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SUPPORT TO ENHANCING THE CAPACITY OF YOUTH AND WOMEN FOR EMPLOYMENT IN AQUACULTURE

November 2019

SDGs:



Countries:

The Gambia

Project Codes:

TCP/GAM/3603

FAO Contribution:

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Duration:

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Contact Info:

FAO Representation in Gambia

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Implementing Partners

Fisheries Department, Ministry of Fisheries and Water Resources.

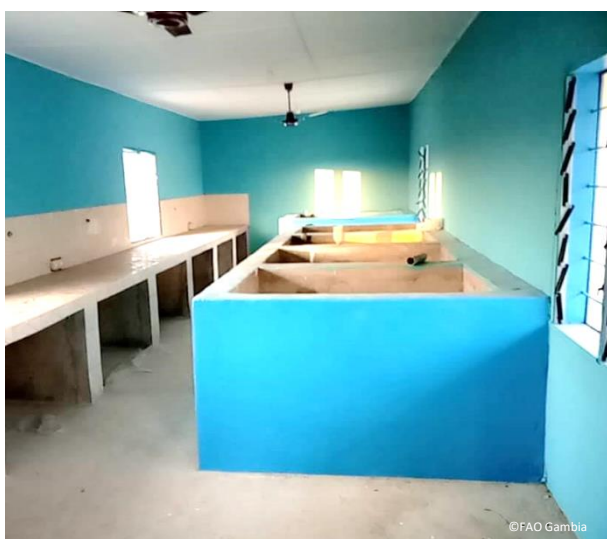
Beneficiaries

Youth and women in selected Community Based Organizations (CBOs); Fisheries extension staff; Grow-out farmers; Fingerling producers; Feed producers.

Country Programming Framework

Output 1.2: Capacity of community organizations strengthened on production, post-harvest handling, processing and marketing of fish.

Output 2.2: Strengthened capacity of Agriculture and Natural Resources sector Extension agencies and communities in improved participatory approaches.



BACKGROUND

The fisheries sector of the Gambia has long been dependent on both artisanal and industrial capture fisheries; however, productivity in this area is declining for a variety of reasons. The most notable of these are the weak enforcement of fisheries laws, the high fishing effort and climate change.

Fish from capture fisheries, particularly in the artisanal subsector, is the main source of animal protein in the country. This is because of the affordability of fish, as opposed to terrestrial animal protein, which is very expensive for the resource-poor farmers who make up a large part of the population. With the current production figures, the country will barely meet the demand for fish for its ever-increasing population in the near future. For this reason, the development of aquaculture is inevitable.

Currently, aquaculture is the fastest growing food-producing sector globally. The Gambia is endowed with marine, brackish and freshwater, which means there is great potential to develop aquaculture in the country. The first aquaculture intervention in the Gambia took place in 1979 but, since then, the sector has not seen much success. The lack of development in this area is attributed to the use of poor quality seed (fingerlings) and feed, and the inadequate technical knowledge of both technicians and fish farmers. It is in this context that the Gambian government, through the Ministry of Fisheries and Water Resources, requested the development of a Technical Cooperation Programme (TCP) project from FAO to address the constraints hindering aquaculture.

This project sought to establish a solid foundation for the sustainable provision of and access to good quality fish seed and feed. In addition, farmers and officers benefited from capacity development sessions on technical, technological, managerial and other business skills. Special attention was given to the inclusion of women and youth in project activities to bolster their participation in the sector. The project therefore supported effective and sustainable development in the aquaculture sector, with the ultimate aim of having a positive impact on the lives of the targeted beneficiaries.

IMPACT

This TCP project was designed to support the transformation of aquaculture in the Gambia into an economically viable, financially self-sustaining and employment-generating sector, all of which are prerequisites for sustainable development. As a result of the project's activities, it is expected that actors in the aquaculture sector will utilize high-quality fingerlings and fish feed produced in local hatcheries and mills, and that enterprises in aquaculture will be efficient and profitable, while improving food and nutrition security and safety.

ACHIEVEMENT OF RESULTS

Overall, the project was successful in achieving the desired goal of supporting the aquaculture sector in the Gambia, with emphasis placed on involving women and youth in this area. Two catfish and tilapia hatcheries were constructed for the production of affordable, quality fingerlings. The provision of two fish feed mills (manufacturing units) for feed production enhanced opportunities for youth groups, who were contracted for feed production. The training provided in this area produced some unforeseen benefits, such as improved incomes for those working at the mills.

The beneficiaries, namely, grow-out farmers, fingerling producers and feed producers, as well as fisheries extension staff, benefited from various in-service trainings to strengthen their capacities in feed production, good aquaculture practices and aquaculture as a business. The training in aquaculture as a business is expected to enable the participants to have the technical capacity to establish aquaculture systems that can generate decent salaries, as well as profits. There was also a demonstrated increase in knowledge on good management practices in aquaculture. Farmers adopted record keeping practices, which will enable them to evaluate the profitability of their farm activities.

Output 1 focused on the efficient and sustainable production of high-quality fish seed by farmers, as well as youth and women. To begin with, two Technical Cooperation among Developing Countries (TCDC) experts on catfish and tilapia hatcheries conducted missions to select sites for the hatcheries. The sites were then assessed for potential environmental impact.



Under this Output, training manuals and standards were developed for catfish and tilapia hatcheries, fingerling production and brood stock management. To complement the trainings and solidify the development of aquaculture, tilapia and catfish hatcheries were constructed, and all the related equipment and necessary supplies for hatchery operations were procured and delivered to the beneficiaries.

Thirteen fisheries extension staff and fifty youth and women were trained on the principles of good aquaculture practice. Building capacities in this area helped to ensure and improve both the quality and quantity of seed, and the effective running of the hatcheries as businesses.

Twenty people (four women and sixteen men) were also trained on good aquaculture practices in hatchery management. Topics included biosecurity, brood stock management, sex-reversal technologies and fingerling handling and transportation. Awareness was raised on the quality of both the fish seed and the young fish themselves, which is vital for successful aquaculture.

Twenty fingerling producers, including youth and women, were trained in running a hatchery as a business. Training modules included efficient production, record keeping, price determination and marketing strategies. Seed marketing in any aquaculture venture is an important aspect of the enterprise. Building capacities in this area helped to assure seed producers that investments they make can be recovered by utilizing effective marketing strategies, which lead to sales. The training also highlighted the need for fingerling producers to strengthen linkages with farmers and formulate realistic arrangements to plan activities on both sides, such that pond harvesting and restocking are done on a regular basis. At the time of this report, the fingerlings were not yet in full production; however, they will be monitored for quality standards when possible.

Output 2 sought to assure and secure sustainable access to good quality fingerlings, and to explain the project's approach to farmers and fingerling producers. In order to achieve this, partnership agreements with seed producers and farmers were put into place. They were awaiting finalization and signatures at the time of this report. Fingerling producers were provided with the necessary equipment for transporting the fingerlings, which means that they can be transported properly, thereby reducing mortality rates. Relevant training sessions targeted at increasing management skills were also conducted. This improved hatchery production and facilitated access to high quality fish seed.

Output 3 set out to develop farmers' capacities to produce good quality, accessible fish feed.

A TCDC expert in fish feed production was recruited to work with feed producers in country. The expert advised on the type of fish feed mills that were required, according to the kind of fish being raised, as well as the production and formulation of the feed. In addition, production standards were set on fish feed for farmed tilapia and catfish. This compound feed is essential, both as a supplement to the natural food base, and for the growth of farmed fish.

A training course on feed production was conducted for twelve potential feed producers, including young men and women (four women and eight men). Topics covered included good fish feed practices, feed handling and transportation, and feed mill management. The training helped the producers to understand the technology of fish feed production and the various ingredients used in it. In addition, twelve potential feed producers were trained in running a feed mill as a business. The topics covered in this session were record keeping, efficient production, price determination and marketing strategies. The training session built the participants' technical capacities and economic skills for conducting aquaculture as a business.



Two fish feed mill houses were constructed. The essential equipment was provided to beneficiaries in two regions, namely Kuloro in the West Coast Region and Jahally in the Central River Region. A feed formulation using locally produced inputs that can be used for rearing tilapia and catfish was also developed for feed production. This feed was used during the training for feed mill operators.

A partnership agreement was established between farmers and feed unit operators to strengthen the feed mills and provide access to quality feed for farmers. The agreement was awaiting finalization at the time of this report.

Output 4 focused on supporting the use of good quality feeds in a sustainable manner.

Seed producers were supplied with equipment for fingerling transportation, and a supply and payment mechanism was put into place for farmers to have access to good quality feed when needed. The locations of the fish feed mill houses are easily reachable and the transportation of feed can be managed to ensure that an adequate supply is provided to farms. In this respect, partnership agreements were developed stipulating the modalities of execution, and the roles and responsibilities of each party (feed producers and grow-out farmers). At the time of this report, the agreements were awaiting finalization.

The goal of Output 5 was to provide training on the basic principles of aquaculture to fisheries officers and grow-out farmers. A total of thirteen extension staff from the Department of Fisheries and 20 grow-out farmers were trained. Topics included site selection, pond construction, fish handling and transport, pond stocking, feed and feeding, hatchery management, water quality and management in aquaculture, fish harvesting and marketing, and other aquaculture production systems.

Output 6 further developed the capacities of ten fisheries officers, 30 grow-out farmers (ten more than originally planned), five fingerling producers and five feed producers, who were trained on aquaculture as a business. The objective was to enhance the capacity of both officers and farmers in developing business acumen in aquaculture to facilitate the transformation of this sector into an economically vibrant and sustainable one in the Gambia. Specifically, the workshop intended to help the participants assess the profitability level and financial wealth of aquaculture farms to assist them in making investment decisions.

A six-day exchange visit to Uganda was conducted for one grow-out farmer, one fingerling producer, one feed producer and one fisheries officer. Those who went on the mission were able to learn good aquaculture practices from fish farmers for technology transfer, efficient seed production methods from hatchery operators, and how to produce quality, low-cost feed using locally available materials from feed mill operators. The mission provided them with an insight on how to operate an aquaculture system in a sustainable and profitable manner.

IMPLEMENTATION OF WORK PLAN

There were no major problems during project implementation. Having said that, there were some issues with timing. For instance, the recruitment of the TCDC fisheries experts was a challenge, because of the length of time required to find and select qualified candidates and to confirm their availability. In addition, the National Project Coordinator was replaced twice over the course of the project, which caused some minor issues, including a delay in the implementation of activities. Coupled with the process of procuring the feed mill equipment and the materials required for the hatcheries, which were sourced outside the country, and other pre-implementation formalities, some activities were not carried out on time. Thanks to a no-cost extension to 31 July 2019, some of the activities that had been delayed were implemented within the new timeframe.



A few other activities were not carried out owing to these delays. The first was the establishment and implementation of contracts between the project and hatchery owners, which would have assisted in the strengthening of the hatcheries by partially covering some of their operating costs for the first few fingerling production cycles and provided access to quality seed for farmers. A Farmer Field School (FFS) was originally included in the work plan, but this was not conducted owing to time constraints. Finally, a two-day refreshing workshop was meant to be held for ten grow-out farmers, four seed producers and three feed producers on conducting aquaculture as a business; however, this was not carried out either.

The initial target number of hatcheries to be built was four; however, owing to salt intrusion in some of the potential sites, only two were constructed. The hatcheries were built in Jahally, which was an ideal site for catfish and tilapia hatcheries, according to one of the TCDC experts. For this reason, efforts were focused on that area. Two fish feed production units were constructed to supply feed to the hatcheries instead of three, which was the original target. It was decided that two feed production units could adequately supply the two hatcheries.

The low level of national capacity in aquaculture was identified as a risk for the project. This was mitigated thanks to support from the TCDC experts in feed production and tilapia and catfish hatcheries. The engagement of the Department of Fisheries by the FAO Regional Office for Africa (RAF) and FAO Representation in Gambia was a mitigation measure for this issue, and it facilitated the smooth implementation of activities. The participation of fisheries officers and beneficiaries further ensured that activities were implemented without difficulty. The FAO staff at country and regional level provided support through adequate technical backstopping. The government also showed interest in the project through active participation and involvement. The high illiteracy rate among communities in rural areas was also considered as a potential risk regarding knowledge acquisition and retention among beneficiaries attending the capacity development training sessions. In order to combat this problem, training sessions were held in local languages and inputs from the TCDC experts were translated when necessary. Other mitigation measures included selecting beneficiaries based on their educational background (i.e. those with high school certificates), and making sure that the training sessions were hands-on.



The possibility of conflicts between stakeholders over access to land for fishponds and competition in sales between cultured fish and captured fish was also identified as a potential risk. Certain farmers stock their ponds with juvenile fish from the wild, which was seen as another potential cause of conflict. There was, in fact, some conflict among stakeholders during the planning and implementation of the project, mainly owing to the fact that all of the beneficiaries in the different groups (i.e. feed and fingerling producers and grow-out farmers) had specific roles to play and communication channels that they established amongst themselves.

The final risk was the fact that project implementation depended on access to ponds. In the end, this proved to be a non-issue because ponds had already been dug for other projects in Jahally, and access to them was granted for this project thanks to a collaboration with the Ministry of Agriculture and the Food and Agriculture Sector Development Project (FASDEP).

The overall view of the project is that it strengthened synergies and complementarities between ongoing projects, both in terms of the provision of quality seed and feed for existing aquaculture sites, as well as in the creation of new employment opportunities for target groups, especially young men and women.

FOLLOW-UP FOR GOVERNMENT ATTENTION

Although farmers were provided with adequate training regarding aquaculture techniques, it is strongly recommended that the training sessions be continuous, because they would support sustainable, farmer-managed aquaculture. The farmers' activities should also be continuously monitored to ensure that they remain on course in terms of producing quality feed and seed. Particular emphasis should also be placed on reinforcing their capacities in technical aquaculture practices such as hatcheries and grow-out systems, as well as management. Technical capacity building in the field of aquaculture should be enhanced for fisheries extension staff. It is also recommended that Training of Training (ToT) sessions be provided for fisheries extension staff, because it would enable them to conduct capacity building sessions for farmers as needed.

For effective management of the Jahally aquaculture centre and the sustainability of activities, public-private partnerships (PPP) should be developed by the government. The government should also encourage businesses to import key inputs, such as certain feed ingredients and broodstock, to address the shortages of feed and fingerlings in the country. Finally, it is recommended that the funding of the fisheries subsector be increased for the implementation of aquaculture activities.

SUSTAINABILITY

1. Capacity development

The development of subsistence, small-scale and commercial aquaculture is a stated government fisheries policy, owing to the nutritional and economic potential of this subsector. This policy will support the sustainability of the project outcome.

Through the training sessions and study tour, a total of 123 grow-out farmers, feed and fingerling producers as well as fisheries extension workers had their capacities built regarding good aquaculture practices and aquaculture as a business, fish hatcheries and feed production techniques. This will provide the beneficiaries with the necessary skills and knowledge to engage in fish farming and related activities. The training of the extension staff from the Fisheries Department will enable them to provide more direct support services to beneficiaries at community level. The training of the farmers on good aquaculture practices and aquaculture as a business will support the sustainability of the project.

2. Gender equality

Women and youth were involved at various levels of project implementation, and the different roles they played in fish production will facilitate the project's sustainability. Women attended all of the trainings, namely, aquaculture as a business, principles of aquaculture, and the fingerling and feed production training workshops.



3. Environmental sustainability

Environmental impact assessments (EIAs) were carried out when choosing the sites for the hatcheries. The environmental impact of the project was easily managed at both the construction and operational phases for a few reasons. The first was that an external donor agency had developed infrastructure on the site where the catfish and tilapia hatcheries were built, and the rehabilitation of the area for the construction of the hatcheries did not have an impact on the environment. In addition, in the areas of the ponds, trees were left alone to protect water sources. Grass was planted on the banks of the ponds to avoid their erosion and collapse. Finally, the construction of the feed mill houses did not require any vegetation to be cleared.



4. Human Rights-based Approach (HRBA) – in particular Right to Food and Decent Work

The project is expected to contribute greatly to the development of aquaculture in the country, and more importantly, it will help to improve the socioeconomic status of beneficiary communities through employment creation, income generation and increased food production. Young men showed particular interest in the project activities, which may encourage them to participate in local aquaculture activities, rather than seeking employment elsewhere. Women and youth were a main focus of this project, and their capacities were built throughout the project to facilitate and support their employment in the aquaculture sector.

5. Technological sustainability

The project promoted sustainable aquaculture and farming technologies that contribute to reducing pressure on the natural resource base.

6. Economic sustainability

As a result of this project, the government was able to mobilize additional financial resources to send three fisheries extension staff to Senegal for three months to receive training on best practices in aquaculture.



DOCUMENTS AND OUTREACH PRODUCTS

- ❑ Baseline Environmental Impact Assessment (EIA) Report for selection of fish feed mill sites and hatcheries. National Environment Agency (NEA). December 2017. 17 pp.
- ❑ Mission report from TCDC expert on fish feed mill design, feed formulation, manufacturing and quality control. S. Bouda. April 2017. 57 pp.
- ❑ Report from TCDC expert on Tilapia hatchery construction, and management and fingerlings production in Gambia. A. Sene. December 2017. 42 pp.
- ❑ Report from TCDC expert on Catfish hatchery construction, management, and fingerlings production in Gambia. O. Julius. June 2017. 57 pp.
- ❑ Training Workshop report on Doing Aquaculture as a Business. X. Yuan and J Cai. September 2018. 26 pp.



ACHIEVEMENT OF RESULTS - LOGICAL FRAMEWORK

Impact 1	Farmers use good quality fingerlings produced from local hatcheries		
Outcome 1	Good quality fish seeds are locally and sustainably produced, available and accessible to farmers		
	Indicator	<ul style="list-style-type: none">– The number of operational hatcheries is increased, and they produce enough good quality fingerlings.– The use of good quality fingerlings has increased.	
	Baseline	<ul style="list-style-type: none">– 0– 0	
	End Target	<ul style="list-style-type: none">– 4 capable of producing half a million fry per year each– 30 percent of farmers	
	Comments and follow-up action to be taken	<ul style="list-style-type: none">– Two fish hatcheries were established in Jahally, which, according to the TCDC expert, was an ideal site for tilapia and catfish hatcheries. The groundwater in other sites appeared to suffer from salt intrusion, particularly during the dry periods. For these reasons, only two hatcheries were established. Continuous monitoring of their performance by government extension officers is recommended.– Twenty-five farmers (equivalent to 30 percent of beneficiaries) were trained to use hatchery-produced fingerlings. It is recommended that hands-on trainings be conducted, and that their performance be monitored continuously as follow-up actions.	
Output 1	Four farmers or groups of farmers, including youth and women, produce good quality fish seeds in an efficient and sustainable manner		
	Indicators	Target	Achieved
	The number of operational hatcheries increased, and they produce enough good quality fingerlings.	4	Partially
Baseline	0		
Comments	As stated above, two fish hatcheries were established, and they should be monitored continuously by government extension officers.		
Activity 1.1	Bring over and host TCDC technical (hands-on) experts in fish seed production (tilapia and catfish) to work with host-country seed producers (for 63 days in three missions for tilapia and 63 days in three missions for catfish)		
	Achieved	Yes	
	Comments	Missions for site selection and environmental impact assessments were conducted.	
Activity 1.2	Define and set standards for good quality fingerlings with specific reference to tilapia species and catfish species farmed in the Gambia		
	Achieved	Yes	
	Comments	EIAs were carried out by local authorities. Training manuals were developed and standards were set for catfish and tilapia hatcheries, fingerling production and brood stock management. The project itself did not provide brood stock; it will be taken from the River Gambia.	
Activity 1.3	Select four individuals or groups of farmers (including youth and women) with the willingness and potential to produce good quality fingerlings and run hatcheries effectively as a business (two for freshwater tilapia, one for freshwater catfish and one for brackish water tilapia [four hatcheries in total])		
	Achieved	Yes	
	Comments	Capacities were built on good practices in aquaculture for 13 fisheries extension staff members and 50 youth and women at the manufacturing unit and the two hatcheries that were established by the project.	
Activity 1.4	Establish and implement contracts (Memorandum of Understanding [MoU]) between the project and hatchery owners aimed at financially assisting the latter to establish (or strengthen) hatcheries and partially cover operating costs for two to three cycles of fingerling production, and for them to ease access of fish growers to seeds meeting specified standards		
	Achieved	No	
	Comments	The replacement of the national project coordinator resulted in some delays and time constraints; therefore, this activity was not carried out.	
Activity 1.5	Prepare and issue invitations to tender for the construction/enhancement of hatcheries and supply of related equipment		
	Achieved	Yes	
	Comments	The successful tenderers built the feed manufacturing stations and fish hatcheries.	

Activity 1.6	Acquire decent brood stock and the necessary supplies for hatchery operations (hormones and other products)		
	Achieved	Yes	
	Comments	All the necessary equipment and supplies were procured and delivered to the beneficiaries.	
Activity 1.7	Train (hands-on) selected potential fingerling producers, including youth and women, in hatchery management best practices including biosecurity, brood stock management, sex-reversal technologies and fingerling handling and transportation (12 people/session of five days)		
	Achieved	Yes	
	Comments	A total of twenty people (four men and 16 women) were trained.	
Activity 1.8	Train (hands-on) selected potential fingerling producers, including youth and women, in running a hatchery as a business including record keeping, efficient production, price determination and marketing strategies (12 people/session of three days)		
	Achieved	Yes	
	Comments	Twenty fingerling producers were trained.	
Activity 1.9	Follow closely and monitor fingerling producers to ensure that the fingerlings produced meet the quality standards set and certify (or not) them		
	Achieved	Partially	
	Comments	Fingerlings are not yet in full production; however, quality standards will be ensured through follow-up monitoring.	
Output 2	Thirty percent of farmers, including youth and women, use good quality fingerlings in a sustainable manner		
	Indicators	Target	Achieved
	Number of farmers using quality fingerlings.	30 percent of farmers.	
Baseline	0		
Comments	Twenty-five farmers (which fulfilled the 30 percent target) were trained to use hatchery-produced fingerlings. It is recommended that follow-up trainings be conducted, and that performance is monitored continuously by government extension officers.		
Activity 2.1	Supply fingerling producers with adequate equipment for fingerlings transportation		
	Achieved	Yes	
	Comments	Transportation equipment was procured and provided.	
Activity 2.2	Establish supply and payment mechanisms, which ensure that farmers access good quality fingerlings where and when needed (including MoU with seed producers)		
	Achieved	Partially	
	Comments	The partnership agreements with seed producers and farmers were awaiting finalization and signatures at the time of this report. They are expected to ensure that farmers can access good quality fingerlings.	

Impact 2	Farmers use good quality fish feed produced by local feed mills		
Outcome 2	Good quality fish feeds are locally and sustainably produced, available and accessible to farmers		
	Indicator	<ul style="list-style-type: none">– The number of operational fish feed production units has increased and they produce enough feed.– The use of good quality fish feed has increased.	
	Baseline	<ul style="list-style-type: none">– 0– 0	
	End Target	<ul style="list-style-type: none">– 3 capable of producing at least 500 kg/day each.– 30 percent of farmers.	
	Comments and follow-up action to be taken	<ul style="list-style-type: none">– Two fish feed mills were installed in two regions, and they each have a production capacity of 800 kg/day. Continuous monitoring of the activities is recommended to ensure that they remain on course in terms of producing quality feed for farmers.– The elements for locally produced, good quality fish feed are present; however, the optimal formula has not been exactly determined.	
Output 3	Three fish feed production units run by farmers or groups of farmers, including youth and women, produce good quality fish feeds in an efficient and sustainable manner		
	Indicators	Target	Achieved
	Number of fish feed production units established.	3	
Baseline	0		
Comments	Two fish feed mills were installed in two regions to provide feed for the two hatcheries that were constructed. Their performance should be continuously monitored by government extension officers as a follow-up action.		
Activity 3.1	Bring over and host TCDC technical (hands-on) experts in fish feed mill design, feed formulation, manufacturing and quality control (tilapia and catfish) to work with host-country feed producers for 30 days in two missions		
	Achieved	Yes	
	Comments	The TCDC expert worked with feed producers and provided advice on the types of fish feed mills needed based on the type of fish to be reared, and the feed formulation and production.	
Activity 3.2	Define and set standards for good quality feed with specific reference to tilapia species and catfish species farmed in the Gambia and by fish development stage		
	Achieved	Yes	
	Comments	Production quality standards were set.	
Activity 3.3	Select three individuals or groups of farmers (including youth and women) with the willingness and potential to produce good quality fish feed and run a fish feed production unit effectively as a business		
	Achieved	Yes	
	Comments	Three groups of four farmers each (totalling twelve potential feed producers) were trained in running a feed mill.	
Activity 3.4	Establish and implement contracts (MoU) between the project and owners of fish feed production units with the aim of financially assisting the latter to establish (or strengthen) decent feed mills and partially cover operating costs for the first year of operation, and for them to ease access of fish growers to feed meeting specified standards		
	Achieved	Partially	
	Comments	A partnership agreement was established between farmers and feed production unit operators. At the time of this report, the agreement was awaiting signatures from the parties involved.	
Activity 3.5	Prepare and issue invitations to tender for the construction/enhancement of fish feed production units and delivery of related equipment and supplies		
	Achieved	Yes	
	Comments	The tendering process followed all FAO rules and regulations. It took place over three weeks. Contractors picked up tender documents to express their interest by submitting a sealed bid. The units were provided with all the necessary equipment and supplies.	

Activity 3.6	Make, by region and season, an inventory of locally available raw materials and their prices, which can be used in fish (tilapia species and clarias gariepinus) feed production		
	Achieved	Yes	
	Comments	Locally produced inputs were included in the feed formulations developed in Activity 3.7. Feed formula made from local available materials was recommended by the TCDC expert on fish feed, and it was later developed and used during the training for the feed operators.	
Activity 3.7	Document, through literature (first) and/or lab analysis, the composition (protein, energy, minerals, content) of ingredients in Activity 3.6, and establish practical feed formulas for each species (tilapia species and clarias gariepinus) accordingly (for use by feed producers)		
	Achieved	Yes	
	Comments	Feed formulations for tilapia and catfish were developed. The lab analysis was not carried out due to time constraints.	
Activity 3.8	Train (hands-on) selected potential feed producers (including youth and women) in feed production, best fish feed practices including biosecurity, feed handling and transportation, and in management of fish feed production units (nine people/session of two days)		
	Achieved	Yes	
	Comments	Four women and eight men were trained on feed production.	
Activity 3.9	Train (hands-on) selected potential feed producers (including youth and women) in running a fish feed production unit as a business including record keeping, efficient production, price determination and marketing strategies (nine people/session of two days)		
	Achieved	Yes	
	Comments	Twelve potential feed producers were trained.	
Activity 3.10	Follow closely and monitor feed producers to ensure that the feed produced meet the quality standards set and certify (or not) them		
	Achieved	Partially	
	Comments	Beneficiaries have been trained on producing quality feeds. Fish feeds are not yet in full production due to time constraints.	
Output 4	Thirty percent of farmers, including youth and women, use good quality feed in a sustainable manner		
	Indicators	Target	Achieved
	Number of farmers using good quality fish feed.	Thirty percent.	Yes
Baseline	0		
Comments	Thirty grow-out farmers (which is equivalent to the 30 percent target) were trained on principles of good aquaculture practices, and twelve feed producers were trained in feed production technology. Follow-up trainings are recommended.		
Activity 4.1	Supply feed producers with adequate equipment for feed transportation		
	Achieved	Yes	
	Comments	All the necessary equipment was provided.	
Activity 4.2	Establish supply and payment mechanisms, which ensure that farmers have access to good quality feed where and when needed (including MoU with feed producers)		
	Achieved	Yes	
	Comments	Supply and payment mechanisms were put into place. A partnership agreement was established and is to be signed by the parties involved.	

Impact 3	Farmers and feed producers conduct their operations in an efficient and profitable manner		
Outcome 3	Government fisheries officers, seed producers, feed producers and grow-out farmers have a good understanding of basic good aquaculture practices and have the capacity to run aquaculture enterprises as a business		
	Indicator	– Seed and feed producers and grow-out farmers apply good aquaculture practices. – Seed and feed producers and grow-out farmers keep records on their activities. – Seed and feed producers and grow-out farmers know how to assess the profitability level of their enterprises.	
	Baseline	– 0 – 0 – 0	
	End Target	– 43 – 43 – 43	
	Comments and follow-up action to be taken	Follow-up technical capacity building on aquaculture practices and aquaculture as a business is required to enhance the capacities of fisheries extension staff and feed and seed growers.	
Output 5	Twelve fisheries officers and twenty grow-out farmers are trained in basic principles of aquaculture		
	Indicators	Target	Achieved
	Number of capacities are built on the principle of aquaculture	43	Yes
Baseline	0		
Comments	Thirteen fisheries extension staff of the Department of Fisheries and 30 grow-out farmers were trained in principles of good aquaculture practice, which surpassed the original goal of twelve fisheries officers and twenty grow-out farmers. Hands-on training is to be conducted as a follow-up action.		
Activity 5.1	Organize a four-day training workshop for 12 fisheries officers on good aquaculture practices including notions of basic principles of aquaculture, site selection, pond construction, fish handling and transport, pond stocking, feeds and feeding, hatchery management, water quality and management in aquaculture, fish harvesting and marketing, etc., and other aquaculture production systems such as cages, tanks, hapas, rice-fish farming, etc. (12 people/session of 4 days)		
	Achieved	Yes	
	Comments	Thirteen extension staff members from the Department of Fisheries were trained.	
Activity 5.2	Organize a five-day training workshop for 20 grow-out farmers on good aquaculture practices including notions of basic principles of aquaculture, site selection, pond construction, pond stocking, hatchery management, fish handling and transport, feeds and feeding, water quality and management in aquaculture, fish harvesting and marketing, etc., and various aquaculture production systems such as cages, tanks, hapas, rice-fish farming, etc. (20 people/session of 5 days)		
	Achieved	Yes	
	Comments	Twenty grow-out farmers were trained.	
Activity 5.3	Organize mass farmers' education in the form of Farmer Field School (FFS) (two sessions per year of 20 farmers each)		
	Achieved	No	
	Comments	This activity was not carried out because of time constraints.	

Output 6	Twelve fisheries officers, twenty grow-out farmers, four fingerling producers, three feed producer are trained in conducting aquaculture as a business		
	Indicators	Target	Achieved
	Number of capacities are built on aquaculture as a business	43	Yes
Baseline	0		
Comments	Fifty people were trained on aquaculture as business (ten fisheries officers, 30 grow-out farmers, five fingerling producers and five feed producers). Hands-on training to be conducted as a follow-up action.		
Activity 6.1	Organize a four-day training workshop for 12 fisheries officers on conducting aquaculture as a business (12 people/session of four days)		
	Achieved	Partially	
	Comments	Ten fisheries officers were trained, which is the total number of officers in the aquaculture unit at the Department of Fisheries.	
Activity 6.2	Organize a four-day training workshop for 20 grow-out farmers on conducting aquaculture as a business (20 people/session of four days)		
	Achieved	Yes	
	Comments	Thirty grow-out farmers were trained, which surpassed the original target.	
Activity 6.3	Organize a six-day exchange visit for one farmer, one fingerling producer, one feed producer and one fisheries officer in the subregion or elsewhere in Africa (four people/visit of six days including travel)		
	Achieved	Yes	
	Comments	The exchange took place in Uganda for one grow-out farmer, one fingerling producer, one feed producer and one fisheries officer.	
Activity 6.4	Organize a two-day refreshing training workshop for ten grow-out farmers, four seed producers and three feed producers on conducting aquaculture as a business (20 people/session of two days)		
	Achieved	No	
	Comments	Not conducted due to time constraints.	

Outreach, Marketing and Reporting Unit (PSRR)
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