has improved. NRDC staff and administrators confirmed this by admitting that the upgraded curriculum has expanded the aquaculture component of their study programme. The availability of the online training platform and the fish training centre also makes the practical aspect of their teaching much easier for students.

On my part as a lecturer, this makes my life easier. My imagination is not their imagination, and I use the videos as a reference, making it easier to teach. It is also easier for students to relate to what I am talking about when they remember the video. (Comp I _KII_ NRDC, Pos. 2)

Another intended effect of the project is the extent to which the project has elevated the NRDC as a national college for aquaculture training. This outcome of the project, as the evaluation discovered, is reducing the gap between the need for skilled aquaculture professionals for the sector in Zambia. The college, as a result, has attracted several interests and collaborations from various fish farming entities who want to acquire short training on aquaculture.

The project has aroused interest in other institutions and universities as well. The University of Zambia is interested now, and Mulungushi University in Kabwe is also interested. The Mulungushi University expressed interest to partner with us on short courses. So, we have attracted attention. We have the facilities and ponds, hatcheries etc. (Comp I _KII_NRDC, Pos. 2)

As an unintended effect, the project, by equipping NRDC, has replaced unapproved and unverified aquaculture training providers. We found that several individuals and private entities offer unsupervised and unapproved training on aquaculture to farmers. These groups contributed to the spread of misinformation and practices on fish farming. With support from the AQTEVET project, NRDC has successfully lobbied the Ministry of Agriculture to be recognised as the only institution currently offering the proper training on aquaculture. With this status, the college can now provide short courses to train trainers who will, in turn, train smallholder farmers with the appropriate aquaculture practices.

We have come to say we have the facilities and everything to provide the needed training. With that, we were able to lobby the ministry that we are the only ones who offer the proper training. Other quake trainers were slashed out. So, we are now very relevant. There is also a lot of funding coming into the sector, and in the near future, we will see a lot of impacts. (Comp I _KII_NRDC, Pos. 2)

→ *Increased in Student Enrolment at NRDC*

One significant change that the fisheries and aquaculture study programme has seen is increased enrolment figures.

Yes, enrolment improved. We have distance and regular students; before, we could have six students, and now we have 18. (Comp I _KII _NRDC, Pos. 2)

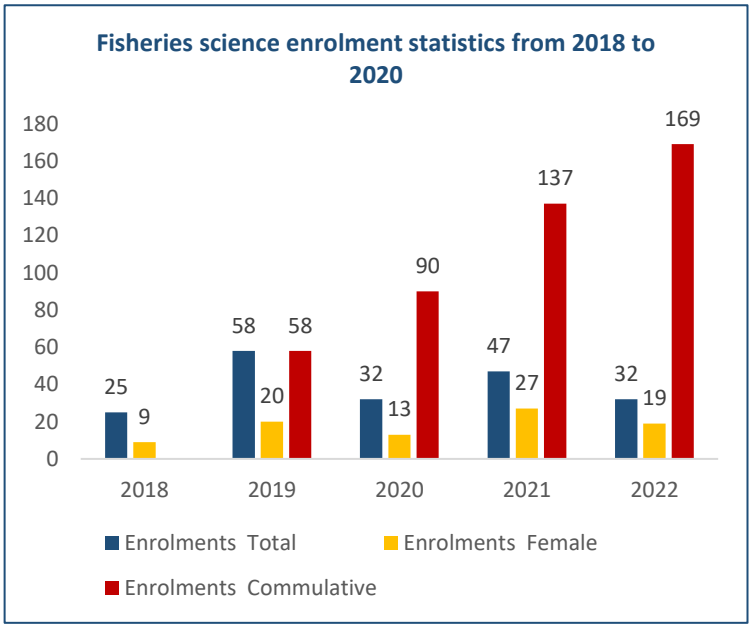

Figure 10: Student Enrolment (2018 - 2022)

As of March 2022, the enrolment figures for the fisheries and aquaculture study programme had increased from 58 students in 2019 to 137 in 2021 and 169 students in 2022. This number represents an increase of close to three times the targeted 135 students by the end of the project in 2021 (**Figure 10**). This number, however, does not guarantee that all the students enrolled will complete the study programme. The evaluation found that some students drop out from the programme to either join other programmes in the college or altogether leave the college because of failing some courses and the lack of financial support. For example, out of the 58 total enrolments in 2019, only 41 completed the training in 2021. Regardless of the dropouts, the enrolment figures continue to rise due to the increased interest in prospective students to study aquaculture. The evaluation also found the number of female students to be increasing.

"The project encouraged female applicants. We have more female applicants. We had years when we had three females to 21 male students, but now more women, even 50/50 sometimes or even more females enrol." (Comp1_KII _NRDC, Pos. 2)

The increase in female enrolment has fluctuated (comparing 2020, 2021, and 2022 figures), but overall, female enrolment has increased. The increase in student enrolment testified to the AQTEVET's intervention when NRDC was at the point of deciding to discontinue the programme.

"Everything changes we are experiencing now can be attributed to the AQTEVET project. At one point, we were about to close that programme. The department was in an ICU situation, but the project came at the right time." (Comp1_KII_ Pos. 2)

→ *Enhance Interest in Aquaculture sector participation among students*

Again, the evaluation found that 40% of NRDC students who completed in 2021 plan to start their own aquaculture business or find a job in an aquaculture related company (Figure 11).
The interest of more graduating students looking to go into aquaculture-related businesses results from increased confidence in the training they have acquired.

"Change is difficult to measure now, but you could tell the students are going out with confidence in terms of saying we can do this and that." (Comp1_KII_NRDC, Pos. 2)

Introduction to the upgraded aquaculture curriculum (including entrepreneur training), practical training at the ASTC and the improved internship programme, according to the students, have equipped them for the aquaculture business.

"I am fully equipped to be feasible in the business sector under aquaculture" (NRDC student, soon to graduate)

Students' attitude has positively changed towards the fisheries and aquaculture study programme. With the level of upgrade that the department has received, students enrolled in the programme feel confident and "special", which has positively affected their out-of-school perspective on aquaculture.

"Students felt special. It was the only project running here that was directly encouraging students and trying to upgrade them. This encouraged students to work hard." (Comp1_KII _NRDC, Pos. 2)

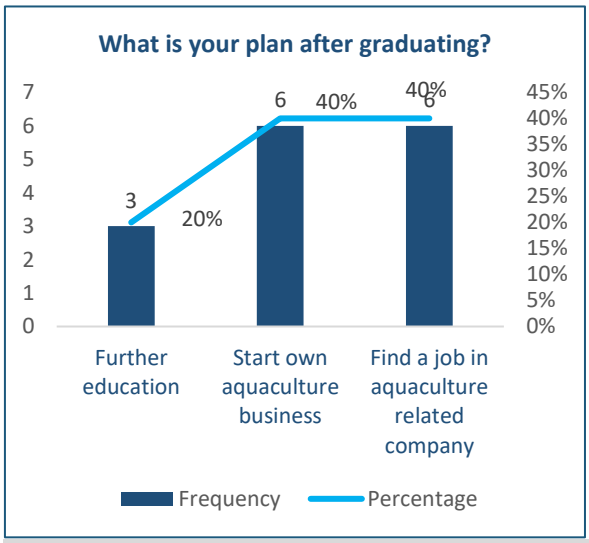

Figure 11: Interests in Aquaculture after Graduating

→ *Generating interests and investments*

An effect of the AQTEVET project has been the generation of interest and investment among key stakeholders in the aquaculture sector. In project component 1, the evaluation found that, as a result of the project, NRDC developed a fish innovation lab. The project generated interest in fish research at the college leading to the innovation lab.

"During the project, we had another thing that came through; the Fish innovation lab. We put up research (flow-through aquarium system), and the project put up tanks and a number of things, and we have done research on the project with the Fish innovation lab. This came because of the WorldFish project." (Comp1_KII_ NRDC, Pos. 2)

Also, the project led NRDC to invest in providing a water source for the ASTC, providing land, and allocating space for the computer lab. These additional investments and interests were possible because of the project. It again speaks to the project approach of cost-sharing and creating interest in investments among actors.

In component 2, the project has also generated interest and investment among the private companies linked to farmers in the Northern and Luapula Provinces and the selected SMEs. For example, this evaluation confirmed that three of the interns that the project provided to the private sector actors were hired by these actors.

"At the moment, because I was not there before, they are now willing to push [hire]me in specifically for the SME… Yes, like the contract I signed ended in September, but I am still here because they said no."
(Comp2_KII_intern_Novatek, Pos. 24

The intern explained that Novatek had kept him after his internship to continue providing extension/training services to farmers. The evaluation team observed the same situation with the SMEs Hopeways and Kasakalabwe. Even though the project provided these actors with motorbikes, the actors fuelled and serviced the motorbikes for the extension services. An investment that would otherwise not happen.

Another area of interest and investment could be seen in the expansion of these SMEs and private companies. For example, Novatek and Aller Aqua have opened several depots and shops in the two regions, offering extension services and training for farmers.

→ ***Enhanced knowledge of aquaculture farming practices, access to input and output market among smallholder fish farmers***

The comprehensiveness of the AQTEVET in terms of activities such as training and linkages has changed the aquaculture scene in the Northern and Luapula Provinces. Survey and FGD results indicate that fish farmers have access to training, inputs, and output markets as an effect of the project. The farmers confirmed training on species selection, site selection, pond construction, fishpond management, and biosecurity to have increased their knowledge and approaches to fish farming (Figure 12). This result is consistent with the mid-term evaluation report and other WorldFish progress reports.

→ ***Enhanced knowledge among farmers***

Indeed, most of the respondents mentioned they are yet to harvest their fish, many for the first time. The highest percentage of respondents (64%) pointed out that the training they have received from the project is beneficial, and they are incorporating it into their daily group pond farming activities (Figure 12).

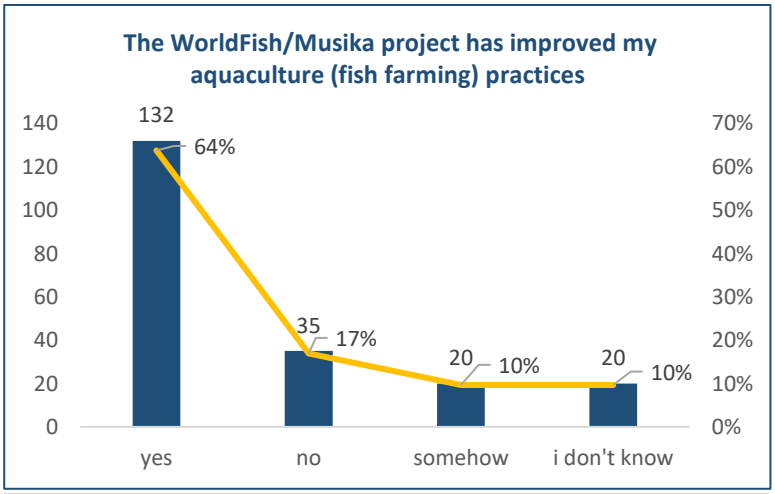

Figure 12: Farmers' Perception of Improved Aquaculture Practices

→ ***Pond construction***

On pond construction and flood prevention, the majority (82.7%) of the respondents revealed they now know that pond size determines the number of fish to stock and harvest; 81.3% said they know that the walls of their ponds should be raised to avoid collapse during flooding and 84.1% stated they know their ponds should have both inlet and outlet. They indicated the inlet is used to draw water into the pond and while the outlet is used to drain the pond after harvest and during flooding. Respondents also mentioned that the project trained them to drain their ponds after harvesting. Also, they confirmed to have been trained to let some parts of the pond be shallow and regularly change their brooding stock.

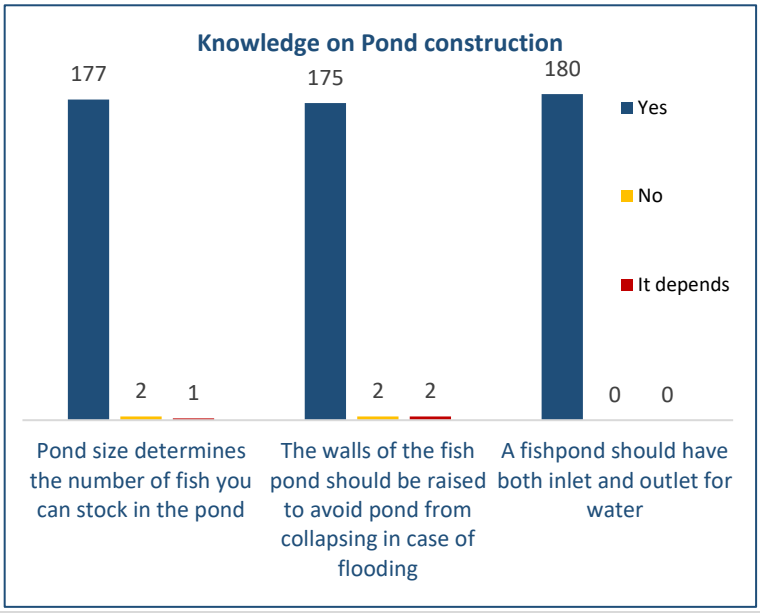

Figure 13: Farmers' Knowledge on Pond Construction

By answering these technical questions on site selection, pond construction and fish management, the result indicates that farmers who have participated in training conducted under the project have acquired the relevant knowledge in aquaculture for their fish farming activities. Some quotations from respondents include;

"We used to overstock our fishponds, but now we understand stocking density and its effects." (Farmers' survey respondent)

"Before the training, we would not take into consideration the way we constructed; we were just constructing without knowing how to and did not know the impact that would have on our fish." (Farmers' survey respondent)

"Knowing how to calculate stocking density according to the pond size has increased my yield and avoided overstocking of fish." (Farmers' survey respondent)

→ Fish management practices

The evaluation learned that farmers' knowledge of fish farming management practices has improved. The evaluation asked about farmers' knowledge of management practices, 75% (115) of the respondents passed by confirming that recycled fingerlings can cause stunted growth. Meanwhile, more than 90% of the farmers agreed that sex-reversed fingerlings grow better (149) and must get their fingerlings from the hatchery (143). Close to 90% of the farmer respondents also mentioned that they should not buy fingerlings from their fellow farmers.

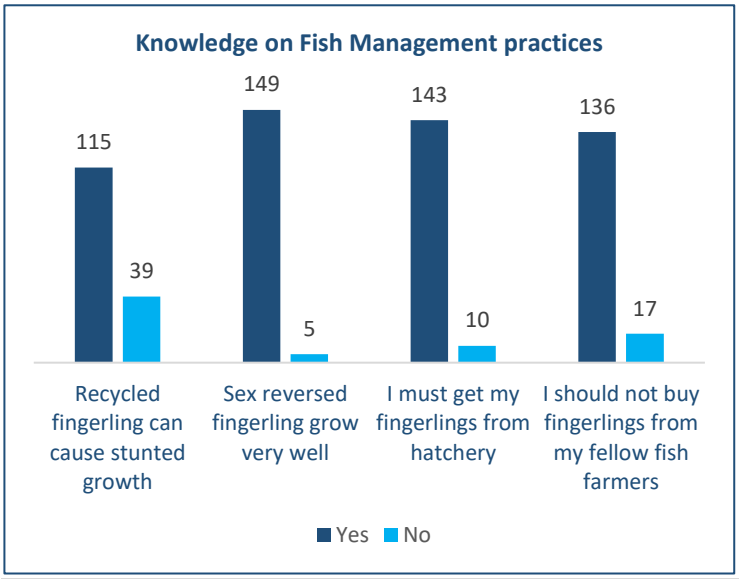

Figure 14: Farmers' Knowledge on Fish Management

Besides showing the effect of the project on their increased knowledge of fish management, the fish farmers also mentioned some changes they have observed;

"It's been five months since I stalked my last fish, and I must say I have not had even a single mortality. I believe this is a result of my proper application of the knowledge I gained about fingerling management." (Farmers' survey respondent)

"Knowledge was well received. This time I can know the fingerlings which are healthy, and those are the only ones I buy" (Farmers' survey respondent)

→ Fish Farm Management

All the 159 who answered the fish farm management skills question (**Figure 15**) showed excellent knowledge from the training received. Almost all the respondents (between 96% -100%) showed knowledge of record-keeping, separating fish farm business from other activities and managing their farms as a business.

"It helped me learn how to better manage my fish; I never used to keep a record of my expenditure and income. I used to stock mixed-sex fingerlings. This resulted in having variation of sizes in ponds. When you have a variation of sizes in one pond, it's difficult to feed them, so my fish were not growing to their maximum size. I used to make little or no income from my business, but all that has changed after having the training with Hopeways." (Farmers' survey respondent)

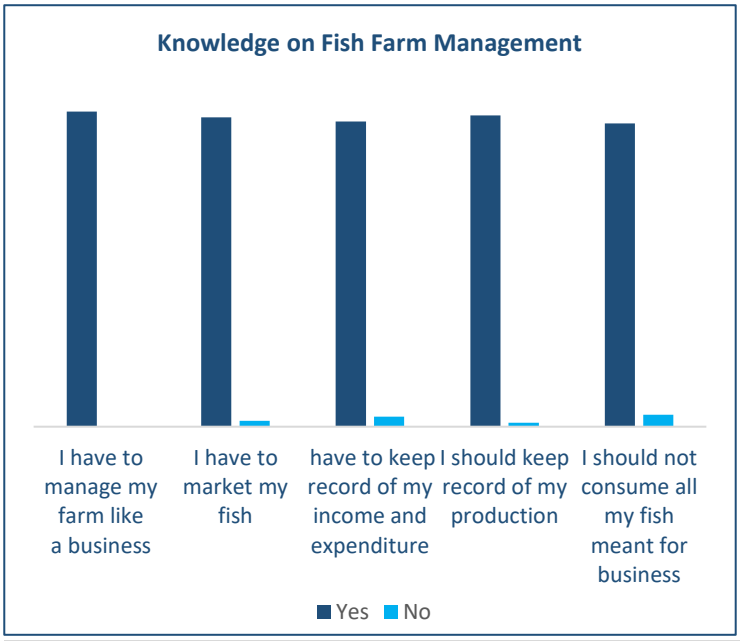

Figure 15: Farmers' Knowledge on Fish Farm Management

→ Biosecurity

Few (130) respondents had received training on biosecurity compared to the other pieces of training. Yet, from this number, almost all of the respondents (98%) showed improved knowledge of biosecurity practices for aquaculture (**Figure 16**).

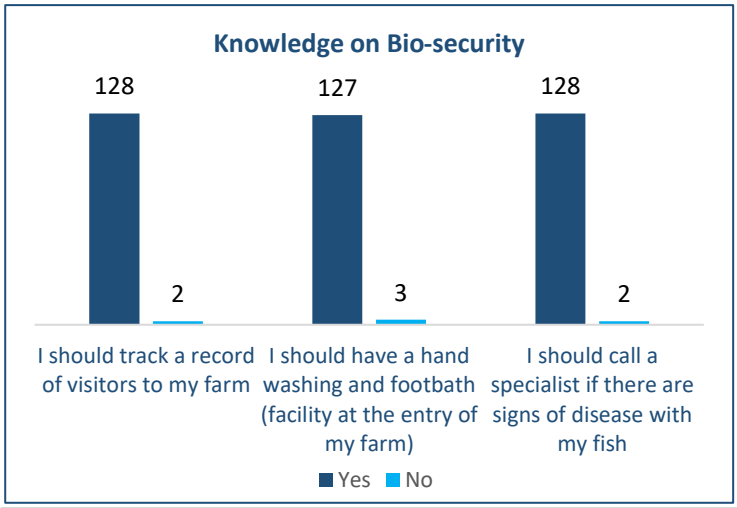

Figure 16: Farmers' Knowledge on Biosecurity

Other observed changes among farmers

On top of expressing enhanced knowledge as an effect of the training they have received, 71% (152) of all the respondents (214) admitted to having seen improvement in how they access inputs like linkage to markets (40%) and extension services (61%). The result that the farmers can access extension services testifies to a significant improvement resulting from the project's effect. It is an improvement from a 2020 smallholder fish farmers' census that found that fewer farmers have access to extension services.

According to 128 (60%) respondents (**Table 9**), access to commercial feed has improved, and commercial feed stores are within their reach.

Improvement in Access to Commercial Feed?		
Response	Number of Respondents	Percentage
No answer	12	5.6
No	74	34.6
Yes	128	59.8
Total	214	100.0

Table 9: Farmers' Perception of Access to Feed

Commercial feeds are readily available and accessible, and the distance to access the feed has also been reduced. The 2020 smallholder fish farmers' census found that only a small number of farmers in the two provinces used commercial feed because of the long distances to access feed. Given this result, the (60%) improvement in access to feed is a remarkable change effected by the implementation of the AQTEVET project. Of course, many farmers did not know the exact role the project had played regarding their close reach to inputs.

Most of the farmers (72%) mentioned that despite knowing the importance of using commercial feeds, they still cannot afford them. Such farmers still use homemade and left-over household food (nshima) to feed their fish. The project, nevertheless, through its activities, has created awareness and helped provide the corresponding linkages for the value chain.

Photo 6: Farmers Loading Feed from NovateK Shop in Kasama

Nearly 35% of the farmers stated they now get fingerlings from hatcheries. At the same time, the remaining mentioned that they still depend on their old breeding stock due to the high price of fingerling from private farms (average 1ZMW per fingerling). This result constitutes an unintended effect, which is explained by the fact that despite knowing the best practices, some farmers are simply unable to maximise the possible impact of the training due to financial constraints. It limits the project to showing maximum positive effects.

On fish growth in sizes, some farmers indicated they had seen improvement in their fish growth because they are now using high-quality fingerlings from the hatchery operators. Others attributed fish growth to the use of commercial feed. This was also confirmed by some of the extension services providers under

the project, who mentioned that farmers who are applying the training and using the right feed are seeing improvement in the sizes of their fish.

Fifty-five (55) percent of the farmers asserted that they have access to readily available markets for their harvests. Others (6%) also mentioned that the price of selling fish has improved. In the focus group discussion with the Riverside Women's Club, the discussants revealed that through the project, they had been linked to an SME to whom they now sell their harvest. The farmers said it is more profitable and beneficial than selling to individuals in the communities (70ZMW per kg to private actors).

Response	Number of Respondents	Percentage
No, respond	67	31.3
The market is readily available	117	54.7
other, Specify	7	3.3
The distance I travel to sell is now shorter	3	1.4
The price has improved	12	5.6
The quantity has increased	8	3.7
Total	214	100.0

Table 10: Farmers Links to Output Market

4.7 EFFICIENCY

To what extent was the project implementation efficient?

EQ7. Were the project objectives achieved on time?

Despite the initial delays in getting some stakeholders (for example, private actors) on board, the project performed remarkably well. Meeting the project objectives within the planned three and half years also meant the project implementation had to be rushed. For example, the project did not have enough time to sensitize and create awareness among several stakeholders in the aquaculture sector. This could have been done before or alongside the project implementation should the project have had a longer time frame. It also explains the additional 4-month extension for wrapping up the project.

Achieving these significant results within the three half timeline is nevertheless an efficient result. However, the evaluation data showed that many of the actors involved in the evaluation study perceived the project as trying to achieve too many things in a short time. This, according to some stakeholders, risked leaving other relevant stakeholders behind.

The project's aim of transforming aquaculture by linking smallholder farmers (especially recruiting 40% women) to larger aquaculture companies and sector actors within three and half years was, in our assessment, too ambitious. We did not find specific project activities within the second component directed toward enhancing women's participation in aquaculture. Again, farmers' mindset changes towards adopting improved practices need a longer implementation time.

This final evaluation result agrees with the mid-term findings that a programmatic approach that allowed the project to be implemented in phases with specific milestones would have been much more efficient regarding time. Such an approach would have allowed for adequate implementation, making room for navigating different bottlenecks. It would have also allowed all stakeholders involved, including WorldFish, to have adequate time to experience the impacts of the project results. For example, this final evaluation

of the project would have been able to assess project impacts, thereby increasing the efficiency of the end-term evaluation exercise.

EQ8. Was the project implemented most efficiently?

The AQTEVET project had a total budget of 20million Norwegian Kronor, and as of August 2021, 17million had been spent. This allowed WorldFish to extend the project timeline to make up for the time lost to Covid-19 and evaluate and finalise the project. A larger portion of the project's budget went into activities that involved partners (NRDC, BluePlanet, and Musika), followed by personnel, supplies and operations, consultancy, and other costs. Personnel for the project were project leader, project managers (one each for components 1 and 2), monitoring and evaluation team, and accountant and support. The evaluation finds the personnel composition to be efficient regarding the roles of these positions in the project. The hiring of two project managers for the two components of the project was effective and efficient in the different roles that the managers played. For instance, the project found hiring a female member of staff from NRDC to join the project team as a manager for the first component to have significantly increased the efficiency of the first four activities because of her familiarity and experience with the college.

The project's verification systems included calls to workshop participants, random calls to hotels, field reports, receipts, and yearly trips by the project accountant to the North to visit every project area. Our assessment of these verification approaches found them appropriate and part of an overall effective financial control for efficiency.

We also found that personnel cost was initially under-budgeted, causing a readjustment in the budget to meet the personnel cost. The measures included shared transportation, accommodation, and office spaces. For example, the project housed all the three full-time staff for component 2 of the project in a one-house complex in Kasama to reduce travel, accommodation and office costs.

With these designs and approaches, the project made savings and increased efficiency. Also, during the Covid-19 lockdowns in 2020 and 2021, the project was able to make savings.

> *"The project made savings under the operations and supplies budget line because most people worked from home. So, office expenditure on things like stationery and printing was not incurred, which was used to support other budget lines."*
> *(WorldFish_ KII_ Pos. 2)*

However, expenditure on communication (internet) increased due to the Covid-19 related lockdowns, which necessitated home office for the project personnel.

The inability of a UK consultant to fully execute the curriculum upgrading resulted in the project engaging the University of Zambia, NRDC and the Curriculum Development Centre in Zambia to upgrade the curriculum. This delayed the project, and it was inefficient as it increased project costs. Here, WorldFish could have avoided the inefficiency had they decided on local consultancy from the onset of the project. This is especially because the curriculum as a product is a national document that requires local experts with an understanding of the Zambian (aquaculture) context.

Another aspect of the AQTEVET project that increased efficiency was the cost-sharing approach adopted by the project. For example, as the mid-term evaluation already pointed out, NRDC showed greater commitment and ownership of the ASTC by providing land, fencing the land, and connecting a water source to the facility. These contributions significantly reduced the project cost and increased ownership for NRDC.

In the second component, the supply of motorbikes to SMEs was an efficient way of reducing transportation costs and reaching most remote farming localities. Again, the SMEs who received the motorbikes were responsible for fuelling their motorbikes during the project timeframe. This was an efficient approach that also reduced the project costs.

Overall, the AQTEVET project was implemented efficiently regarding cost-effectiveness and timing. The project successfully achieved many results in a very short time without overspending. The project covered all of its component costs through prudent financial controls and provided value for money with the achieved results. This was partly possible because of investments from key partners.

4.8 SUSTAINABILITY

EQ9. How sustainable are the project benefits?

To what extent will the project benefits continue after donor funding ceases?

The strategy to sustain the ASTC at NRDC rests on using the centre for student training and running it as a business unit. Three (3) key components are identified to generate funds to sustain the ASTC. These are:

- → Using the hatcheries and ponds (sales from fingerlings and harvests)
- → Running short courses for a fee (targeting smallholder farmers and private sector actors)
- → Creating research partnerships

Additionally, there is a push for a Private-Public Partnership to bring on board private actors and investors for the management of the ASTC. If well implemented, the strategy can indeed sustain itself.

Currently, there is high ownership of the centre among the NRDC management and the Department of Basic Science and Fisheries. There is a high possibility that the government will continue to pay for recurrent costs under its funds allocated to the College. A recent partnership led to the use of the centre by the Genetic Improvement Program to host excess fingerlings under the Zambia Aquaculture Enterprise Development Project (ZAEDP), a project partnership with the Zambian government with financial support from the African Development Bank (ADB). The project hired two interns under the supervision of a lecturer from the Basic Science and Fisheries Department of the NRDC and a WorldFish scientist.

These strategies can be sustainable, depending on how and who implements them. The main concern regarding this sustainability plan for this project component is that it was not implemented during the project's timeframe. Now that the project is over, it is unclear how the sustainability plan will be implemented.

In component 2 of the AQTEVET project, implementers expect that the linkages created by the project will be sustained by the SMEs and the private companies engaged. Private sector actors are incentivised to continue providing input and output markets and extension/training services to expand their businesses and farmer clients. This already is working sustainably without the project. For example, Kasakalabwe is already linking their farmers to Triple Blessing to sell their fish. Novatek has set up additional SMEs to extend services to remote parts of the two provinces. The private actors who received motorbikes maintain these bikes at their own cost to sustain their services to smallholder farmers. Some private actors like Kasakalabwe and Hopeways intend to hire their interns to continue training farmers. The knowledge gained by farmers is sustainable as far as they invest in their fish farming business and put the training into use.

EQ10. What major factors can influence the unsustainability of the project benefits?

A change in government policies and development priorities can affect the sustainability of the project benefits. Currently, there is massive government support for aquaculture development and promotion in Zambia. The past and present governments have been pro-aquaculture. However, changing government priorities on other sectors away from aquaculture could be a challenge.

As it stands, the online training platform is entirely in the hands of BluePlanet with less control or ownership by NRDC. There was less transfer of technical knowledge (changing t and uploading content on the platform) between BluePlanet and NRDC, which could ensure NRDC taking over and sustaining the platform itself. It means the training platform is sustainable if NRDC can pay for the services of BluePlanet. As of this evaluation, NRDC had signed a 5-year contract with BluePlanet. This must be re-negotiated after the agreement elapsed to sustain the project benefits.

Photo 7: Drone shot of Hopeways Fish Farm

Photo 1: One of the Project Motorbikes for SMEs

Photo 9: Drone Shot of Kasakalabwe Cooperative's facilities

5. CONCLUSION

This final evaluation study assessed the AQTEVET project's achievement against its objectives, outcomes, and outputs.

The evaluation found that the project was relevant to the needs and priorities of the targeted actors – students and smallholder farmers. The project's policies, design, and objective fit the need for more skilled aquaculture professionals, input and output markets for smallholder farmers and improved knowledge and skills on aquaculture in Zambia. The project appropriately bridged the gap between farmers and access to training, input and output markets. It was, however, not appropriate for addressing farmers' need for access to financial services for aquaculture businesses. Also, the AQTEVET fits strategies and programmes number 1, 3 and 5 of the 7th National Development Plan and the measures outlined in the Second National Agricultural Policy of 2016.

On effectiveness, the evaluation results show that the five (5) activities implemented by the AQTEVET comprehensively achieved the project objectives. The project successfully upgraded the aquaculture curriculum at NRDC (including short and long-term courses and entrepreneurial training), provided an online training platform to enhance learning, established an aquaculture training centre to foster practical skills, and improved the coordination of the student internship programme through the development of a database of internship providers. In addition, the above-achieved activities have attracted the expected interest from other institutions to adapt or modify these outcomes. Despite the results achieved with these activities, the project could not effectively link any student to financial institutions to support students in establishing their aquaculture business as targeted by the project.

In the second component 2, the project was effective by creating linkages between private sector actors and smallholder farmers by engaging two private companies (Aller Aqua and Novatek) and six small-medium sized enterprises (Kasama Food Basket, EvaMuta, Kasakalabwe, ADSEK and Hopeways, and Triple Blessings). These linkages have effectively brought input and output markets and, to a larger extent, training/extension services to farmers but not access to financial inputs for farmers. The findings also show an increase in farmers' knowledge of aquaculture farming practices on pond construction, fish management practices, fish farming management, and biosecurity. Access to inputs (seeds, fingerlings, and feed) and off-takers (output market) has improved significantly in the two provinces. Many farmers (especially female farmers) do not have access to financial inputs (loans) to buy feed and other inputs. Factors such as the comprehensiveness of the project design, government interest in aquaculture, buy-ins, the willingness of project partners to invest, and the motivation of the implementation team were found to have contributed significantly to the project's achieved results. The evaluation also found the project's short timeframe, the 2018-2019 drought and the Covid-19 pandemic, the delay in getting key partners on board, the lack of financial linkages in the project design, the dependency mindset of farmers, and the project design's lack of gender-specific supports for women were factors that hampered the full achievement of project results.

AQTEVET project's effective implementation of activities has enhanced aquaculture training among TEVET institutions in Zambia. We also found that the project's effect has contributed to a significant increase in student enrolment (from 58 students in 2019 to 169 students as of 2022) in the Fisheries and

Aquaculture study programme at NRDC. Graduating students also show confidence in their training because of the project. The project has also generated government educational institutions (NRDC) and private sector actors' interests and investments in aquaculture in Zambia. Private sector businesses are expanding in the targeted region by investing in the aquaculture value chain's input and output market outlets. Smallholder farmers' knowledge of aquaculture practices has also increased significantly because of the training and extension services. However, the project implementation period (3.5 years) was too short for observing real project (short or long-term) impacts.

Overall, the AQTEVET project was implemented efficiently regarding cost-effectiveness and timing. The project successfully achieved many results in a very short time and reduced costs via shared transportation and accommodation policies. The project covered all its component costs through prudent financial controls and provided value for money with the achieved results.

On sustainability, the AQTEVET results were found to have a high possibility to sustain its effects. The project's intervention package at the NRDC has a realistic sustainability strategy - involving commercialisation and partnerships for research - that can sustain the results when well implemented. However, the successful implementation of the sustainable strategy depends on the proactiveness of key personnel (Head of the Basic Science and Fisheries Department and the College Principal) at NRDC.

The increase in farmers' knowledge of aquaculture through the training provided by the project can sustain their aquaculture businesses when applied. Also, the established linkages between the private actors and smallholder farmers are sustainable due to continuing investment by these actors. Yet, without the financial inputs to support their aquaculture business, many farmers may resort to traditional practices, making the project's current results unsustainable.

Considering the findings of this evaluation, the AQTEVET project succeeded in its basic intention and, as such, can undoubtedly be evaluated as a successful project. The following recommendations are presented to strengthen similar projects in future.

5.1 RECOMMENDATIONS

Timing	⇢ In a similar project, WorldFish should plan for a minimum of a 5-year implementation timeline. This can avoid rushed implementation of project activities.
Improve visibility	⇢ WorldFish should develop a visibility strategy for all its projects in Zambia to enhance the organisation's good work. A well designed and implemented visibility strategy can increase the presence and goodwill of WorldFish and its donors in project areas as well as attract new partners.
Impact studies needed	⇢ There will be a need for a comprehensive impact study to capture the AQTEVET project's short- and long-term impacts. It should be done at a reasonable interval after the project has ended.
Disseminate and share lessons learned	⇢ The lessons learned from the project studies should be strategically shared with relevant and central actors (e.g., TEVET Coordinator at MOFA) that are in a position to extend and apply the AQ TEVET strategies in other institutions and rural fish farming communities.
Create financial input linkages	⇢ WorldFish should use its credibility and influence to explore and establish mechanisms for financial input linkages between financial institutions and smallholder farmers.
Women-focused activities and advocacy	⇢ As many women prefer joining cooperatives to individual fish farms, future projects should consider encouraging the establishment of more women cooperatives. Supports in pond construction, access to fingerlings, and access to financial inputs should be part of such gender-focused activity.

6. ANNEXES

6.1 1. LIST OF DOCUMENTS RECEIVED

	No.	File type	Name of Document	Date received
Period surveys	1	pdf	Annex J - Private Sector Needs Assessment Report	13/01/2022
	2	pdf	Annex K - NRDC Tracer Study Report	13/01/2022
	3	pdf	AQTEVET midterm evaluation report	13/01/2022
	4	pdf	Smallholder fish farmers population census_baseline report	13/01/2022
Progress reports	5	pdf	2018 AQ TEVET Annual Progress Report	13/01/2022
	6	Pdf	2019 AQ TEVET Annual Technical Progress Report_final_2019_01042020	13/01/2022
	7	pdf	AQTEVET_Technical_report_year_2020_29032021	13/01/2022
Project partners reports	8	pdf	Blue Planet sub-grand Agreement0001	13/01/2022
	9	pdf	PLA11941 Musika -WF signed- 2018	13/01/2022
Project proposal documents	10	pdf	Document 1 - Project Proposal Description (1)	13/01/2022
	11	pdf	Document 2 - Project Proposal Results Framework	13/01/2022
	12	pdf	Zambia AQ TEVET Project_Brief guide	13/01/2022
Sampling frame	13	Excel	List of Students Fisheries 3rd Years	19/01/2022
	14	Excel	KIIs stakeholders list for Comp 1 and 2	19/01/2022
	15	Excel	Fish farmers sampling frame for Northern and Luapula provinces	19/01/2022
	16	Word	End Term Evaluation Enumerators	19/01/2022

6.2 RESEARCH TEAM COMPOSITION

Team Members	Primary Role	Tasks within the study	Deliverables
Dr Kwaku Arhin-Sam	Lead Consultant *(Impact Evaluation)*	Evaluation management Develop data collection tools Data Collection Data Analysis Report Writing	Inception report Dissemination Draft report Final Report
Dr Alexander Tetteh Kwasi Nuer	Technical Consultant *(TEVET/Agribusiness/ Extension)*	Documentation review Technical reporting	Technical report for final report
Isaac Nyameke	Technical Consultant *(Fish Science)*	Documentation review Technical report	Technical report for final report
Dr Nyamwaya Munthali	Country Consultant (Evaluation Research)	Data Collection Coordination Data Collection Country Report	Qualitative data Country report for final report
Blair Syakobbola Felix Bwalya Florence Ngambi Frank Mumbi Bwalya Hanu Habeenzu Micheal Mwansabamba Mweemba Hamanyati Natasha Mulenga Mwila Edgar Kaango Kezzy Besa	Enumerators	Data Collection	Qualitative/quantitative data

6.3 EVALUATION TIMEFRAME

FIFE will adhere to the outcomes and the corresponding timeframes in the table below.

Activity	Timeframe
Draft Inception report for the end-term evaluation of the AQ TEVET project and signing of the contract.	22nd January 2022
Final Inception report for the end-term evaluation of the AQ TEVET project, including data collection tools, a clear methodology work plan and sampling framework.	26th January
Fieldwork / Data collection	31th-12th February 2022
Clean data sets submitted to WorldFish.	15 March 2022
The draft assessment report, submitted to WorldFish	24th March 2022
Final Evaluation Report, incorporating comments from WorldFish, to be approved by WorldFish	15 April 2022

6.4 EVALUATION MATRIX

Impact To what extent did the project contribute to the intended impact?			
Sub-questions	**Method**	**Data Source**	**Analysis**
What has been the effect (positive and negative) of the intervention relating to the situation of the beneficiaries (persons & institutions)?	FGD	Smallholder commercial fish farmers	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	● Students ● Smallholder commercial fish farmers ●	Inferential Statistics
What visible/evident impact emerged from the project implementation?	FGD	Smallholder commercial fish farmers	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	Content Analysis
	Survey	● Students ● Smallholder commercial fish farmers ●	Inferential Statistics
	Observations	Project sites, activities, communications, facilities, farms	Content Analysis
Visibility Was communication and dissemination of project outputs adequate?			
Sub-questions	**Method**	**Data Source**	**Analysis**
What channels and mediums of communication and dissemination did the project use?	Desk Rev	Project documents	Content Analysis
	FGD	Smallholder commercial fish farmers	
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	● Students ● Smallholder commercial fish farmers ●	Inferential Statistics
How effective were these channels and mediums?	Desk Rev	Project documents	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	● Students ● Smallholder commercial fish farmers ●	Inferential Statistics

Lessons learned What are the recommendations for future scaling activities and models? What worked well and did not?			
What aspects of the AQTEVET project design and implemented activities do you think could have been done differently?	Desk Rev	Project documents	Content Analysis
	FGD	Smallholder commercial fish farmers	
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	● Students ● Smallholder commercial fish farmers ●	Inferential Statistics
What part of the AQTVET project worked well and what did not work well?	Desk Rev	Project documents	Content Analysis
	FGD	Smallholder commercial fish farmers	
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	●Students ● Smallholder commercial fish farmers ●	Inferential Statistics
If the project is to be implemented in another province or country, what would be your advice?	Desk Rev	Project documents	Content Analysis
	FGD	Smallholder commercial fish farmers	
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	●Students ● Smallholder commercial fish farmers ●	Inferential Statistics
Coherence How does the project align with internal standards and other interventions of the implementing agencies and external International and national standards, policies, regulations, guidelines, and structure?			
Sub-questions	**Method**	**Data Source**	**Analysis**
How does the project align with the Zambian governments' policies and administrative structure?	Desk Rev	Project documents ● National policy documents.	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD	
Relevance To what extent was the project relevant?			
Sub-questions	**Method**	**Data Source**	**Analysis**
Were the program design policies fitting to meet the needs of the target groups?	FGD	Smallholder commercial fish farmers	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	● Students ● Smallholder commercial fish farmers ●	Inferential Statistics
How appropriate was the project implementation to the target groups, recipient and donor?	FGDs	Smallholder commercial fish farmers	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern	

		●SMEs/Dealers Luapula	
	Survey	● Students ● Smallholder commercial fish farmers ●	Inferential Statistics
Effectiveness How effective were the project delivery mechanisms?			
Sub-questions	**Method**	**Data Source**	**Analysis**
How comprehensive were the objectives of the project achieved?	Desk Rev	Project documents	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
What significant factors influenced the achievement or non-achievement of the project's objectives?	Desk Rev	Project Cost Data	Cost-Benefit Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	Content Analysis
	Desk Rev	Project Output Data	Inferential Statistics
Efficiency To what extent was the project implementation efficient?			
Sub-questions	**Method**	**Data Source**	**Analysis**
Were the objectives of the project achieved on time?	FGD	Smallholder commercial fish farmers	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	● Students ● Smallholder commercial fish farmers ●	Inferential Statistics
Was the project implemented most efficiently?	FGD	Smallholder commercial fish farmers	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	● Students ● Smallholder commercial fish farmers ●	Inferential Statistics
Sustainability How sustainable are the project benefits?			
Sub-questions	**Method**	**Data Source**	**Analysis**
To what extent the project benefits will continue after donor funding ceases?	FGD	Smallholder commercial fish farmers	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	●Students ● Smallholder commercial fish farmers ●	Inferential Statistics
What major factors influence the sustainability and unsustainability of the project benefits?	FGD	Smallholder commercial fish farmers	Content Analysis
	KII	●NRDC ●WorldFish ●Blue Planet ●Musika ●MFL ●Kasaka Fisheiries Training Institute ●NORAD ●SMEs/Dealers Northern ●SMEs/Dealers Luapula	
	Survey	●Students ● Smallholder commercial fish farmers ●	Inferential Statistics

6.5 DATA COLLECTION INSTRUMENTS

General introduction for all instruments

Introduction

Hello Sir/Madam, my name is [interviewer]. May I kindly ask you if you know about the Aquaculture Technical, Vocational, and Entrepreneurship Training for Improved Private Sector and Smallholder Skills (AQTEVET) project implemented by WorldFish, Zambia? Yes/No
If No, explain the project further (use notes on the project). If the answer is still no, thank her or him and make a note that the interviewee is not aware of the project. Ask permission and leave.

If Yes, Continue
I am part of an evaluation research team conducting a final evaluation of the AQ TEVET project to assess the progress and impacts of the project. Out of the list of stakeholders of the AQTEVET project, we have shortlisted you to ask you some questions regarding the project's activities in the following areas;

- Upgrading the fisheries/aquaculture curriculum (long- and short-term courses),
- training tools, online training platforms, and
- internship programs of TEVET institutions in Zambia.
- training of students on entrepreneurial skills

Consent

This interview should last about one (1) hour. We will not share your answers with anyone except those working directly on this study and WorldFish. All your responses will be anonymised, and your name will never be linked with the information you provide. To better track all the information you provide today, I will take notes and or audio record the conversation. Your participation is voluntary, and you always have the option of choosing not to answer a question if you do not wish to. You can end your participation in the discussion at any time.

Do we have your agreement to participate voluntarily in this interview?

- **If YES**, continue.
- **If NO,** thank him/her, and make a note that he/she did not want to participate.

Do you have any questions about what I have just mentioned?

- **If YES**, answer all the informant's questions and continue.
- **If NO,** continue.

Do we have your permission to record the interview?

- **If YES**, continue.
- **If NO,** confirm that you will not record the conversation and continue without activating the audio recording.[takes note]

IMPORTANT NOTE: Start the audio recording after receiving consent.

COMPONENT 1: Instruments

A. KEY INFORMANT INTERVIEW GUIDE

WorldFish, NRDC, BluePlanet, Kasaka, MAMFL, UNZA, TEVET.

BACKGROUND					
Interviewer Code:		Interview No.		Date	
Name of Respondent		Organisation			
Position of respondent		Sex			
Start time :		End time :			

- In general, what can you say about the AQTEVET programme?

- Have you been involved in any activities that WorldFish has conducted under the AQ TEVET project?
  a. Yes b. No
- If yes, in what activities were you involved?

RELEVANCE: TO WHAT EXTENT WAS THE PROJECT RELEVANT?
1. How relevant were the project activities to the Students and the Aquaculture industry in Zambia?
• One of the project's objectives was to upgrade the aquaculture TVET in Zambia. How was upgrading the curriculum relevant to students and the aquaculture industry?
• How relevant was it to upscale the upgraded aquaculture curriculum to the industry?
• Are you aware of online training platforms for TEVET institutions in Zambia? a. Yes b. No
• What role did WorldFish play in establishing these online platforms?
• How relevant is the online platform for TVET education in Zambia?
• Are you aware of internship programmes for TEVET students? a. Yes b. No
• How does the internship programme work?
• What role has WorldFish played in these internship programmes?
• How relevant is the internship programme for TEVET education and students in Zambia?
• What can be improved regarding these internship programmes?
• Why was it relevant for the project to train students on entrepreneurship and link them to microfinance institutions?
• Are the project's design policies fitting to the needs of students and Aquaculture TEVET?
• What needs of students and the industry do the project address?
• What other needs of students and the industry, in your view, were not tackled by the project?
• How is the project relevant to the needs of women and female youth in Zambia?

- How has the upgraded curriculum incorporated the needs of women and female youth?

- How do the training tools like manuals and reference materials incorporate the needs of women and female youth?

- In what ways does the online training platform incorporate the needs of women and female youth?

- How sensitive is the internship program to the needs of women and female youth?

COHERENCE: HOW DOES AQTEVET ALIGN WITH NATIONAL AND INTERNATIONAL STANDARDS, POLICIES, REGULATIONS, GUIDELINES, AND STRUCTURE?

- Does the project's component 1 align with the Zambian governments' policies and administrative structure?

How does the project's component 1 align with the Zambian governments' policies and administrative structure?

- Upgrading the curriculum

- Developing the internship programme

- Linking students to potential employers/private sectors

- Scaling the upgraded fisheries and aquaculture curriculum for adoption by other TEVET institutes in Zambia

- Has the project so far achieved its component 1 objectives?

Do you consider that the project has so far achieved its component 1 objectives?

- Upgrading the curriculum
  a. Yes b. No c. somewhat

- Developing the internship programme
  a. Yes b. No c. somewhat

- Linking students to potential employers/private sectors
  a. Yes b. No c. somewhat

- Scaling the upgraded fisheries and aquaculture curriculum for adoption by other TEVET institutes in Zambia
  a. Yes b. No c. somewhat

EFFECTIVENESS: HOW EFFECTIVE WERE THE PROJECT DELIVERY MECHANISMS?

- How comprehensive were the objectives of the programme achieved?

- Do you believe that the AQTEVET project was comprehensive enough to address the aquaculture industry needs in Zambia? How?

- Which areas should the AQTEVET project have included in its activities to address the challenges facing aquaculture TEVET in Zambia?

- In what ways do you believe the AQTEVET project benefited students and the industry? in terms of
  - the needs of the private sector
  - improved employment

- What major factors influenced the achievement or non-achievement of the programme's objectives?

- Do you think the AQTEVET project was implemented in the best way possible?

- What would you consider as factors that influenced the achievement of the AQTEVET project objectives?

- What factors do you believe hampered the project from achieving its objective effectively?
- If there was anything you could change, what would that be and why?

EFFICIENCY: TO WHAT EXTENT WAS THE PROJECT IMPLEMENTATION EFFICIENT?

- Were the objectives of the AQTEVET project achieved on time?
  - Do you think the project had all the needed staff?
  - Do you think the project time frame was enough for the project objectives?
  - Do you think the project objectives were achieved on time?
  - What are some of the delays you have observed?
- Were the project activities implemented most efficiently?
  - In what ways do you think the project made financial savings?
  - Where do you think the project could have made more savings?
  - What factors contributed to the increase in project expenditure?
  - Are there alternatives to how the project was implemented that could have been more efficient?

SUSTAINABILITY: HOW SUSTAINABLE ARE THE PROJECT BENEFITS?

- To what extent will the project benefits continue after donor funding ceases?
  - How do you think the benefits of the AQTEVET can continue when external funding is over?
  - Do you believe that the programme generated additional interest and investment? Y/N
  - If yes, how has the programme generated additional interest and investment?
- What major factors influence the sustainability and unsustainability of the project benefits?
  - What do you think the project should do to encourage sustainability after the end of the project?
  - What factors do you believe encourage the sustainability of the project's results?
  - How possible is it to apply and replicate the AQTEVET project in other parts of the country or other countries?
  - Are there specific components or activities of the AQTEVET project that you see to have the greatest potential for repeating in a similar project?

VISIBILITY: WAS COMMUNICATION AND DISSEMINATION OF PROJECT OUTPUTS ADEQUATE?

- What channels and medium of communication and dissemination did the project use?
  - What has the project done to make its activities known to the public?
  - What major visibility channels and mediums did the project employ?
- How effective were the visibility channels and mediums that were used by the AQTEVET?
  - How many other TVET institutions know about the project activities going on at NRDC? How do you think they got to know about the project?

IMPACT: TO WHAT EXTENT DID THE PROJECT CONTRIBUTE TO THE INTENDED IMPACT?
• What has been the effect (positive and negative) of the AQ TEVET project relating to the situation of the students and the aquaculture industry in Zambia?
• What changes have you noticed in the aquaculture industry in Zambia since the launch of the AQTEVET project?
• In what way do you think the AQTEVET contributed to changes in the attitude of students?
• In what way do you think the AQTEVET contributed to changes in TEVET institutions in Zambia?
• In what way do you think the AQTEVET contributed to improving the aquaculture industry in Zambia?
• What visible/evident impact emerged from the programme implementation?
• What specific changes have you observed in aquaculture TEVET in Zambia regarding; • Students overall Enrolment • Women and female youth involvement in the aquaculture industry • Students' Access to internships. • Students' Access to jobs
LESSONS LEARNED: WHAT ARE THE LESSONS LEARNED FOR FUTURE PROJECTS AND FOR SCALING ACTIVITIES AND MODELS?
• What worked well and did not?
• What part of the AQTVET project worked well and what did not work well?
• What aspects of the AQTEVET project design and implemented activities do you think could have been done differently?
• If the project is to be implemented in another province or country, what would be your advice?

B. STUDENT QUESTIONNAIRE (online)

BACKGROUND					
Interviewer Code:		Interview No.		Date	
Age			Sex		
Province of origin					
Start time :			End time :		

THE NEW CURRICULUM
1. Are you aware of changes to the aquaculture curriculum at your institute? a. Yes b. No
2. If yes, what has changed in the new curriculum?

FISHERIES AND AQUACULTURE ONLINE TRAINING PLATFORM
3. Are you aware of the existence of a fisheries and aquaculture online training platform at your school? a. Yes b. No
4. If yes, have you been introduced to this online training platform at your school? a. Yes b. No
5. If yes, in what course/module/lesson did you participate?

a. No Fish biology b. Fish welfare c. Other, please specify

6. How confident are you in how to use the online training platform at your school?
   a. very competent b. Somewhat competent c. not competent

   Please give a reason for your answer?

7. How relevant is the online training platform to your studies?
   a. very satisfied b. Somewhat satisfied c. not satisfied

   Please give a reason for your answer?

8. How satisfied are you with the content of the online fisheries and aquaculture training platform
   a. very satisfied b. Somewhat satisfied c. not satisfied

   Please give a reason for your answer?

9. How satisfied are you with the set-up/interface of the online fisheries and aquaculture training platform
   a. very satisfied b. Somewhat satisfied c. not satisfied

   Please give a reason for your answer?

10. Do you face challenges when using the online fisheries and aquaculture training platform?
    a. Yes b. No

11. If yes, what kind of challenges do you face? Please specify

12. What should be improved about the online fisheries and aquaculture training platform?

PRACTICAL TRAINING

13. Do you get practical training as part of your training?
    a. Yes b. No

14. If yes, from where do you get the practical training? Please specify

15. How important are the practical skills you have received to your training in aquaculture?
    a. very important b. Somewhat important c. not important

    Please give a reason for your answer

16. In your view, how adequate are the practical skills you have acquired in your training and for your career?
    a. very adequate b. somewhat adequate c. not adequate

    Please give a reason for your answer

17. What can be done to improve practical skills training in TEVET institutions?

ATTACHMENTS AND INTERNSHIPS

18. Have you undertaken an internship/attachment as part of your training?
    a. Yes b. No

19. If yes, when did you do your internship?

20. Where did you do your internship?

21. Did you receive assistance in getting an internship/attachment?
    a. Yes b. No

22. If yes, from where did you get the assistance and in what form was the assistance?
23. How would you describe your internship experience? a. very helpful b. somewhat helpful c. not helpful
EMPLOYABILITY
24. What is your plan after graduating? a. further education b. start own aquaculture business c. Find a job in aquaculture related company d. other, please specify
25. If to start own aquaculture business, have you receive entrepreneurial or business training as part of your training? a. Yes b. No
26. How adequate would you describe the entrepreneurial/business skills you have received from your training? a. very adequate b. somewhat adequate c. not adequate
27. Are you linked to any financial service provider through NRDC that can support you to start your own aquaculture business? a. Yes b. No
28. Are you aware of aquaculture relate work opportunities available to you after completing this training? a. Yes b. No
29. If yes, please list some of the existing aquaculture related work opportunities
30. In your view what will make an aquaculture and fisheries graduate stand a better chance for work opportunities in Zambia?
Any information you want to share?

COMPONENT 2: INSTRUMENTS

A. FARMER QUESTIONNAIRE

BACKGROUND					
Interviewer Code:		Interview No.		Date	
Age				Sex	
Province of origin					
Start time :				End time :	
Cooperative:					
1. Name of cooperative affiliated to					
2. Name of private actor /affiliated agro dealer					
3. How many fishponds do you have?					
4. What is the size of your pond in meter squares (Separate entry by commas)					
5. When did you construct these ponds?					
6. How much of your household income comes from selling fish?					
7. How many people are in your household?					
8. How many are children?					

EXTERNAL SUPPORT

Have you received any form of support on your fish farming from any organisation?
A. Yes B. No

If yes, from which organisation did you receive the support?
(WorldFish, Musika , Triple Blessing, Luwingu, Aller Aqua, Kasama and Lusaka, HopeWays General Dealers, Mansa, Kasakalabwe Multipurpose Cooperative, Kasama, Adsek Enterprises Ltd, Mule-staus Agro- dealers, Mansa, Eva-Muta Enterprises Ltd, Mungwi) other

9. What was the nature of the support?
   A. Training/extension service
   B. Links to input markets *(seeds, feeds, fingerlings)*
   C. Linkage to output markets *(selling of fishes)*
   D. Other, specify

10. How relevant is the support to you as a small-scale commercial fish farmer?
    A. very relevant B. somewhat relevant C. not relevant

11. If relevant, why? Please specify.
    A. I have access to input like fingerlings/seed
    B. I have access to feed
    C. I have access to markets for my produce
    D. My yield has improved
    E. My skills and knowledge about fish farming have improved
    F. Other, specify

KNOWLEDGE OF POND CONSTRUCTION

12. Have you received any training on how to a constructed pond?
    A. Yes B. No

13. If yes, who conducted this training?
    A. Kasakalabwe
    B. Hope ways
    C. Triple blessings
    D. Aller Aqua
    E. Other, specify

14. How long ago did you receive this training?

15. Based on the training you received on pond construction, state whether you agree or disagree with the following statement?
    A. Pond size determines the number of fish you can stock in the pond
       a. Yes b. No
    B. The walls of the fish pond should be raised to avoid the pond from collapsing in case of flooding
       a. Yes b. No
    C. A fishpond should have both inlet and outlet for water
       a. Yes b. No

16. How relevant was the training on pond construction to you?
    A. Very relevant B. Somewhat relevant C. Not relevant

17. If relevant, why? Please specify.

18. How much on your own are you applying what you have learned on how to construct a pond?
    A. I am strongly applying the training
    B. I am somewhat applying the training
    C. I have not yet put the training into use

18A. If strongly applying training, please give an example of what you have done.

KNOWLEDGE ON QUALITY OF FINGERLINGS

19. Have you been trained on how to better manage fingerlings?
    A. Yes B. No

20. If yes, who conducted this training?
    A. Private actors
    B. NGO

C. Government actor
D. Other

21. How long ago did you receive this training?

22. Based on the training you received on better management practices, state whether you agree or disagree with the following statement
    A. Recycled fingerling can cause stunted growth
        a. Yes b. No
    B. Sex reversed fingerling grow very well
        a. Yes b. No
    C. I must get my fingerlings from the hatchery
        a. Yes b. No
    D. I should not buy fingerlings from my fellow fish farmers
        a. Yes b. No

23. How relevant was the training on quality management of fingerlings to your work?
    A. Very relevant B. Somewhat relevant C. Not relevant

24. How much on your own are you applying what you have learned on how to manage quality fingerlings?
    D. I am strongly applying the training
    E. I am somewhat applying the training
    F. I have not yet put the training into use

24A. If strongly applying training, please give an example of what you have done.

TRAINING ON BUSINESS MANAGEMENT

25. Have you received any training on managing your farms as a business? *(e.g., how to keep records better management practices, fish marketing as well as records management)*
    A. Yes B. No

26. If yes, who conducted this training?

27. How long ago did you receive this training?

28. Based on the training you received on fish farm management, state whether you agree or disagree with the following statement
    A. I have to manage my farm like a business
        a. Yes b. No
    B. I have to market my fish
        a. Yes b. No
    C. I have to keep record of my income and expenditure
        a. Yes b. No
    D. I should keep record of my production e.g. number of fingerlings stocked vs the fish harvested
        a. Yes b. No
    E. I should not consume all my fish meant for business
        a. Yes b. No

29. How relevant was the training on managing a farm as a business you received to you?
    A. Very relevant B. Somewhat relevant C. Not relevant

30. How much on your own are you applying what you have learned on how to manage your fish farm as a business?
    A. I am strongly applying the training
    B. I am somewhat applying the training
    C. I have not yet put the training into use

30A. If strongly applying training, please give an example of what you have done.

TRAINING ON BIOSECURITY/FISH HEALTH

31. What about training on biosecurity? Have you received any such training?
    A. Yes B. No

32. If yes, who conducted this training?

33. How long ago did you receive this training?

34. Based on the training you received on biosecurity, state whether you agree or disagree with the following statement
    A. I should track a record of visitors to my farm
        a. Yes b. No
    B. I should have a hand washing facility at the entry of my farm
        a. Yes b. No
    C. I should call a specialist if there are signs of disease with my fish
        a. Yes b. No
35. How relevant was the training on biosecurity to you received to you?
    A. Very relevant B. Somewhat relevant C. Not relevant
36. How much on your own are you applying what you have learned on how to manage your fish farm as a business?
    a. I am strongly applying the training
    b. I am somewhat applying the training
    c. I have not yet put the training into use

    36A. If strongly applying training, please give an example of what you have done.

COMMUNICATION/VISIBILITY

37. Have you heard a radio program where aquaculture related issues were discussed in the past 6 months?
    A. Yes B. No
38. If yes, who was running the program?

OUTCOMES OF PRIVATE SECTOR EXTENSION SERVICES

39. Have you seen improvement in where/how you access input?
    A. Yes B. No
40. If yes, what has been the difference?
    A. Training/extension services
    B. Linkage to input markets
    C. Linkage to output markets
    D. Other, specify
41. Have you seen improvement in where/how you access feed?
    A. Yes B. No
42. If yes, what has been the difference?
    A. Distance has reduced
    B. Commercial feed is readily available
    C. Commercial feed is readily accessible
    D. Other, specify
43. Have you seen improvement in where you sell your fish?
    A. Yes B. No
44. If yes, what has been the difference?
    A. Market is readily available
    B. The quantity has increased
    C. The price has improved
    D. The distance I travel to sell is shorter
    E. Other, Specify
45. How much do you buy fingerlings?
46. How much do you buy the following types of feed?
    A. Starter 25kg
    B. Grower 40kg
    C. Finisher 40kg
47. Have you harvested any fish from your pond in the last 12 months?
    A. Yes B. No
48. If yes, how many kgs?
49. What did you do with the fish you harvested?

A. I sold all of it B. I sold some and ate some C. I ate all of it
50. How much (price) did you sell per kg?
51. How much did you make from your last harvest sales?
52. Is there a difference in this amount compared to before you started receiving project support/linked to the market? A. Yes B. No
53. How satisfied are you with the support you have received through private sector extension service? A. very satisfied B. somewhat satisfied C. Not satisfied Why?
54. The WorldFish/Musika project has improved my aquaculture (fish farming) practices A. Yes B. No

2nd COMPONENT

B. FOCUS GROUP DISCUSSION GUIDE

Stakeholders: Smallholder commercial fish farmers.

BACKGROUND			
Moderator Code:		FGD No.	Date
Name of cooperative		Private actor(s) linked:	
Start time :		End time :	
Discussants background info			
Discussant	Sex	Age range	Area of residence
Discussant 1			
Discussant 2			
Discussant 3			
Discussant 4			
Discussant 5			
Discussant 6			
Discussant 9			

1. Please tell us what you know or have heard about the WorldFish/Musika Project in this area?
2. When and how did you hear about WorldFish/Musika project?
3. Why do you think the WorldFish/Musika project is in this area?
4. Have you received any support from *[name of private sector company]?* If yes, what is the nature of the support? ⇢ *What about field days, demo ponds, radio programs, access to market for their fish?*

5. How has these services that you have received from [name of private sector company] improved your knowledge on aquaculture?

6. Since you received the services from this company, have you realised any changes in your level of fish production? What about your income levels?
   If yes, how?

   Any example you wish to share?

7. How has the project affected how you access seed?
   - ⇢ Is there a change in the quality of the seed/fingerlings that you are using? Is there a change in the price of seed/fingerlings? How much do you buy seed/fingerlings? Is there a change in the distance you travel to buy the seed?

8. How do you access feed now?
   - ⇢ How has your access to feed changed? To you see a change in the quality of feed you are using now? Is there a change in the price of feed? How much do you buy feed? Is there a change in the distance you travel to buy the feed?

9. How has the project affected how and where you sell your fish?
   - ⇢ Is there a change in the price of your sale the fish per kg? Is there a change in the distance you have to travel to sell the fish? Is there a change in the quantity of fish you are selling?

10. Have you received any training from this private sector company [name of the company]? If yes, what is the nature of the training?
    [Probe = for pond constructions, biosecurity, fish health, better management practices, fish marketing as well as records management.

11. What topics were covered in these training?
    - ⇢ What was the delivery mode? How long was the training?
    - ⇢ Have women and youth been participating in these training?
    - ⇢ What are some of the barriers to women and youth participating in training?
    - ⇢ What could have been done differently to encourage more women and youth participation?

12. Since you received the training, what actions related to your fish farming have you taken individually?
    - ⇢ Is it easy for women to take the action mentioned? What prevents you from taking action? Are these challenges the same for women or different? How?

13. Are you happy with the training that you received from the Private Sector Company and/or Musika/WorldFish project?
    - ⇢ What do you like most about the project?
    - ⇢ If you could change or improve anything about the project, what would that be?

14. What changes have you seen in your life or in your family that you can say was as a result of the training and support you got from the project for your fish farming?

15. Tell us more about your cooperation.
    - ⇢ Are you happy with the management of your cooperative? Why?

16. How does the project support the functioning of your cooperative?
17. What could the project have done more to strengthen your cooperation?
18. Do you think you can sustain your fish farming business after the project has come to an end?
19. Anything else you would want us to know about activities of the private sector Company [insert actual name of the actor] and/or Musika/WorldFish project?
20.

C. KEY INFORMANT INTERVIEW GUIDE

Stakeholders: WorldFish, Musika, private sector companies, and smallholder commercial fish farmers

BACKGROUND					
Interviewer Code:		Interview No.		Date	
Name of Respondent		Organisation			
Position of respondent		Sex			
Start time :		End time :			

- In general, what can you say about the AQTEVET programme?

- Have you been involved in any activities that WorldFish has carried out under AQ TEVET project? Yes/No
- If Yes, in what activities were you involved?

RELEVANCE: TO WHAT EXTENT WAS THE PROJECT RELEVANT?

2. How relevant were the project activities to the target groups?

- How do you think the project has been able to link farmers to private sector?

- How was linking farmers to the private sector agencies relevant for both farmers and these agencies?

- Were the program design policies fitting to the needs of students and small-scale farmers?
  - How well do you think the linking of farmers to the private sector met the needs of
  - Smallholder commercial farmers ii)
  - Aquaculture industry

- Are there other needs of smallholder commercial farmers in the aquaculture industry that are not addressed by the project?

EFFECTIVENESS: HOW EFFECTIVE WERE THE PROJECT DELIVERY MECHANISMS?

- How comprehensive were the objectives of the programme achieved?
  - How have you been able to engage the private sector companies to invest in smallholder aquaculture in Luapula and Northern province?

- Do you believe that the linking of private sector companies with small scale commercial farmers in Luapula and Northern provinces was comprehensive enough to address the needs of the farmers and the companies?

- What areas could have the AQTEVET project include in its activities regarding the challenges facing aquaculture TEVET in Zambia?

- How many farmers have been trained and provided with extension services as a result of the project? How many males and females?

- To what extent were the extension services and training conducted by the private sector actors sensitive to the needs of women and youth?

- What was the biggest challenge faced by women and youth in these training and extension services?

- What has the project done specifically to enhance women/youth participation in smallholder aquaculture?

- How can female participation in the fish industry be further improved?

- What major factors influenced the achievement or non-achievement of the programme's objectives?

- Do you think that the linkages between farmers and companies were implemented in the best way possible?

- What would you consider as factors that influenced the achievement project objective of bringing farmers and companies together?

- What factors do you believe negatively affected the achievement of this objective of bringing these parties together?

- If there was anything you could change, what will that be and why?

EFFICIENCY: TO WHAT EXTENT WAS THE PROJECT IMPLEMENTATION EFFICIENT?

- WERE THE OBJECTIVES OF THE AQTEVET PROJECT ACHIEVED ON TIME?

- Do you think the project had all the needed staff?

- Do you think the project time frame was enough for the project objectives?

- Do you think the project objectives of linking farmers with companies and the companies support to the farmers was achieved on time?

- What are some of the delays you observe?

- Were the programme implemented in the most efficient way?

- In what ways do you think the project made financial savings?
- Where do you think the project could have made more savings?
- What factors contributed to the increase in project expenditure?
- Are there alternatives to the way the project was implemented that could have been more efficient?

SUSTAINABILITY: HOW SUSTAINABLE ARE THE PROJECT BENEFITS?

- 12. To what extent will the project benefits continue after donor funding ceases?
  - How do you think the benefits of the AQTEVET can continue when external funding is over?
  - How do you think the linkages between farmers and companies can continue when the AQTEVET project is over?
  - Do you believe that the programme generated additional interest and investment? Y/N
  - If yes, how has the programme generated additional interests and investment?
- What major factors influence the sustainability and unsustainability of the project benefits?
  - What do you think the project should do to encourage sustainability after the end of the project?
  - What factors do you believe encourage the sustainability of the project's results?
  - How possible is it to apply and replicate the AQTEVET project in other parts of the country or other countries?
  - Are there specific components or activities of the AQTEVET project that you see to have the greatest potential for repeating in a similar project?

VISIBILITY: WAS COMMUNICATION AND DISSEMINATION OF PROJECT OUTPUTS ADEQUATE?

- What channels and mediums of communication and dissemination were used by the project?
  - What has the project done to make its activities known in the Luapula and Northern province?
  - How are small scale farmers in the project area able to know about the AQTEVET project? (Marketing activities)
  - What other organizations are working with smallholders in Northern and Luapula?
  - How well do you think these organisations know about AQTEVET project activities? Examples?
- How effective were the visibility channels and mediums that were used by the AQTEVET?
  - How many other TVET institutions know about the project activities going on at NRDC? How do you think they got to know about the project?

IMPACT: TO WHAT EXTENT DID THE PROJECT CONTRIBUTE TO THE INTENDED IMPACT?

• What has been the effect (positive and negative) of the AQ TEVET project relating to the situation of the farmers and private sector companies in Zambia?
• What changes have you noticed in the aquaculture industry in Zambia since the launch of the AQTEVET project?
• Do you think that farmers that have been linked to companies have so far improved in the following? Y/N • If Yes, what has improved? If No, why? What has been the challenge?

• In what ways do you think the AQTEVET has contributed to farmers access to the following?
  ○ Fingerling
  ○ Food
  ○ Market
  ○ Information

• In what ways do you think the AQTEVET improved women participation in the aquaculture industry in Zambia?
• In what ways do you think the AQTEVET contributed to improving the aquaculture industry in Zambia?
• What visible/evident impact emerged from the programme implementation?
• What specific changes in the behaviour of farmers and companies have you observed so far? Any examples?
LESSONS LEARNED: WHAT ARE THE LESSONS LEARNED FOR A FUTURE PROJECT AND FOR SCALING ACTIVITIES AND MODELS?
• What worked well and not?
• What about the AQTVET project worked well and what did not work well?
• What aspects of AQTEVET project design and implemented activities do you think could have been done differently?
• If the project is to be implemented in another province or country, what would be your advice?