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Evaluation of Donor Funded Sustainable Rural Livelihood Projects. A case of Aquaculture Project funded by DFID in the Ellembelle District of Ghana

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DECLARATION

I wish to declare that the content of this work is the result of my effort through research and that the work has not been presented for any Certificate, Diploma or Degree elsewhere. Those whose works were read and partly used are duly acknowledged in the text. I therefore present this for the award of the degree of Doctor of Philosophy in Community and Social Development

ABSTRACT

This study sought to evaluate the effectiveness, efficiency, impact, and sustainability of DFID funded sustainable Aquaculture livelihood intervention in the Ellembelle and neighboring Districts in the Western Region of Ghana.

The study looked beyond the usual project evaluation practice of assessing actual results against expected results using a before and after approach to further examine the optimality of transforming inputs into outputs, how output have been used to achieve outcome and impacts as well as the reasons for the achievement or otherwise of expected result.

The research further assessed the extent to which steps have been taken to ensure that activities initiated by the project will continue after cessation of DFID support, support to local institutions and integration with local social, economic, and cultural conditions and prospects for replication and upscaling of best practices.

The study adopted a quasi-experimental design approach of collecting data from direct project beneficiaries, differentiated between those who participated only in the demonstration farms and beneficiaries of technical and managerial proficiency compared to the performance of non-project participants.

The project provided the following direct services to project beneficiaries in response to the needs identified through a baseline study, (i) quality inputs (feed, fingerlings); (ii) know how on best pond/business management practices; and (iii) diversified markets for farmed fresh fish (catfish and tilapia).

In terms of effectiveness, the project has made some significant progress towards the achievement of its objectives. With regards to improvement in household incomes, fish farming provides about 15.5% of the monthly household incomes of farmers who benefited from the pond demonstration intervention. It was observed from the study that fish farming contributes more to the household incomes of demonstration beneficiaries than non-beneficiaries of the demonstration intervention.

Demonstration beneficiaries have 177.59% more income from fish farming than proficiency- only beneficiaries, and 170.45% more income than non-participants. Also, whereas fish farming contributes 15.52% to the household incomes of demonstration beneficiaries, it contributes only 6.38% and 5% to the household incomes for proficiency-only beneficiaries and non-participants, respectively. The inferential analysis showed the differences in the contribution of fish farming to

monthly income between demonstration beneficiaries and others to be significant (*F-ratio = 5.560, mean diff. = 177.59, p <0.03 for proficiency-only beneficiaries; and F-ratio = 5.560, mean diff. = 170.45, p <0.08 for non-participants*).

With regards to job creation, the intervention has provided new jobs and employment to people in the participating districts. about 60% of new entrants who were non-beneficiaries became fish farmers due directly to the intervention. Further, about 26% (21) of beneficiaries were also dormant farmers whose fish farming ventures have been revived through the intervention. Job creation by beneficiaries has also increased markedly. Before the intervention, existing farmers employed 2 to 3 additional hands on their farms. However, beneficiaries were able to employ 4 additional hands on the fish farms within 2 years of project support. This indicates that the intervention exceeded its target of 3 farm hands per farmer.

The difference is statistically significant indicating that the intervention has created jobs in the coastal communities (***t=4.043, p<0.01***).

In terms of efficiency, it was observed that all the 4 farmer-based associations made profits after the first production cycle, indicating an optimized utilization of inputs. The high level of the adoption of best practices by farmer-based associations led to efficiency in feeding, reduction in fish mortality as well as increase in the weight of fish produced, compared to the baseline. Overall, feeding was very efficient resulting in a feed conversion ratio of 1.4, an improvement on a baseline of 4.0. Also, average mortality for the demonstration ponds after the first production cycle was 6.25% - tremendous reduction in a baseline of over 60%. Also, average fish weight was around 1kg indicating an improvement in the baseline weight of 0.8kg

Apart from the increased incomes and jobs, the project impacted on the beneficiaries through a reduction in the average fish mortality rate from 60% at baseline to only 4.83%. Those who benefited from proficiency only reduced to 11.46% whereas that of non-participants reduced to 34.62%. Demonstration beneficiaries have about 84.56% more yield than proficiency-only beneficiaries, and 130.59% more yield than non-participants.

LIST OF ABREVIATIONS

ANCOFA	Ankasa Conservation Fish Farmers Association
ATT	Agriculture Technology Transfer
BAC	Business Advisory Centre
BCA	Benefit Cost Analysis
CBA	Cost Benefit Analysis
CSR	Corporate Social Responsibility
DAC	Development Assistance Committee
DFID	Department for International Development
EPA	Environmental Protection Agency
FCDO	Foreign Commonwealth Development Office
FGD	Focused Group Discussion
GEPA	Ghana Export Promotion Authority
GNPC	Ghana National Petroleum Company
GPP	Ghana Poultry Program
GSS	Ghana Statistical Service
IFAD	International Fund for Agricultural Development
MoFA	Ministry of Food and Agriculture
MSR	Market systems resilience
MVP	Millenium Villages Project
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares

PHC	Population ad Housing Census
PPA	Project Performance Assessment
PSM	Propensity Score Matching
RCT	Randomized Contral Trial
RDD	Regression Discontinuity Design
REP	Rural Enterprises Project
RFSP	Rural Financial Services Project
RING	Resilience in Northern Ghana
RTF	Rural Technology Facility
ToC	Theory of Change
TVET	Technical Vocational Education and Training
UFE	Utilization Focused Evaluation
USDA	United States Department of Agriculture
WRCF	Western Region Coastal Foundation
WRI	Water Resources Institute

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1 INTRODUCTION

1.1 Background of the Study

With the intention of giving the local rural inhabitants a better quality of life and a means of escaping poverty, aquaculture has been introduced for centuries into many developing nations, including Asia and Africa (Edward P. 2002). An encouraging change in aquaculture is being seen in Africa, spearheaded by Egypt. The past 20 years have seen considerable increase in aquaculture production in several Sub-Saharan African (SSA) countries, with annual growth rates ranging from 12 to 23 percent (Ragasa et al., 2022a).

Evidence suggests that pond aquaculture has increased the welfare of low-income households; aquaculture interventions were found to improve the livelihoods of low-income households in Northwest Bangladesh. (1997, DFID). Between 2004 and 2011, aquaculture grew at a rate of over 2.5 million tons year, whereas the world's wild capture decreased at a rate of more than 0.5 million tonnes annually.

The poor have not been the focus of many programs, and the relationship between aquaculture and poverty has not received much attention. The emphasis on household food security in early attempts to promote aquaculture may have contributed to the high failure rate of development initiatives, especially in Africa. Understanding the right technology is essential for running a successful small-scale aquaculture business. For example, in northeastern Thailand, many small-scale farmers failed to raise fish because they overstocked fingerlings at an excessive density in ponds that were not fed or fertilized, which resulted in high fish mortality, fish that were eaten by surviving wild carnivorous fish populations, or fish that did not grow (Edwards et al., 1996).

The availability of seed is essential and frequently a significant barrier to aquaculture adoption. New farmers typically need institutional help in the form of inputs, particularly seed, or extension advice (Edwards P. 2000)

Ghana has a large aquaculture industry, with more than 60% of farms located in the country's southern and central regions (Buchanan, Joanne G., 2016). In Ghana, new methods are being used to improve alternate sources of income and increase the availability, affordability, and consumption of protein in locations with a climate, water bodies, and other resources that are suitable for aquaculture production.

Because aquaculture creates more jobs and generates more revenue, it helps the poor. The aquaculture industry in rural areas is labor-intensive, mostly focused on small-scale operations, and utilizes sophisticated machinery sparingly. Because of this method, rural communities without access to land can at least make a livelihood by laboring for other aquaculture farms. (Olu R.U.S 2023)

Most of the small-scale aquaculture interventions were largely promoted in rural areas and has often times been integrated into rural development programs. Establishing a successful aquaculture industry in rural areas is not an easy task owing to factors such as limited access to productive resources. Conventional approaches to promoting aquaculture have failed to have a major impact on the poor, particularly in Africa (Harrison et al., 1994). There is a plethora of real-life cases, mostly in Africa and some other underdeveloped countries, where aquaculture interventions have failed.

Ghana's capture fisheries production decreased from 431 thousand tonnes in 2008 to 375 thousand tonnes in 2014 (MoFAD, 2013, 2015). Poverty incidence still remains high (87%) in the fishing communities (Asiedu, Nunoo, Ofori-Danson, Sarpong, & Sumaila, 2013) with about 24% of children suffering from chronic malnutrition (stunting) (Ghana Statistical Service (GSS), 2014, Berchie A et al 2017)

Aquaculture helps a nation in earning valuable foreign exchange, increases food production, diversify the economy, and results in job creation in the rural areas. Small scale aquaculture farming also assists the remote population to be self-sufficient without relying much on imports. Governments need to develop policies to implement holistic strategies which include the poor in the aquaculture development as part of their national development plans to ensure that entire population of the country would benefit (OluR.2023)

Ghana's current fish production from aquaculture is 52,470.49 metric tonnes a year1. About 10 percent of Ghana population is dependent on the aquaculture sector for their livelihoods1 .

In 2021, total domestic fish production in Ghana was 628,617.53mt, with aquaculture contributing 89,375.48mt (14.22%). With the national fish requirement of 1,268,800.00mt, there was a deficit 640,182.47mt2.Ghana's new Aquaculture Development Plan aims to increase the country's fish

farming output from 89,376 tonnes in 2021 to 211,697 tonnes by the end of 2027 – an increase of 136 percent

Its significance to the economy of Ghana can be seen in key economic variables such as employment, livelihood support, poverty reduction, food security and foreign exchange earnings (Rosena et al 2010)[3]. The Ghanaian fisheries contribute about 1.5% to the GDP annually with GDP growth rate of 5% (Ghana Statistical Service [GSS], 2015), and very important in the development of coastal poor populations.

The contribution of fisheries to livelihoods and food security increased from 2.2 to 2.4 million people between 2011 and 2015 (MoFAD, 2015). Foreign exchange earnings from fisheries increased from US$ 165.7 million in 2010 to US$ 309.7 million in 2015, with a corresponding increase in the overall fish production by volume of 9.3% between 2010 and 2015 (MoFAD, 2011, 2016). The inland fisheries and aquaculture contribute 30% to total fish production.

Households' livelihood security remains a pertinent issue in the economic development of low household income communities (Bhandari & Grant, 2007). Livelihood Security has been defined as adequate and sustainable access to the income and resources required to meet basic needs. The basic need includes adequate access to food, health facilities, educational opportunities, housing, community participation and social integration (Frankenberger & McCaston, 1998)[4]

Fish is a preferred source of animal protein and consumed by the majority of Ghanaians ranging from the rural poor to the urban rich. It is estimated that 75% of the total domestic production of fish is consumed locally, contributing about 60% of the total animal protein requirement in the average Ghanaian diet (Buchanan, Joanne G., 2016(Asiedu, Failler, & Yolaine, 2015)

The per capita fish consumption is estimated at 26 kg which is higher than the world's average (20 kg) and Africa's average (10 kg) (FAO, 2014, 2016). The fishery sector plays important role in the livelihoods support and economy growth of Ghana.

The aquaculture industry of Ghana looks promising as the climate, demand, water bodies and other resources are suitable for aquaculture production.

The aquaculture industry is confronted with several challenges including high cost of good quality feed, lack of access to funds, inadequate fingerlings, lack of training and extension services. The Poor market of farmed fish products and poor management of farms inhibit the growth of the aquaculture industry. These challenges coupled with unfavorable weather conditions and poor infrastructure lead to the increasing incidence of farm abandonment.

Government effort to make aquaculture alternative livelihood to capture fisheries, ensuring food security, increasing nutritional needs and other opportunities will be materialized if the bottlenecks are tackled urgently (Buchanan, Joanne G.2016)

The poor need to be targeted and provided, at least initially, with public sector support although aquaculture has to function on a self-financing basis within the private sector for it to contribute sustainably to livelihood5

Aquaculture may be defined simply as farming fish and other aquatic organisms. Fish is used here generically to include all farmed aquatic organisms. Land-base systems are commonly integrated with agriculture by stocking fish in rice fields and ponds. Water-based systems involve stocking fish directly in enclosures or attaching them to substrates in water bodies such as rivers, lakes, reservoirs, or bays (Edwards ,2000).

According to Edward P. (1997)6 rural aquaculture is generally explained as ‘aqua farming practices in extensive to semi-intensive scale with relatively low production cost and technologies. Targeting low-income consumer groups, this small-scale household activity adopts off-farm agro-industrial inputs and organic fertilizer, without relying on any formulated feed to supply low-value production (OLU 2023)

Rural aquaculture creates an ‘own enterprise’ employment, where the entire family devotes to the business. During harvesting season, extra hands are needed from casual or occasional laborers. Aquaculture then creates job opportunities for illiterate women to earn side income for their household.

After the farmers’ income has increased, they reflected stronger purchasing power than before and have better access to the resources, which includes sanitary, transportation, housing, health services, and communication technologies. In rural aquaculture context, most of the time farmers’ household tend to eat the small fish which fails to meet the market size and left the bigger one which can fetch higher prices [8]. Occasionally, some rural communities do practice by giving out fishes as a type of

payment to laborers working in the farms. These small fishes are eaten together with their head and bones, added more micronutrients, vitamins and mineral that could not be found in larger fish (Ahmed N, 2011)

Scoones (1998) has identified five main categories of capital as contributing to assets in the livelihood definition. These include natural capital, physical capital, human capital, financial capital and social capital. Natural capital refers to the natural resource base (land, water, forest…etc) that yields products utilized by human populations for their survival. Physical capital refers to assets brought into existence through the economic production processes. Human capital refers to the education level and health status of individuals and populations. Financial capital refers to stocks of cash that can be accessed in order to purchase either production or consumption goods and access to credit might be included in this category. Social capital refers to the social networks and associations in which people participate, and from which they can derive support that contributes to their livelihoods (Manjura K, 2006.p12)

However, adoption of a livelihood approach has been valued as a conceptual tool for clustering individuals into meaningful groups and collection of information to construct profiles by different institutes (Carney et al. 1999). Identifying and characterizing the poor or vulnerable households is crucial for designing and implementing actions to improve their situation and reduce their number.

Martin et al. (2013) posited that alternative livelihoods within the rural setting are unlikely to cause fishers to leave fishery, but instead strengthen the livelihood portfolio as a supplementary activity. Fishing forms a greater proportion of income, employment, and food security for the poor in the coastal areas.[7]

Cinner, McClanahan, and Wamukota (2010) reported that household livelihoods in tropical coastal communities are not dependent on a single livelihood strategy but often a multiplicity of occupational sectors, such as agriculture, fisheries, and informal economic activities.

The income-based approach is the main basis for the analysis of identifying household livelihood strategies (Brown, Stephens, Ouma, Murithi, & Barrett, 2006; Barrett, Bezuneh, Clay, & Reardon, 2005)

As policies and programs don't commonly target single individuals, it is necessary to identify meaningful groups for practical assistance. By choosing the livelihood system as a classifying tool, it

is possible to cluster individuals with similar characteristics into groups that are subject to similar factors and processes affecting their poverty and vulnerability (Manjurul K,2006)

1.2 Problem Statement

There have been several donor interventions in improving community livelihoods in Africa. A lot of the donor projects in rural livelihood enhancement assume that rural communities lack the capacity and skills for creating wealth, jobs, and incomes for a decent quality of life.

Community groups such as those involved in aquaculture can play an important role in sustaining livelihoods and reducing poverty in rural Africa. Many of these groups collapse without donor support, because of subsidies provided to the groups during the implementation of the projects. This support often ceases after the completion of the projects. Without adequate provision for the sustainability of the livelihood intervention projects, the local businesses which were thriving during the lifetime of the project often collapse after the completion of the donor projects.

The use of subsidies results in groups becoming dependent on donors. It is therefore important that the groups can build up trust and cooperation based on long- term learning processes, simple flexible rules established by members, the ability to enforce rules and allowing people to manage their own business and income.

There is limited knowledge about the relationship between donor projects in livelihood enhancement for rural community members and the actual impact the projects have on the quality of life of the intended beneficiaries. Project implementers normally undertake self-assessment of the performance of their projects and arrive at a conclusion of effectiveness with very little independent judgement of project results. Even when independent external evaluators are engaged, the findings of some of the evaluations are compromised. The issue of project sustainability, efficiency and Value for Money which are part of international best practice for evaluation and project assessment is normally downplayed leading to temporary achievement of project results.

Donor projects are characterized by certain features such as aligning the project objectives to the overall objectives of the donor and not that of the local government. This has implications for coherence in terms of how they complement other local projects to achieve the bigger objective of the local government, as well as relevance to local needs which are normally determined by a comprehensive needs assessment.

Timeframes of most donor projects are determined by the donors and not the project beneficiaries, When the timeframe for project implementation comes to an end, they are often not extended to fully

achieve its intended objectives. If all project activities are not implemented by the end of the project, the communities are abandoned without effective sustainability strategies aimed at adoption or replication.

Donor funded livelihood enhancement projects are often designed broadly to cover several countries with similar or the same expected deliverables, outcomes and timelines and are therefore not context specific. For example, Global Affairs Canada, Local Economic Development project implemented through International Finance Corporation in Ghana, involves Cote d'Ivoire, Sierra Leone and Kenya. Owing to the non-alignment of these projects to the local context, the projects ended in all countries around the same time even when others have not fully completed all their activities.

These projects are often implemented through foreign/local consortiums who are profit minded and are inclined to allocate a greater part of the project funding to staff emolument to the detriment of the target beneficiaries. When evaluation is conducted by the funders and findings indicate that much of the money meant for the project was spent on overheads instead of project activities, the project is deemed not value for money and often terminated before their planned end date.

Assessing impacts is just one aspect of a very large number of issues considered during evaluations but most of the evaluations only concentrate on assessment of impact. Other important considerations in evaluation include the relevance, efficiency and effectiveness of programme/project design and implementation, as well as sustainability. As a result, impacts are often inadequately dealt with in evaluation reports, especially because they may be more problematic to assess than other evaluation questions.

Many programmes fail to specify indicators and related baseline data at their inception, making the measurement of success problematic. This is often explained by the difficulty in obtaining such data (both before and after programmes), and the failure to plan detailed evaluations as part of a Monitoring and Evaluation Plan prior to programme commencement. Only by doing so can the necessary steps be taken to ensure that the inferences made in evaluations are robust and valid.

The evaluation of donor funded livelihood interventions, particularly in the aquaculture sector, is riddled with some inherent challenges and issues which require further studies and recommendations for improvement. These major evaluation concerns include the following:

i. A comparison of the intended and claimed impacts/outcomes in various evaluations show that in many cases the intended objectives described are different from the actual impacts and objectives reported. It is almost always the result, not of unintended positive impacts, but of evaluators assessing and writing about impacts that are different from those originally intended. This is

sometimes explained by a lack of clarity in the intended objectives of the programmes. It is also due to evaluators finding it easier to assess and describe outcome benefits, than impact/goal level benefits.

ii. Determining the extent of correlation vs. causation, and the validity of inferences made in evaluations, is also strongly determined by the type of evaluation methodology used. Most evaluations do not include the use of control groups, thus limiting the confidence that can be had in inferences made about the changes measured.

iii. Clearly stating the intended or expected results of development assistance in evaluation reports is important in assessing whether programmes can be deemed to have achieved what it was set out to achieve. There is often a tendency for programme design documentation to be more specific about activities and outputs, than outcomes and impacts, resulting in a failure of many evaluations to be able to clearly state the intended impacts and outcomes.

iv. Donor organizations may have a vested interest in seeing evaluations that report positively on their activities. Such vested interests may compromise the integrity of the evaluations completed, irrespective of whether they are self-assessments or evaluations that are contracted out to consultants/third parties.

v. Methodologies required to complete rigorous evaluations can be complex, requiring specialist expertise in evaluation methodology not just in the field of aquaculture. Recent trends towards types of development assistance that are more multi-disciplinary in nature further enhances the requirement for a broad range of skills in evaluation.

vi. Budgets and timeframes provided for evaluations are typically small, thereby compromising the ability of those undertaking them to provide high quality outputs.

vii. Many donors do not conduct programme evaluations but only deal with a project, which is an aspect of the broader programme. Programme evaluations which examine impacts across a range of projects are very important in learning lessons to maximize the impacts of future development assistance.

viii. Most evaluations show strong prominence in intended impacts and outcomes related to economic growth, sustainable livelihoods, poverty alleviation, and human capacity development with relatively minor importance of intended impacts and outcomes related to food security. Given the important contribution that fisheries/aquaculture can make to food security and the fact that food security is a Sustainable Development Goal, it should be accorded a greater prominence in evaluation of aquaculture interventions.

ix. Many programmes fail to adequately discuss the externalities that may cast doubt on the claims made about programme successes, and which also provide contextual information of importance in assessing programme implementation. Readers are left unclear as to the extent to which any changes measured are due to a programme and the extent to which they would have taken place anyway – a problem of correlation as opposed to causation.

x. The time at which evaluations are conducted may have a significant bearing on the results. Some positive benefits may not materialize until some considerable time after a programme has been completed, but waiting to evaluate results also complicates the ability of evaluators to attribute changes to the programme rather than to other external factors.

xi. The causes of success are very wide ranging, and it is not possible to make conclusions about some being more important than others. Common themes include a) the importance of demand-driven programme/project design, b) the use of appropriate technology, c) flexible and high-quality sources of expertise, and d) the importance of long-term donor commitments. Beside these causes, supportive enabling conditions may be crucial to programme/projects achieving their intended objectives.

xii. Parallel to a discussion of the causes of success, and the extent of the positive impacts of development assistance, is a consideration of the sustainability of these impacts. Many of the evaluations lack a proper consideration of the sustainability of the impacts claimed.

xiii. Few evaluations suggest that development assistance results in negative impacts/outcomes. In seeking to find positive impacts most evaluations do not specifically and sufficiently investigate whether negative impacts/outcomes may have resulted, and a focus in evaluations on any distributional changes in incomes resulting from interventions is frequently lacking.

1.3 Rationale of the Research

This study seeks to assess the performance of Aquaculture rural livelihood intervention project funded by British Department for International Development (DFID), now known as Foreign Commonwealth and Development Office (FCDO) through Western Region Coastal Foundation (WRCF) in the Ellembelle and adjoining Districts of Western Region in Ghana.

The research assesses the performance of the various activities under the aquaculture intervention and investigates the reasons for the performance as well as the sustainability of the intervention and the conditions under which the intervention can be absorbed, replicated or scaled-up . It also examines

the project achievements, gaps, lessons learnt, and provides recommendations and best practices to guide future programming of rural livelihood enhancement projects.

Appropriate study, well-targeted towards meeting the needs of the poor with clear impact on people's livelihoods has become a major objective of donors (Cox et al. 1998; Hendry, 2000). It has become widely recognized that income on its own is imperfect as an indicator and that non-monetary variables and the views of the poor need consideration.

Determining the effectiveness alone in terms of how livelihood enhancement projects by donors achieve their intended objectives, typically increased incomes, jobs, and food security, does not constitute comprehensive evaluation according to the OECD criteria for project evaluation. Sustainable rural livelihood intervention projects are expected to fit within the context and align with existing projects promoting similar objectives, as well as institute measures around financial, technical, and institutional sustainability to ensure the continuation of the successes and gains realized during donor support.

Again, efficiency around judicious use of resources time and money and avoiding waste and cost reduction is a critical aspect of evaluation usually overlooked by assessment on livelihood enhancement project.

In this regard, this research is very significant in contributing to knowledge on the holistic assessment of sustainable rural livelihood projects funded by donors. Aquaculture is used as a case to assess the holistic benefits of donor-funded sustainable livelihood enhancement projects. It is also examined in terms of the kind of interventions provided by the donors, such as training, technology, input or market access, or financial access. It is important to ensure that the project design addresses the felt needs of the target population, avoiding a one-size-fits-all approach for different locations with different contexts.

1.4 Objectives of the Study

1.4.1 *General Objective:*

To evaluate the extent to which Donor funded Sustainable Rural Livelihood Enhancement Projects are effective, efficient, coherent, relevant, sustainable, and impactful.

1.4.2 Specific Objectives:

1. Determine the effectiveness of Donor funded sustainable Rural Livelihood projects on rural incomes, job creation and food security.
2. Evaluate the extent to which Donor funded Rural Livelihood Projects are relevant to community.
3. Assess the extent to which Donor funded Livelihood Enhancement Projects are sustainable.
4. Assess the efficiency of Donor led Rural Livelihood Projects
5. Analyze the impact of donor funded sustainable rural livelihood enhancement projects.
6. Evaluate the intervention logic and theory of change of the project and its key assumptions.

1.5 Research Questions

1. To what extent do Donor funded sustainable rural livelihood enhancement projects meet their expected objective of increased incomes, jobs and productivity.
2. To what extent are livelihood enhancement project relevant to community needs?
3. How sustainable are Donor funded rural livelihood enhancement projects?
4. How efficient are donor funded sustainable rural livelihood projects?
5. Are donor funded livelihood enhancement projects coherent with other local economic development projects
6. Are there positive impact of Donor funded Sustainable Rural Livelihood project.

1.6 The Study Area

1.6.1 Location and Size

The Ellembelle District is one of the 261 Metropolitan, Municipal and District Assemblies (MMDAs) in Ghana and forms part of the 14 MMDAs in the Western Region of Ghana.

The district is located at the southern part of the Western Region of Ghana between longitudes 2º 05'' W and 2º 35'' W and latitude 4º 40''N and 5º 20''N covering a total land size of 995.8 Square Kilometres (GSS, 2010 PHC). It is a coastal district sharing boundaries with Jomoro District to the West, Wassa Amenfi West and Amenfi Central Districts to the North, Nzema East Municipal to the East and a 70 km stretch of sandy beaches along the Atlantic Ocean to the south. The district capital is Nkroful which is the birthplace of the first President of the Republic of Ghana, **Osagyefo Dr. Kwame Nkrumah.** The location of the district within the Oil and Gas enclave of Ghana strategically positions it for businesses and other economic activities ranging from farming, services, trading, fishing, mining, oil and gas, tourism to thrive.

The location of the district in Regional and National context is represented in figure 1 below

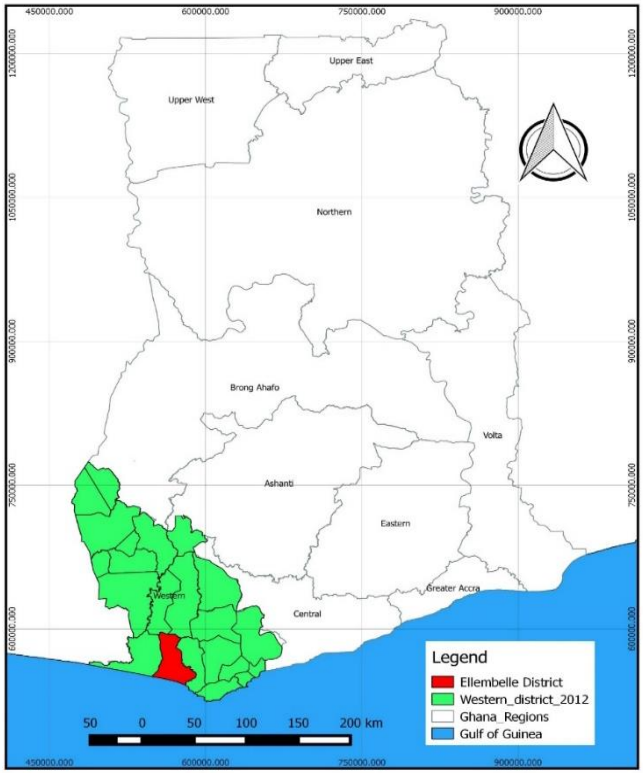


Figure 1 : Elembelle District in National Context

Figure 2: District in the Regional Context

Figure 3**: Map of Ellembelle District**

Even though majority of the fish famer groups interviewed for this research are based in Ellembelle District, other fish farmer groups supported by DFID through Western Region Coastal Foundation (WRCF) and who were also interviewed as part of this study are in Jomoro and Nzema East Districts.

1.6.2 Population size and Density

The district's population, as per the 2021 census, is 120,893 with an almost equal number of males (60,586) and females (60,307). There has been an increase in population from 87,501 in 2010 to 120,893 in 2021. The district covers an area of 999.7 km² and has a population density of 120.9/km² in 2021. The annual population change between 2010 and 2021 is 3.0%. The gender composition is approximately equal, with males accounting for 50.1% and females for 49.9% of the population. The adult literacy rate stands at 72%. About 72% of the population resides in rural areas, while the remaining 28% live in urban areas.

Table 1 : Age Structure of Ellembelle District

Age Cohort	**Population**	**Percentage**
0-14 years	42,807	35.4
15-64 years	73,787	61
65+ years	4,299	3.6

1.6.3 Soil, Vegetation and Agriculture

Some of the soils in the district are acidic and low in nutrient due to high leaching because of the high rainfall in the district. Soil in the District includes clay, loams, sandy loams, loose sands, and alluvial soil. A large deposit of Kaolin could be located around Teleku Bokazo, Salman and Aluku. The soil types support different types of crop and livestock production.

The ferric acrisols type of soil constitute about 98% of the entire land of the district which supports the cultivation of a wide range of crops including cocoa, coffee, coconuts, oil palm, plantain, rubber, and cassava. Due to this characteristic, the district has a comparative advantage in agriculture especially in agro-processing and plantations.

The vegetation of the district is made up of the moist semi-deciduous rain forest in the northern part of the district but turns into secondary forest southwards mainly due to human activities like tree felling and farming. The Coastline, which is about 70km long, is mainly of savanna vegetation (ghanadistricts.com, 2013). The district has several timber species and other non-timber forest products like rattan, bamboo, among others. It also abounds in game and wildlife all of which offer opportunities for resources extraction, tourism and enterprise development.

The district has a rich diversity of fauna and flora, which has the potential of turning the district into a major tourist destination in the country, in particular, and the globe in general, if the needed tourist infrastructure such as good roads, hotels, restaurants and communication facilities are made available. There is therefore a great potential to generate huge revenue from tourism in the district using the forest resources and for this reason; the District Assembly should be supported and encouraged to develop the tourism industry into an investment attraction as an appropriate alternative revenue earner.

1.6.4 Climate

The district lies within the wet semi-equatorial climatic zone of the West African Sub-region. The area experiences an all – year-round rainfall with the highest or maximum monthly mean of rainfall occurring around May and June. Mean Annual rainfall figures range from 26.8mm to 46.6mm. The average temperature in the district is about 29.40^0C with variation in mean monthly ranging between 40^0C to 50^0C throughout the year. The district records high relative humidity figures ranging from 27.6% to 26.6% between May and June and 27.3% to 27.9 during the rest of the year.

The climate of the district is suitable for the cultivation of various crops, both food and cash. The heavy and prolonged rains associated with this type of climate adversely affect cocoa harvest especially drying of the beans and aggravate the black pod diseases that attack cocoa. In addition, all the untarred roads become almost immotorable during the rainy season. The effects of this on the economy of the district are obvious.

The District is affected by serious sea erosion along the beach, stretching from Ankobra community to Atuabo community, flooding in Ankobra community, depletion of the mangroves on the wetlands, endangering species in the sea especially where the Ankobra River enters the sea as a result of the illegal mining (Galamsey) activities in the river, sea weeds, coconut trees are heavily affected due to climate change and activities of the mining companies in the Nkroful Area Council.

The rich natural resources of the district are being degraded because of mining, farming, lumbering, and logging as well as building activities. The climate change stressors that the district is experiencing because of these activities include seasonal variability of rainfall, windstorms, and river and sea flooding. These could be attributed to the activities of timber firms with concessions in the Forest Reserves, bad agricultural practices, unplanned settlements, indiscriminate disposal of waste and illegal mining which pollutes the water bodies especially the Ankobra River have led to changes in the rainfall pattern. Traditional methods of farming which involve slash and burn have led to the depletion of the vegetation cover and increased soil erosion and loss of valuable nutrients.

High amount of rainfall as well as its intensity have affected communities that are found in low lying areas as they are mostly flooded by the Ankobra and Amanzule Rivers which overflow their banks during the raining season. The number of floods recorded in the district increase from 13 to 38 between 2012 and 2017. Windstorms recorded from 2012 to 2017 also increased from 19 to 32.

1.6.5 Relief and Drainage

The district is endowed with several rivers and streams, the most important of which is the Ankobra River with its major tributaries like the Ahama and Nwini rivers. Others like the Ankansa and Draw rivers and their tributaries drain the Northern part and act as boundaries between Ellembelle and Wassa Amenfi West District. The Amanzule River in the south – western part and some other minor rivers and streams also flow throughout the year in the district. These streams and rivers exhibit a dendritic pattern that forms the Ankobra basin. The relief and drainage system favour the development of fish farming and cultivation of valley bottom rice, sugarcane and dry season vegetables. The presence of larger Rivers like the Ankobra has induced commercial fish farming in communities along the Ankobra basin.

1.6.6 Economic activities- Crops/Livestock and Fishing

Farming and fishing are the main occupations of the people in the district. However, small scale mining and trading is carried out in the middle and the northern zones. There are three major market days in the district at Aiyinase (two market days) and Asasetre markets where most food stuffs are sold. Processing and sale of copra oil is also carried out in certain parts of the district.

Cocoa is a predominant tree crop now grown as a result of the devastation of the coconut crop by the deadly lethal yellowing Disease (Cape Saint Paul's wilt Disease). Other tree crops of economic importance include oil palm, robber, and citrus. Major food crops are cassava, plantain, rice, vegetables such as garden eggs, pepper, and tomato. Livestock kept include cattle, sheep and goat, pigs, local poultry and ducks. Marine fishing is the major activity along the coastal belt of the district.

1.7 Outline of the Thesis

The thesis has been divided into five chapters commencing with Chapter 1 that presents the introduction, the background and context of the role of aquaculture in promoting sustainable rural livelihoods.

Chapter 2 presents the literature review including conceptual and theoretical frameworks. Sustainable rural livelihoods, different types, and criteria for evaluation of livelihood projects. Evaluation designs including experimental, quasi experimental and non-experimental evaluations have been discussed.

Various evaluations that have been conducted on donor funded rural livelihood interventions, particularly aquaculture, are reviewed.

The Chapter 3 discusses the case study (DFID Project on aquaculture as a sustainable rural livelihood intervention in the Ellembelle District of Ghana) , the methodology for the research, qualitative and quantitative approaches, sampling, data collection and analysis.

Chapter 4 presents the results and findings derived from the study of the aquaculture project funded by DFID in Ellembelle District of Ghana.

Chapter 5 discusses the findings/results of the study, conclusions, and recommendations.

CHAPTER TWO

2 CONCEPTUAL AND THEORETICAL FRAMEWORKS AND LITERATURE REVIEW

In this study, different concepts, and theories relevant to define the scope, provide guidelines, rationale, and relation between variables of the study are discussed. These concepts and theories define and provide the framework for the research questions, the methodological stance including data collection tools, data analysis, and interpretation.

2.1 Conceptual Framework

The concepts serve as a roadmap to schematize the structure for the study by providing an outline that connects concepts, and theories and depicts presumed relationships among the study variables. The purpose is to serve as a scheme for organizing and categorizing the study and help to develop theories and hypotheses.

In this study relevant concepts include definition and purpose of development evaluation, different types of evaluation of livelihood projects –baseline, midline, endline and impact evaluations as well as experimental, quasi experimental and non-experimental evaluations as well as best practice evaluation criteria such as effectiveness, efficiency, relevance, coherence, sustainability and impact, aquaculture as a livelihood strategy and the types of support provided by donors including training, technology transfer, market and financial linkages, and sustainable rural livelihoods

2.2 Evaluation Concepts

2.2.1 Evaluation Defined

Evaluation has many meanings, "the process of determining the merit, worth, or value of something" According to the standard definition of the Development Assistance Committee (DAC) of the OECD an evaluation is: " a systematic and objective assessment of an ongoing or completed project, program or policy, its design, implementation and results, *a careful and systematic retrospective assessment of the design, implementation, and results of development activities*

Evaluation is a reality test, a learning mechanism that provides feedback on the results of action in relation to prior objectives, plans, expectations, or standards of performance. It covers both assessments of ongoing and completed projects/activities.

An interim evaluation is an evaluation of activities in progress. End-of-project evaluation is an evaluation that is carried out when an activity is completed. An ex-post evaluation is carried out at

some later point in time after the project has ended. Ex-ante, evaluation a priori or baseline evaluation is undertaken before the actual start of the project as a benchmark for comparing assessing changes brough about by the project.

A process evaluation deals with the planning and implementation of an activity as well as with outputs and other intermediary results. An impact evaluation, by contrast, is concerned with the effects, outcomes, and impacts. Interim evaluations are mainly process evaluations, whereas end-of-programme evaluations and ex post evaluations focus on effects.

An important component of credibility of development evaluation is independence. The OECD/DAC glossary defines an independent evaluation as "an evaluation carried out by entities and persons free of the control of those responsible for the design and implementation of the development intervention" (OECD 2002, p. 25). It notes: The credibility of an evaluation depends in part on how independently it has been carried out. Independence implies freedom from political influence and organizational pressure. It is characterized by full access to information and by full autonomy in carrying out investigations and reporting findings. It is conducted by people who are not beholden to those who designed and implemented the intervention.

Consider whether the theories, approaches, questions, and criteria as well as the data collection and analysis, and sharing of results reflect the context and traditions of the society in which the evaluation is implemented. Take care that the assessments and conclusions are accurate and credible across the range of cultural contexts, and respectful of the diversity of perspectives. Ascertain the meaning of 'success' – of that which is being evaluated, or of the evaluation - where stakeholder perspectives on the issue might differ.

2.2.2 Purpose of Evaluation

Ultimately, the purpose of any evaluation is to provide information to decision makers to enable them to make better decisions about projects, programs, or policies. Evaluation should help decision makers understand what is likely to happen, is happening, or has happened because of an intervention and identify ways to obtain more of the desired benefits.

Evaluation helps answer questions about interventions such as the following:

i. What are the impacts of the intervention?
ii. Is the intervention working as planned?
iii. Are there differences across sites in how the intervention is performing?
iv. Who is benefiting from this intervention?

> People benefit from interventions in different ways. Some benefit directly. Others are indirect beneficiaries—people who are not involved in the intervention but nonetheless reap benefits from it. Some interventions yield short-term benefits; others provide benefits over the long term[8]

Evaluations provide feedback on the results of action regarding prior objectives, plans, expectations, or standards of performance. The main purpose of evaluation is to improve accountability and learning.

Accountability describes a relationship which exists between an agent and a principal where the agent is required to report back to the principal about the implementation and results of tasks assigned. Accountability consists of the agent's answerability to the principal, and the power of the principal to initiate remedial action or impose sanctions in case the agent fails to carry out his obligations as they have been agreed.

Financial accountability refers to answerability for the allocation, disbursement and utilization of funds, and performance accountability concerns results.

Evaluation provides information for reporting about performance and results but is less concerned with financial accountability, which is mainly the function of auditors and accountants.

Evaluation for accountability tries to find out if and to what extent the intervention has achieved the results that it was intended to achieve.

Evaluation for learning produces substantive ideas on how to improve the activities and translate new knowledge into better practice. Evaluations that are primarily meant to contribute to learning are often called formative evaluations, whereas evaluations for accountability are described as summative evaluations.

2.2.3 Evaluation methodologies and approaches

The evaluation methodology allows evaluators to specify the overall approach to the evaluation, which can be (quantitative, qualitative, or mixed), what types of data will be collected the methods that will be used to collect the data, and how the collected data will be analyzed.

A good evaluation methodology guarantees rigor in the evaluation process and produces reliable data that enables the evaluators to make accurate assessments and provide sufficient response to the evaluation questions.

It should make explicit the evaluation criteria and questions, the methodological approach to the evaluation (methodology design), data types and sources, methods including sampling, tools and data collection process, and data analytical methods.

The evaluation methodology is developed after confirming the evaluation question. It should clearly explain the rationale for the evaluation design, data collection methods, sampling, and analytical methods, proving that it is appropriate for the context and purpose of the evaluation and can generate valid findings from a reliable and credible evidence base.

The evaluation methodology is selected according to the criteria and questions to be addressed, the evaluation subject and its context.

2.2.4 Types of evaluation questions

Evaluation questions can be categorized under

a. **Descriptive questions**: These questions focus on a particular area and require a descriptive response, for example: 'Were recipients of the intervention satisfied with the level of service provided; why they used or did not use services; did women receive different services to their male counterparts.
b. **Normative questions**: These questions assess performance against a specific criterion, for example: 'has specified goal, target or standard, as set out in the Project Document been reached?
c. **Cause and effect questions:**

   These questions ask what changes occurred as a result of the intervention, what would have happened had the intervention not been implemented. These questions require an understanding of the situation in the absence of the intervention i.e. counterfactual

2.2.5 Evaluation matrix

The Evaluation Matrix, also called, an Evaluation Framework, is the main analytical framework for an evaluation. The matrix sets out how each evaluation question and evaluation criteria will be addressed. It breaks down the main questions into sub-questions, mapping against them data collection and analysis methods, indicators or/and lines of inquiry, data collection tools and sources

of information. This provides a clear line of sight from the evaluation questions as defined at the start of the evaluation to the findings as outlined in the final evaluation report.

It serves as an organizing tool to help plan the conduct of the evaluation, indicating where secondary data will be used and where primary data will need to be collected. It guides analysis, ensures that all data collected is analyzed and triangulated and supports the identification of evidence gaps.

The Evaluation matrix is developed by the Evaluation Team once evaluation questions are reviewed and confirmed and available secondary sources are taken into consideration/compiled and quality checked, in line with the focus of the evaluation questions. The Evaluation Manager (EM) should ensure that the evaluation team is using and following the agreed evaluation matrix throughout the data collection and reporting phases to guide data collection, analysis and report writing.

When developing the evaluation matrix it is important to understand how different methods and types of data will be combined to answer different questions, how different data sources will be used to answer the same evaluation question, and how any triangulation will be undertaken.

Table 2: Evaluation Matrix

Question 1 e.g. How appropriate was the intervention					**Criterion: Relevance**
Sub-questions	**Indicators**	**Data Collection Methods**	**Main Sources of data/ Information**	**Data Analysis Methods/ Triangulation**	**Data availability/ reliability**
Evaluation questions and sub-questions should apply to the evaluation objectives or purpose. They should relate to the overarching evaluation question and be developed at a level that is helpful to provide direction to the evaluation, and not to a level for a questionnaire / field instrument. e.g. Were the interventions training and technical support appropriate to the needs of the target group	The indicators determine how performance or progress is judged for each sub-question. Indicators should be realistic in terms of data collection within the scope of the evaluation indicators should be clear and measurable qualitatively or quantitatively and correspond to the evaluation question or sub-question	It covers the detailed data collection methods to be used to collect the required data for each question. This can include quantitative beneficiary surveys; key informant interviews; desk review etc. Data collection should be systematically mapped back to the evaluation questions that were asked	Specifies where the evaluation team will get data to answer each question. This is critical to informing the evaluation design e.g. Data from key Informant interviews with partners, Ministry representatives, donor representatives Data from beneficiary focus groups (held separately with women and girls' beneficiaries	Specifies how all data that is collected is analysed to answer the evaluation questions. It helps to avoid collecting data that is not useful, and clearly shows how data is triangulated. This can include regression analysis, statistics, qualitative analysis. Analytical methods should be appropriate to use for the given data that is collected.	Strength of evidence for each evaluation question. Can be recorded as colour coding (green/ amber/red); or numerically (3=strong, 2=fair, 1=weak), or with narrative descriptors (strong,

2.2.6 Evaluation Question for each evaluation criteria

The evaluation questions should be developed in line with the purpose and objectives of the evaluation. The appropriate criteria for the evaluation will need to be selected in alignment with the evaluation questions. The evaluation questions should be designed to give evaluation users the information they need to make strategic and/or operational decisions, take action, or learn from the intervention.

Good evaluation questions should be:

i. **Well-defined and specific to the timing, objectives of the evaluation,** how the evaluation findings will be used, and by whom. For example, an evaluation primarily seeking to inform replication of an intervention in a new context will have different questions from an evaluation that asks whether the intervention covered all vulnerable groups, or whether an intervention was cost-effective.

ii. **Drawn from the intervention Theory of Change** (ToC), to ensure specificity to the context and the intervention logic.

iii. **Go beyond assessing if intended results were achieved** by seeking to explain why and how the project achieved or did not achieve its results, to promote lesson-learning.

iv. **Relevant to the intervention and to users' needs.** An evaluation might also ask additional important evaluation questions that are outside the framework (for example, on equity and human rights).

v. **Prioritized, given that evaluations are limited in time and resources.** A few strategically designed and well-defined evaluation questions are better than many questions that may duplicate or contradict each other.

Table 3: Using the International Evaluation Criteria to develop evaluation questions.

Criteria	Analysis of	Potential Evaluation Questions
Relevance	Relevance of the intervention design to the needs and priorities of the target groups. Continued relevance of the objectives over the life of the intervention, or its ability to adapt to new needs if circumstances change. Alignment and coherence with government, partners, donors' policies and interventions; Consistency of intervention design and logic. Extent to which design and implementation were gender-sensitive, based on gender analysis, and addressed diverse needs.	To what extent: Was the design of the intervention relevant to the wider context? Is the intervention in line with the needs and priorities of the most vulnerable groups (men and women, boys and girls) Is the intervention design and objectives aligned with the needs of the government? Was the intervention based on a sound gender analysis?

	Extent to which the design and implementation of the intervention were sensitive to the capacities in place.	Was the design and implementation of the intervention gender-sensitive? Did the design and implementation of the intervention consider the available capacities
Coherence	Contextual factors and how they influenced the design/ implementation of the subject. The extent to which other interventions (particularly policies) support or undermine the intervention, and vice versa. The synergies and interlinkages between the intervention and other interventions carried out by the same institution/government, as well as the consistency of the intervention with the relevant international norms and standards to which that institution/government adheres (internal coherence). The consistency of the intervention with other actors' interventions in the same context (external coherence). This includes complementarity, harmonization and co-ordination with others, and the extent to which the intervention is adding value while avoiding duplication of effort	To what extent were context factors (political, economic, social stability/instability etc.) considered in the design and delivery of the intervention? To what extent was the intervention coherent with policies and programmes of other partners operating within the same context? What have been the synergies between the intervention and other interventions implemented by the same organization ?
Efficiency	Costs per recipient for different implementation mechanisms Timeliness of delivery, compliance with intended timeframes or budgets, comparison of channels of delivery Comparison of different institutional arrangements (e.g., continuity of supplies and use of local partners / systems / procurement where feasible).	Was the intervention cost-efficient? Was the intervention implemented in a timely way? Was the intervention implemented in the most efficient way compared to alternatives? Did the targeting of the intervention mean that resources were allocated efficiently
Effectiveness	Achievement of objectives (or likelihood that the objectives will be achieved), taking account of the relative importance of the objectives or results.	To what extent were the outputs and outcomes achieved (likely to be achieved)?

	Main results including positive, negative, intended and unintended outcomes. Outputs and outcomes for men, women, boys and girls, and other relevant socio-economic categories. Potential constraints and facilitating factors to achievements.	What major factors influenced the achievement or non-achievement of the outcomes? Were there unintended (positive or negative) outcomes of assistance for participants and non-participants? Is the achievement of outcomes leading to/likely to lead to meeting intervention objectives? What major factors influenced this? Were results delivered for men, and women, boys and girls? Were relevant assistance standards met?
Impact	The extent to which the intervention has generated or is expected to generate significant positive or negative, intended or unintended, higher-level effects (e.g. holistic and enduring changes in the systems or norms, and potential effects on people's well-being, human rights, gender equality and the environment). The ultimate significance and potentially transformative effects of the intervention (e.g., social, environmental, and economic effects that are longer term or broader in scope than those that are already captured under the effectiveness criterion).	Did the intervention contribute to long-term intended results? What were the effects of the intervention on participants' lives (intended and unintended)? Did a specific part of the intervention achieve greater impact than another? Were there impacts on institutions? Was there any gender-specific impacts? Did the intervention influence the gender context?
Sustainability	Capacity building/development results. Institutional/systemic changes. Integration of intervention elements into national systems and processes. The financial, economic, social, environmental, and institutional capacities of the systems needed to sustain net benefits over time.	To what extent did the intervention implementation consider sustainability, such as capacity building of national and local government institutions, communities and other partners? To what extent did the benefits continue after the project work completed,

	Resilience, risks and potential trade-offs	To what extent is it likely that the benefits of the intervention will continue after the project is completed? Has the intervention made any difference to gender relations in the medium or longer term?

2.2.7 Different approaches to evaluation designs

2.2.7.1 Experimental

Evaluators face two broad challenges, namely, measuring the expected results from an intervention and attributing those results to the activities of the intervention. Experimental evaluation designs aim to address both challenges. These designs typically measure both the baseline and the results associated with an intervention and, by incorporating a counterfactual (e.g., A comparison group), can assess the causal link between the intervention and the observed results.

Experimental methods are research designs in which the researcher explicitly and intentionally induces exogenous variation in the intervention assignment to facilitate causal inference. Experimental methods typically include directly randomized variation of programs or interventions9

In this approach, a treatment and control group is randomly selected at the time of the intervention design. The control group is a group of non-recipients with the same attributes as a group targeted for support. The random assignment allows assessment of the impact of the intervention with high levels of validity. This approach requires high level of resources, implementation fidelity and specialized skills and evaluation must be designed at the start of the intervention. The random assignment of control groups may have some ethical issues, if a group is deliberated excluded and sacrificed on evaluation rigor and impact assessment.

Example, a randomized controlled trial (RCT) is an experimental method of impact evaluation in which all eligible units in a sample are randomly assigned to treatment and control groups. The treatment group receives or participates in the program being tested, while the control group does not. An RCT ensures that the control and treatment groups are equal in both observed and unobserved characteristics, thus ruling out selection bias. The only difference between the treatment and control

groups, then, is their participation in the intervention itself, and the difference in their outcomes therefore represents the impact of the intervention or program.

2.2.7.2 Quasi-experimental Design

Quasi-experimental methods are research designs that aim to identify the impact of a particular intervention, program, or event (a "treatment") by comparing treated units (households, groups, villages, schools, firms, etc.) to control units. While quasi-experimental methods use a control group, they differ from experimental methods in that they do not use randomization to select the control group

This is called 'natural comparison group, which is not deliberately pre-selected but is sufficiently like the group receiving the intervention in order for comparisons to be made. This approach requires the same level of skills as the experimental in terms of analysis but does not necessarily have to have been designed at the time of the intervention. For example, Propensity score matching (PSM) is a quasi-experimental method in which the researcher uses statistical techniques to construct an artificial control group by matching each treated unit with a non-treated unit of similar characteristics. Using these matches, the researcher can estimate the impact of an intervention. Matching is a useful method in data analysis for estimating the impact of a program or event for which it is not ethically or logistically feasible to randomize

The difference-in-differences method is a quasi-experimental approach that compares the changes in outcomes over time between a population enrolled in a program (the treatment group) and a population that is not (the comparison group). In comparing the same group to itself, the first difference controls for factors that are constant over time in that group. Then, to capture time-varying factors, difference-in-differences takes the before-after difference in the control group, which was exposed to the same set of environmental conditions as the treatment group. This is the second difference. Finally, difference-in-differences "cleans" all time-varying factors from the first difference by subtracting the second difference from it. This leaves us with the impact estimation – or the difference-in-differences.

Steps in calculating Difference in Difference

- Calculate the before-after difference in the outcome (Y) for the treatment group (B-A).
- Calculate the before-after difference in the outcome (Y) for the comparison group (D-C)

- Calculate the difference between the difference in outcomes for the treatment group (B-A) and the difference for the comparison group (D-C). This is the difference-in-differences: (DD)=(B-A)-(D-C).

Regression Discontinuity Design (RDD) is a quasi-experimental impact evaluation method used to evaluate programs that have a cutoff point in determining who is eligible to participate. It allows researchers to compare the people immediately above and below the cutoff point to identify the impact of the program on a given outcome. In RDD, assignment of treatment and control is not random, but rather based on some clear-cut threshold (or cutoff point) of an observed variable such as age, income, and score. Causal inference is then made comparing individuals on both sides of the cutoff point.

Two main conditions for Regression Discontinuity Design

- A continuous eligibility index: a continuous measure on which the population of interest is ranked (i.e. test score, poverty score, age).
- A clearly defined cutoff point: a point on the index above or below which the population is determined to be eligible for the program. For example, students with a test score of at least 80 of 100 might be eligible for a scholarship, households with a poverty score less than 60 out of 100 might be eligible for food stamps, and individuals age 67 and older might be eligible for pension. The cutoff points in these examples are 80, 60, and 67, respectively. The cutoff point may also be referred to as the threshold.

2.2.7.3 Non-experimental

These approaches do not require the use of counterfactual groups. Normative and cause and effect questions can be addressed by examining the situation prior to the intervention as the baseline scenario, and comparing it with the situation at the time of evaluation. Plausible causal links between the intervention and the observed changes are identified. This approach heavily relies on documentation that shows the logic of the design, the theory of intended change or change pathways, then implementation processes and recorded results. Where there is weak documentation evaluators have to find ways of reconstructing them through discussions and recalls from respondents and stakeholders.

2.2.7.4 Quantitative, Qualitative, and mixed methods

Quantitative methods consist of counts or frequencies, rates or percentages, or other statistics that document the actual existence or absence of problems, behaviors, or occurrences. This data can yield representative and generalizable information depending on how it was collected.

Qualitative methods can be equally objective and systematic, but the data produced are most often presented in textual form. Qualitative methods often explore 'how, why and what questions.

Mixed-method evaluation systematically integrates two or more evaluation methods, potentially at every stage of the evaluation process, usually drawing on both quantitative and qualitative data. Mixed-method evaluations may use multiple designs. They also may include different data collection techniques. In short, a mixed-method evaluation involves the systematic integration of different kinds of data, usually drawn from different designs.

Table 4: Tools for each Evaluation Method

Evaluation Method	Tools	Description
Quantitative methods	Questionnaires	Questionnaires ask 'closed' questions, often focusing on pre- and post- an intervention, and therefore relying on recall of the respondents.
	Use of quantitative records/ databases	Secondary information from existing databases/in records such as Monitoring or financial data. Requires the development of a structured data collection instrument, and relevant software
Qualitative methods	Key informant or individual interviews	Interviews with individuals, usually applying semi-structured interview schedule. These are often the main form of primary data collection, involving interviews with partners (Government, donors, community leaders). The range of interview targets is informed by the stakeholder analysis
	Focus groups	Interviews with groups, usually following a semi-structured format but with scope for open dialogue. To gain the opinions and views of as many members of the focus group as possible, participatory approaches and tools are used where appropriate. Recipients and non-recipients of assistance are often interviewed through focus groups
	Stories / life histories	Collecting narratives from individuals such as recipients of assistance about their experiences
	Diaries, journals	Used to gather in-depth information about events in everyday life, and have to be planned from the start.

Mixed Method –depending on the type data generated	Survey	Can use purely 'closed' questions (quantitative) or combine closed questions with open ended questions (qualitative).
	Observation	Can be used quantitatively through a coded checklist to record events, behavior etc. Observation can be obtrusive (participants are aware of what the evaluator is doing), unobtrusive (no-one knows that the evaluator is there and what they are doing). Can also be used qualitatively and/or through a participatory approach, in order to generate an in-depth account of the experience
	Report cards	It is used to gather information on how a beneficiary has experienced a particular event or Can be used to collect quantitative information (e.g., how frequently, how satisfied) or qualitative information (describing the experience). Usually relies on literate informants.

2.2.7.5 Data types and sources – primary and secondary

Data can be gathered from either primary or secondary sources.

Secondary data is information that is already available, having been collected by someone else for other purposes prior to the start of the evaluation. It is usually in the form of written documents or datasets and can be either internal or external. Any evaluation requires some level of existing data.

A summary of key secondary data sources should be provided in the evaluation ToR. Evaluation teams should undertake some secondary data collection and analysis prior to finalizing the overall evaluation methodology during the inception phase, as it can provide useful contextual and overview information and thus inform the development of a methodology that is appropriate to the evaluation needs and subject.

Secondary data provides useful information regarding the context, for example through: relevant national indicators, policies and strategy documents; national partner/government plans, strategies and programmes; country studies and other information.

It usually provides information about the baseline scenario, for example through baseline studies, baseline indicators in Standard Project Reports, Vulnerability Analysis and Mapping reports and national datasets from prior to the intervention.

Important secondary data sources include monitoring data collected during the programme implementation cycle; operational reports, Standard Project Reports and previous evaluations or reviews reports.

Primary data is collected directly by the evaluation teams for the purpose of answering the evaluation questions. Primary data sources provide more in-depth exploration of results achieved (both intended and unintended) by the intervention and the contextual factors that contributed to the achievements. It has an advantage of providing information collected specifically for the purposes of the evaluation – rather than having been gathered for other reasons.

Table 5: Primary data sources and descriptions

Primary data source	**Description**
Data from semi structured interviews/Key Informant Interviews	Data generated from person-to-person interviews following a pre-determined list of questions, with some room for flexibility of discussion.
Expert information	Data gathered from experts related to specific technical areas covered by the evaluation.
Focus group data	Data gathered from small group interviews (e.g. 6 to 10 participants) for in-depth exploration of specific areas.
On-site observation records	Generated from visits to operational activities and/or project sites to make and record observations.

Survey/ questionnaire data	Data gathered from a standardized list of questions administered to stakeholders

2.2.7.6 Sampling

It is not usually possible to interview all stakeholders or visit all relevant field sites of an intervention during the evaluation. Therefore, for each data collection method employed, a subset of sites, documents and stakeholders must be selected following a clearly developed sampling framework/approach.

The overall sampling framework should describe the characteristics of the sample selected for interrogation, how the sample has been selected, how representative it is of the overall population relevant to the evaluation subject, and any limitations that the sampling approach might present.

The specific rationale for selection should be made explicit in the evaluation methodology section of the inception report. The rationale can include logistical constraints, for example access issues, but the evaluation team should still ensure that the sample is sufficiently representative of the wider population relevant to the evaluation. For example:

A sample of beneficiaries should include both men and women, and marginalized and vulnerable groups where appropriate, as well as a mix of different activities if the intervention being evaluated is an operation with more than one type of activity

Samples for qualitative methods are often selected purposively – that is, to make sure that the sample composition contains examples of all the different types of activities/contexts being evaluated. If a sample is not representative, wrong conclusions may be drawn about the larger population.

The sample size should also be considered carefully. While it needs to be realistically based on the resource and time constraints of the evaluation, it must be large enough to ensure that there is sufficient representation of activities/contexts.

The term “sample” refers to the portion of the population that enables us to draw inferences about the population. So, the sample size must be adequate to make meaningful inferences. It is the minimum size needed to estimate the true population proportion with the required margin of error and confidence level.

Sample size formula helps to calculate or determine the minimum sample size, which is required to know the adequate or correct proportion of the population, along with the confidence level and the margin of error.

Understanding the appropriate sample size is essential since one may use it to validate research findings. The equation can be obtained utilizing population size, the normal distribution critical value, sample proportion, and margin of error.[10]

The sample size for quantitative methods may be determined by the need for statistical validity and will depend to some extent on the level of homogeneity across the target population. A larger sample size reduces sampling error, which is the likelihood that if another sample of the same size were selected, the results would be different.

How to Calculate Sample Size (Step by Step)

Step 1: Determine the population size, which is the total number of distinct entities in your population, denoted by N. In case the population size is very large, but the exact number is not known, use 100,000 because the sample size doesn't change much for populations larger than that.

Step 2: Determine the critical value of the normal distribution at the required confidence level. For example, the critical value at 95% confidence level is 1.96.

Step 3: Determine the sample proportion which can be used from previous survey results or be collected by running a small pilot survey. If unsure, one can always use 0.5 as a conservative approach, and it will give the largest possible sample size.

Step 4: Determine the margin of error, the range in which the true population expects to lie. The Smaller the margin of error, the more is the precision and hence the exact answer.

Step 5: The sample size equation can derive by using population size (Step 1), the critical value of the normal distribution at the required confidence level (Step 2), sample proportion (Step 3), and margin of error (Step 4)

Sample Size Formula for Proportions:

- This formula helps estimate the minimum sample size needed to estimate the true population proportion with a required margin of error and confidence level.

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1-p)}{e^2 \cdot (N-1) + Z^2 \cdot p \cdot (1-p)}$$

- Where:
  - (n) represents the sample size.
  - (N) is the population size.
  - (Z) is the critical value of the normal distribution at the desired confidence level.
  - (p) is the estimated sample proportion.
  - (e) is the margin of error.

Slovin's Formula:

Slovin's Formula provides the sample size ((n)) using the known population size ((N)) and the acceptable error value ((e)):

$$n = \frac{N}{1 + Ne^2}$$

Random Sampling Formula:

If (P) represents the probability of getting a sample selected only once, (n) is the sample size, and (N) is the population size, then:

$$P = 1 - \frac{N-1}{N}$$

Once the required sample size to achieve statistical validity is known, the sample is selected following the selected sampling approach i.e., random, systematic or cluster sampling.

2.2.7.7 Data Analysis

Once data has been collected using an appropriate method, data must be analyzed and synthesized. This is a systematic process of organizing and classifying the information collected, tabulating it, summarizing it and generating findings against the evaluation questions and criteria, from which findings, conclusions and recommendations to respond to the evaluation questions can then be drawn. Data analysis seeks to detect patterns in the evidence to help answer the evaluation questions. This

can be either through identifying specific individual findings (analysis) or combining sources of information to provide a broader understanding (synthesis).

A plan for analysis, including general and specific techniques that will be applied to different data sets for analysis and synthesis, should be clearly articulated in the evaluation methodology.

For qualitative data, normally, in narrative form, an analytical matrix might be useful to summarize data from multiple sources and facilitate triangulation and synthesis. Qualitative data analysis software can also be employed.

For quantitative data, various statistical methods and related software packages can be applied, as appropriate.

As part of the analysis, focusing on particular case studies (e.g. selected activity types or project sites) can provide a more comprehensive picture of specific aspects of an intervention. The detailed analysis involved in constructing a case study can provide a more in-depth understanding of the specific processes, at a level which may not be possible across the whole of the evaluation subject. It can also allow for cross examination between different case studies.

Specific methods may be employed for analyzing the cost-efficiency and cost-effectiveness of an intervention. Cost-efficiency is the analysis of the extent to which the intervention has converted or is expected to convert its resources/inputs (such as funds, expertise, time, etc.) economically into results in order to achieve the maximum possible outputs. This analysis identifies the most efficient alternatives in achieving intended outputs.

Cost-effectiveness analysis is a method of comparing the costs and benefits of an intervention.

When considering the response to cause-and-effect questions, causal links between the intervention and observed changes should be established as far as possible. Identifying these causal links ideally allows attribution of results to the intervention. However, it is appropriate, particular higher up the logic chain (i.e. when considering outcomes and impacts of interventions) to discuss contribution rather than attribution. This involves plausible explanation rather than clear 'proof 'of causal links.[11]

Triangulation of data

Mixed methods permit triangulation across different data sources and collection methods. For example, interview responses from project staff can be cross-checked with feedback from project

[11] 8 http://siteresources.worldbank.org/EXTGLOREGPARPROG/Resources/grpp_sourcebook_chap11.pdf

beneficiaries gained during focus groups, and further validated through observations made during site visits and/or secondary data sources.

Employing triangulation during the analysis strengthens the evidence base and confidence in the findings presented, thus improving credibility.

Information from a less reliable source that does not triangulate with information from other data sources, for example, may be discounted.

2.2.7.8 Sustainable Rural Livelihoods

The term livelihood attempts to capture what people do in order to make a living, the resources that provide them with the capability to build a satisfactory living. It also involves the risk factors, the institutional and policy context that either helps or hinders them in their pursuit to improve living (Ellis, 2003). According to Ellis (2003) resources are referred to assets or capitals and are often categorized between five or more different asset types owned or accessed by family members: human capital (skills, education, health), physical capital (produced investment goods), financial capital (money, savings, loan access), natural capital (land, water, trees etc.), and social capital (networks and associations).

The concept of livelihood describes more complex and diverse strategies for living than what is meant by employment (Chambers & Conway, 1991). According to Haan & Zoomers (2003), a livelihood is about individuals, households, or groups making a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, and responding to new opportunities.

Livelihoods perspectives start with how different people in different places live. A variety of definitions are offered in the literature, including, for example, 'the means of gaining a living' (Chambers 1995, vi) or 'a combination of the resources used and the activities undertaken in order to live'[12]

The word Livelihoods can be attached to all sorts of other words to construct whole fields of development enquiry and practice. These relate to locales (rural or urban livelihoods), occupations (farming, pastoral or fishing livelihoods), social difference (gendered, age-defined livelihoods),

directions (livelihood pathways, trajectories), dynamic patterns (sustainable or resilient livelihoods) and many more.[13]

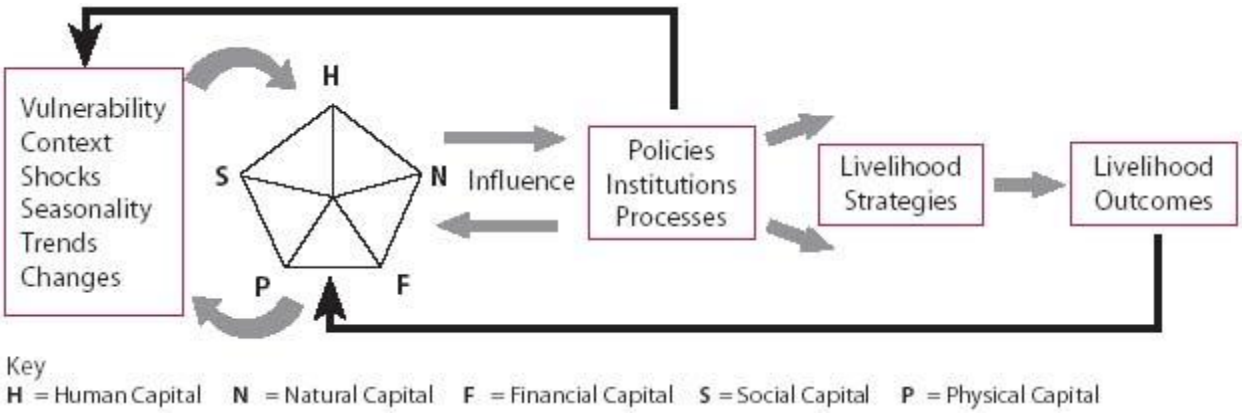
The term ‘sustainability’ entered the lexicon in a big way following the publication of the Brundtland report in 1987 (WCED 1987) and became a central policy concern with the UN Conference. The connection of the three words ‘sustainable’, ‘rural’ and ‘livelihoods’ as a term denoting a particular approach was possibly first made in 1986 in a hotel in Geneva during the discussion around the Food 2000 report for the Brundtland Commission, involving M.S. Swaminathan, Robert Chambers and others, which laid out a vision for a people-oriented development that had as its starting point the rural realities of poor people (Swaminathan et al. 1987).

In 1992, Chambers and Conway produced a working paper for the Institute of Development Studies which define livelihood as

‘A livelihood comprises the capabilities, assets (including both material and social resources) and activities for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base.”(Scoones (1998), Carney et al. (1999). The two authors saw the important links between their respective concerns with ‘putting the last first’ in development practice and agro-ecosystem analysis and the wider challenges of sustainable development.

The Sustainable Livelihoods Framework is a tool for understanding how household livelihood systems interact with the outside environment - both the natural environment and the policy and institutional context[14]

Figure 4: Understanding the Sustainable Livelihoods Framework



Overview of the Sustainable Livelihoods Framework

The left-hand section of the figure shows how the **vulnerability context** impacts on the **livelihood assets** of rural people - denoted by a pentagon. Livelihood **assets** are also influenced by outside **policies**, **institutions** and **processes**. **Livelihood strategies** of different categories of households are shaped by their **asset base** and by the **policy and institutional context** in which they live. **Livelihood outcomes** of several types of households are influenced by the **vulnerability context** - people's exposure to unexpected shocks - and their ability to withstand the shocks, which depends on their **asset** base.

Five concepts are crucial for understanding the linkages within the framework:

- the vulnerability context
- livelihood assets
- institutions
- livelihood strategies
- livelihood outcomes

The **vulnerability context** refers to unpredictable events that can undermine livelihoods and cause households to fall into poverty. Some of these factors are fast acting (such as earthquakes) and others are slower acting (such as soil erosion), but both can undermine livelihoods. It is important to distinguish between shocks originating from outside the community, which affect all people in the same locality, and idiosyncratic shocks that principally affect only individual households.

Vulnerability context

- **Weather-related shocks and natural calamities:** drought, earthquakes, hurricanes, tidal waves, floods, heavy snow, early frost, extreme heat or cold waves
- **Pest and disease epidemics:** insect attacks, predators and diseases affecting crops, animals and people.
- **Economic shocks:** drastic changes in the national or local economy and its insertion in the world economy, affecting prices, markets, employment and purchasing power
- **Civil strife:** war, armed conflict, failed states, displacement, destruction of lives and property
- **Seasonal stresses:** hungry season food insecurity
- **Environmental stresses:** land degradation, soil erosion, bush fires, pollution and
- **Idiosyncratic shocks:** illness or death in family, job loss or theft of personal property.
- **Structural vulnerability:** lack of voice or power to make claims.

Livelihood assets refer to the resource base of the community and of different categories of households. In the centre left of the diagram above we have a pentagon that stands for different types of **assets** available to local people - **human, natural, financial, physical and social**. These assets are interlinked. Each type of asset is denoted in the figure with a capital letter (H, N, F, P, S).

Types of livelihood assets

- **Human capital**: household members, active labour, education, knowledge, and skills
- **Physical capital:** livestock, equipment, vehicles, houses, irrigation pumps,
- **Natural capital**: access to land, forests, water, grazing, fishing, wild products, and biodiversity
- **Financial capital: savings/debt,** gold/jewellery, income, credit, insurance Social capital: kin networks, group membership, socio-political voice and influence

The size and shape of the **asset pentagon** - that is, the amount and relative importance of each type of capital - varies between communities and between wealthy and poor households within the same community. For instance, for historical reasons, rich communities may control more and better land and natural resources than poor communities, and within any given community, rich households control more land, livestock and physical and financial capital than poor households.

Community and household assets are influenced by two sets of outside factors: first, the **policy and institutional context** and secondly the **vulnerability context**.

Policies and institutions are an important set of man-made external factors that influence the range of livelihood options open to different categories of people. They also influence access to assets and vulnerability to shocks.

Institutions

Institutions include both membership **organizations** and invisible "rules of the game"

- **Formal membership organizations** such as cooperatives and registered groups
- **Informal organizations** such as exchange labour groups or rotating savings groups
- **Political institutions** such as parliament, law and order or political parties
- **Economic institutions** such as markets, private companies, banks, land rights or the tax system

Social-cultural institutions such as kinship, marriage, inheritance, religion or draught oxen sharing

An **enabling** policy and institutional environment make it easier for people - poor and less poor -to gain access to assets they need for their livelihoods. A **disabling** policy and institutional environment

may discriminate against the poor, thus making it difficult for them to get access to land, livestock, capital and information.

Asset ownership influences the range of **livelihood options** open to different categories of people. Households with plenty of assets such as land, water, livestock, equipment and money, as well as higher education and skills and better socio-political networks, generally have a wider range of livelihood options than households with fewer assets.

There is **double causality** between the **vulnerability context** and **asset ownership**. On the one hand, shocks cause people to lose their assets. On the other hand, assets help protect people's livelihoods against shocks. Human capital is less vulnerable to shocks because it cannot be stolen, lost or taken away easily (unless you die).

Vulnerability and resilience

Households with many livelihood assets are generally more able to preserve their lives and property in the face of shocks than households with fewer assets. They have enough savings that they can afford to buy food when crops fail. They have enough animals that they can afford to lose or sell a few and still have enough breeding animals to build up their herds again after the emergency passes. **Resilience** is the ability to withstand shocks.

Households with few assets (i.e., little land, few animals, limited physical and financial capital, weak family labour, poor education and lacking in marketable skills) are much more vulnerable to outside shocks than households with more assets. In the face of prolonged drought, when crops fail, poor households are forced first to sell off their animals at low prices to buy grain to feed their families. The longer the emergency, the more they deplete their asset base, to the point that they no longer have anything left to sell but their labour, and even their labour is weak due to hunger and failing health. When they lose their assets, they lose their means of livelihood.

Livelihood strategies are "the range and combination of activities and choices that people make in order to achieve their livelihood goals." On the basis of their personal goals, their resource base and their understanding of the options available, different categories of households - poor and less poor - develop and pursue different livelihood strategies. These strategies include short term considerations such as ways of earning a living, coping with shocks and managing risk, as well as longer-term aspirations for children's future and old age.

A **livelihood system** is the total combination of activities undertaken by a typical household to ensure a living. Most rural households have several income earners, who pursue a combination of crop and livestock, farm, off-farm and non-farm activities in different seasons to earn a living. Income brought by different household members may be pooled in a common "pot" or "purse" or income earners may hold part of it back for personal spending money. In addition to productive tasks, there are reproductive tasks that need to be performed on a daily or seasonal basis such as fetching water, fuel, cooking, cleaning and looking after children. Finally, participation in community-level socio-cultural and political activities is part of the livelihood system. The livelihood system also includes the total pattern of labour allocation of household members between crops, livestock, off-farm work, non-farm business and reproductive and community tasks.

Local institutions influence **household livelihood strategies** directly, by determining which activities are legal/illegal and appropriate/inappropriate for women and men, by creating incentives to pursue certain activities and choices over others, and by influencing perceptions of the effectiveness of particular strategies for achieving desired outcomes. **Local institutions** also affect household livelihood strategies *indirectly* through their influence on **access and control of household assets**.

Livelihood outcomes are what household members achieve through their livelihood strategies, such as levels of food security, income security, health, well-being, asset accumulation and high status in the community. Unsuccessful outcomes include food and income insecurity, high vulnerability to shocks, loss of assets and impoverishment.[15]

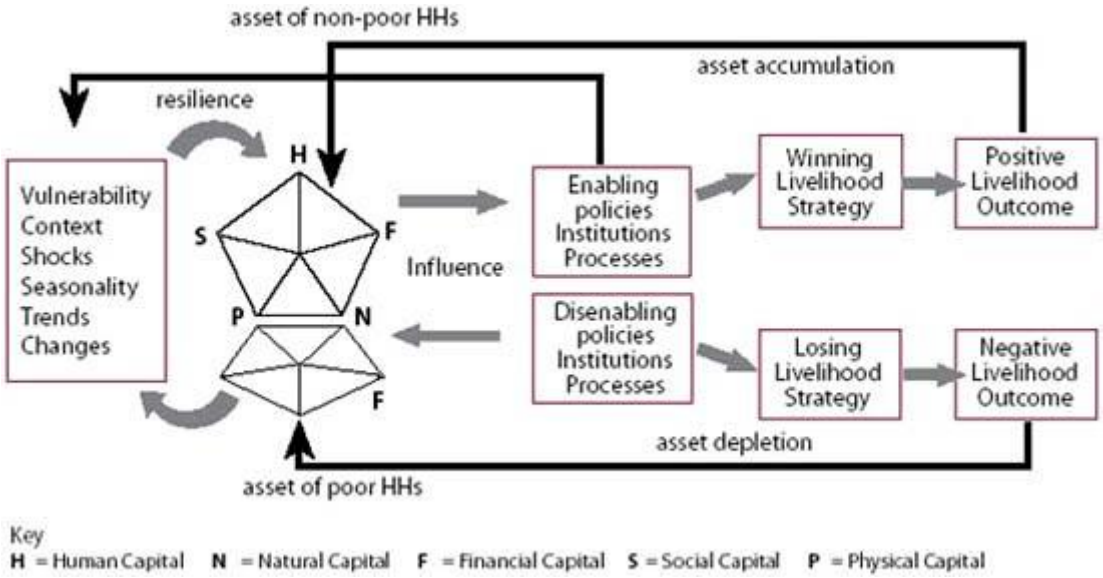
Key linkages in the Sustainable Livelihoods Framework

- The vulnerability context influences household livelihood assets.
- Policies and institutions also influence household livelihood assets.
- Policies and institutions can increase or decrease individual vulnerability.
- Household asset ownership widens livelihood options.
- Asset ownership decreases vulnerability and increases ability to withstand shocks.
- The range of livelihood options influences livelihood strategies
- Different livelihood strategies lead to different livelihood outcomes (positive and negative)

Livelihood outcomes influence the ability to preserve and accumulate household assets

The **process** of **falling into or getting out of poverty** is illustrated in the modified Sustainable Livelihoods Framework figure below.

Figure 5: Livelihoods and poverty



Because of restrictive laws, organizations, and procedures, the asset base of impoverished households is significantly smaller than that of non-poor households. The livelihood alternatives of impoverished households are restricted due to limited access to land, water, natural resources, and other assets. Their inability to rely on resources during times of need leaves them open to shocks. Shocks have a detrimental effect on livelihood outcomes and progressively deplete household assets, which starts off a vicious cycle of poverty.

Coping with long-term change is one of the challenges facing livelihood views. The phrase "sustainable livelihoods" suggests that a person's means of subsistence are steady, long-lasting, sturdy, and resilient against both internal and external shocks. However, which shocks and stresses are crucial? How do you evaluate sustainability? And how does one factor in the livelihoods of future generations? Despite previous appeals, this has been a weak point in many livelihood analyses. As a result of long-term secular shifts, the emphasis has instead frequently been on coping and temporary adaptation, building on a strong tradition of vulnerability analysis, rather than systemic reform.

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A livelihoods perspective remained on the periphery of mainstream discourse, with discussions framed in terms of employment, until issues concerning livelihoods, employment, and poverty surfaced around the 1995 World Summit for Social Development in Copenhagen.

A new Labour administration took office in 1997, and its development ministry, the Department for International Development (DfID), led by devoted minister Clare Short, released a White Paper that made a clear commitment to focusing on poverty and livelihoods (Solesbury 2003). The White Paper's introduction identified "sustainable rural livelihoods" as a key area of development priority.

The later-developed framework for sustainable livelihoods related inputs—referred to as "capitals" or "assets"—and outputs—livelihood strategies—to outcomes that blended well-known concepts—such as employment levels and poverty lines—with broader ones—such as sustainability and well-being. Economists were able to identify these input-output-outcome components of the livelihood framework with ease, and they responded well to quantitative analysis and the use of multiple lengthy questionnaires.

For example, assets are "vehicles for instrumental action (earning a livelihood), hermeneutic activity (making living meaningful), and emancipatory action," according to Bebbington (1999, 22). (challenging the structures under which one makes a living)

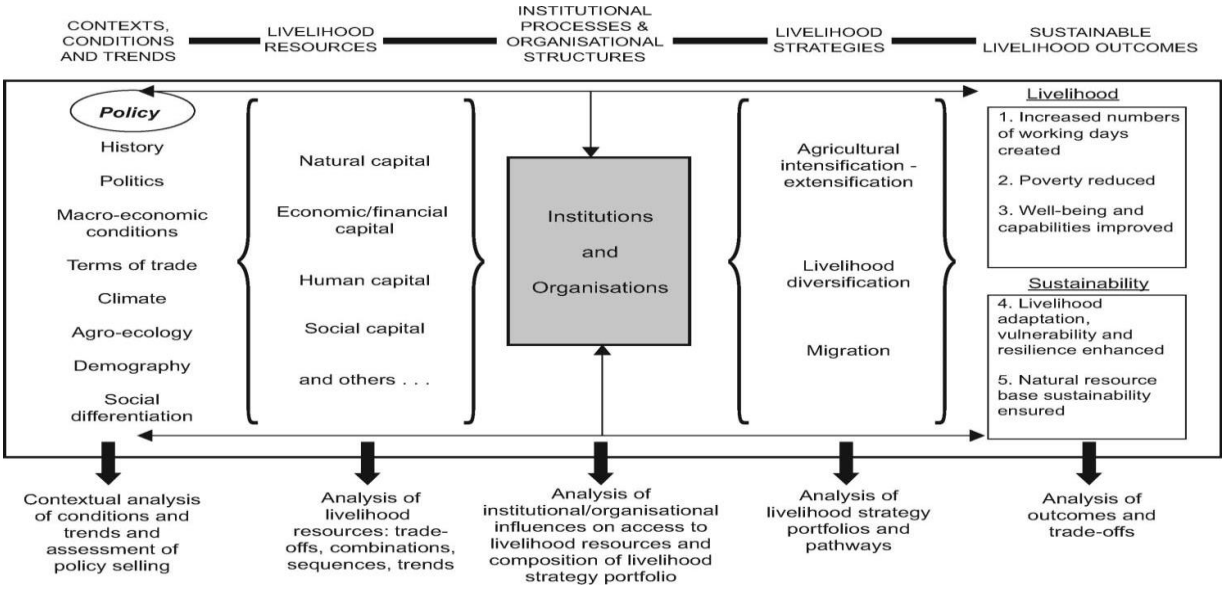


Figure 6: Sustainable livelihoods framework: a checklist (Scoones 1998).

What combination of livelihood resources (different forms of "capital") results in the ability to follow what combination of livelihood strategies (agricultural intensification, livelihood diversification, and migration) with what results, given a specific context of policy setting, politics, history, agroecology, and socioeconomic conditions?

The institutional procedures that mediate the ability to apply such techniques and accomplish (or not) such outcomes are particularly relevant within this paradigm. These procedures are embedded within a network of formal and informal establishments and associations.

The vulnerability context, which characterizes the outside world in which the impoverished live, is a component of the framework. This covers important topics like population or technology trends. It also covers shocks like economic inflation or natural disasters, as well as seasonality, which is the idea that output, employment prospects, and pricing may change with the seasons. Each of these elements has an impact on people's assets, which in turn affects how long their livelihoods can last.

The sustainable livelihoods framework is built on the belief that people need assets to achieve a positive livelihood outcome. People have different kinds of assets that they combine, to help them achieve the livelihoods that they seek. Transforming structure and process includes the institutions, organizations and policies that frame the livelihoods of the poor, and they are found on all levels from the household to the international level. These processes and structures determine the access that people have to different kinds of assets, and therefore the importance cannot be overemphasized.

Examples of processes are international agreements, ownership rights and laws to secure the rights of the individuals, whereas structures might be the existence of ministries, banks that give credit to the farmers or self-help groups in the local community. Livelihoods strategies are the way that people act to achieve their desired livelihood. The access that people have to different kinds of assets affects the strategies that they employ, and the structures and processes in each society also creates possibilities and constraints on the strategies that people are able to use. Finally, Livelihood outcomes are the achievements of people's livelihood strategies. Outcomes should be described by the local people themselves since these include much more than income. For outsiders it can be difficult to understand what people are seeking because this is often influenced by culture, local norms, and values (ibid 2000.).

The focus on the 'asset pentagon' and the use of the 'capitals' metaphor was a diversion. Other work on sustainable livelihoods had emphasized other features such as the idea of institutions and organizations as mediating livelihood strategies and pathways by the IDS studies.16

2.2.7.9 Indicators of Livelihoods

Indicators are specific/explicit verifiable measures of change or results brought about by social action or activity. They are standards against which to measure, assess show progress and change over time (Titi, 1995). When trying to evaluate whether the results of the project meet the goal of sustainable livelihood it would be useful to have a set of indicators with which to measure the results by. The following are indicators of rural livelihood.

Creation of working days – This refers to the ability of a particular combination of livelihood strategies to create gainful employment for a certain portion of the year. This may be on or off-farm, part of a wage labour system or subsistence production. Sen (1975: 5) notes three aspects of employment – income (a wage for the employed), production (employment providing a consumable output) and recognition (where employment provides recognition for being engaged in something worthwhile). In terms of the income/production aspects, various target levels have been suggested, but 200 days a year appears to be widely used as a minimum level to create a livelihood (Lipton 1991; 1993). Overall, the number of livelihoods created will be dependent on the proportion of the population available for work.

ii) Poverty reduction– The poverty level is a key criterion in the assessment of livelihoods. Various measures can be used to develop an absolute 'poverty line' measure based on income or consumption levels (Ravallion 1992; Baulch 1996). Relative poverty and inequality can be assessed using Gini coefficient measures. Such quantitative assessments of poverty can be used in combination with more qualitative indicators of livelihoods (Jodha, 1988; Schaffer 1996).

iii) **Well-being and capabilities** – The notions of 'well-being' (Chambers 1995; 1997) and 'capability' (Sen 1984; 1987) provide a wider definitional scope for the livelihoods concept. Sen sees capabilities as 'what people can do or be with their entitlements'. Such ideas represent more than the human capital which allows people to do things, but also the intrinsically valued elements of 'capability' or 'well-being'. Chambers (1997) argues that such a well-being approach to poverty and livelihood analysis may allow people themselves to define the criteria which are important. This may result in a range of sustainable livelihood outcome criteria, including diverse factors such as self-esteem, security, happiness, stress, vulnerability, power, exclusion, as well as more conventionally measured material concerns (Chambers 1989).

iv) **Livelihood adaptation, vulnerability and resilience** – The ability of a livelihood to be able to cope with and recover from stresses and shocks is central to the definition of sustainable livelihoods. Such resilience in the face of stresses and shocks is key to both livelihood adaptation and coping (Davies 1996). Those who are unable to cope (temporary adjustments in the face of change) or adapt (longer term shifts in livelihood strategies) are inevitably vulnerable and unlikely to achieve sustainable livelihoods. Assessing resilience and the ability to positively adapt or successfully cope requires an analysis of a range of factors, including an evaluation of historical experiences of responses to various shocks and stresses. Different types of shock or stress, in turn, may result in different responses, including avoidance, repartitioning, resistance or tolerance mechanisms (Payne and Lipton 1994: 15).

v) **Natural resource base sustainability** – Most rural livelihoods are reliant on the natural resource base at least to some extent. Following Conway (1985), Holling (1993) and others, natural resource base sustainability refers to the ability of a system to maintain productivity when subject to disturbing forces, whether a 'stress' (a small, regular, predictable disturbance with a cumulative 7 effect) or a 'shock' (a large infrequent, unpredictable disturbance with immediate impact). This implies avoiding depleting stocks of natural resources to a level which results in an effectively permanent decline in the rate at which the natural resource base yields useful products or services for livelihoods5 . Measuring natural resource sustainability is notoriously difficult, as it is critical to link indicators of

resource depletion or accumulation (e.g. soil fertility levels, vegetation cover etc.) to both the temporal dynamics of system resilience (i.e. the ability to recover from disturbance) and livelihood needs (i.e. an assessment of whether natural resource change results in 'effectively permanent declines in useful products or services').

2.3 THEORETICAL FRAMEWORK

2.3.1 Evaluation Theories

Evaluation theories refer to the conceptual frameworks, models, and principles that guide the systematic assessment and analysis of programs, policies, interventions, and other social phenomena. They provide a set of principles and methodologies for evaluating the effectiveness, efficiency, relevance, and sustainability of various interventions and initiatives in different domains, including education, healthcare, social services, environmental protection, and public policy.

They support the choice of evaluation techniques and metrics as well as serve to direct the evaluation process. Evaluation theories can focus on different aspects of the evaluation process, such as the role of stakeholders, the success criteria, the techniques for gathering and analyzing data, and the application of evaluation results. They draw from a variety of disciplines, including psychology, sociology, economics, statistics, and management.

- *"A program evaluation theory is a coherent set of conceptual, hypothetical, pragmatic, and ethical principles forming a general framework to guide the study and practice of program evaluation. Stufflebeam and Shinkfield (2007:63).*
- "*Theories provide guidance in determining the purposes for evaluations, as well as in defining what we consider to be acceptable evidence for making decisions in an evaluation" Mertens and Wilson (2012:37).* Evaluation Theory informs what to say about what we do as professional evaluators (King & Stevhn, 2013).
- Evaluation theories play several crucial roles in evaluation practice. For the preliminary assessment and program design, theory and research can be very useful to save program designers and evaluators time and resources. Evaluation theory provides effective strategies for dealing with the problems of concern regarding the evaluation process (Donaldson, 2011)

Evaluation theories are not really theories per se. Stufflebeam and Shinkfield (2007:68) stated *"The evaluation profession…has far to go in developing overarching, validated theories to guide the study*

and practice of program evaluation. References to theory, usually denote as conceptual approaches or evaluation models that lack the comprehensiveness and validation required of sound theories".

According to Berk and Rossi (1999), since its inception, evaluation has struggled to generate viable theory, so far, theory has not lived up to its promise in evaluation research. The reasons why evaluation has not focused on theory are: lack of conceptual harmony, lack of financial support, lack of practical focus and the like (Stevhn, 2013).

Marvin C. Alkin and Christina A. Christie (2013) proposed an evaluation theory tree which depicts the trunk and the three primary branches of an evaluation family tree. The trunk is built on a dual foundation of accountability and systematic social inquiry. Accountability refers to the process of "giving an account" or being answerable or capable of being accounted for. Wagner (1989) indicates that there are several dimensions to accountability. The first is "reporting," in which description is provided, the second is a "justifying analysis" or explanation.

True accountability requires answerability, that is, those responsible must be held accountable. This phase of accountability is not reflected in evaluation; evaluation simply provides the information for "being answerable. Alkin (1972a), in a paper defining accountability, refers to goal accountability, process accountability, and outcome accountability. Goal accountability examines whether reasonable and appropriate goals have been established. Process accountability reflects whether reasonable and appropriate procedures for accomplishing those goals have been established and implemented. Outcome accountability refers to the extent to which established goals have been achieved. outcome accountability, the provision of evaluation information for examining the adequacy of outcomes, is the major thrust of most evaluation efforts. The importance of accounting for actions or for resources used in the conduct of programs is particularly evident for programs supported by government and donors.

The **social inquiry** root of the tree emanates from a concern for employing a systematic and justifiable set of methods for determining accountability. While accountability provides the rationale, it is from social inquiry that evaluation models have been derived. Many theorists acknowledge the important role that accountability plays in evaluation. Mark, Henry, and Julnes (2000) cite it as one of the four purposes of evaluation. Today, most evaluations have a strong accountability thrust, having as a goal the improvement of institutional performance. The results of these evaluations are often used in policymaking or other governmental decision making.

The main branch of the tree is the continuation of the social inquiry trunk, that is, evaluation as research, or evaluation guided by research methods, branch. This branch is called **methods** since in its purest form, it deals with obtaining generalizability, or "knowledge construction (Shadish,

Cook, and Leviton (1991). Perhaps the first full-scale description of the application of research methods to evaluation was a work by sociologist Edward Suchman, who wrote a book titled Evaluative Research (1967). The title demonstrates his view of evaluation—as a form of research. Shadish et al. (1991) note that Suchman (1967) is responsible for the evaluation field's first theoretical integration (p. 32). Suchman (1967) distinguishes between evaluation as a commonsense usage, referring to the "social process of making judgments of worth" (p. 7) and evaluative research that uses scientific research methods and techniques.

While most evaluation theorists have methodological concerns and view research as the genesis of program evaluation, one group of theorists has been steadfast in clinging to that orientation.

In the social sciences and psychology, this emphasis on research depends on well-designed experimental studies and other controls. Fundamental to these theories are the early work of Donald **Campbell (1957)** and the more popular Campbell and Stanley volume (1966), which defines the conditions for appropriate experimental and quasi-experimental designs. Campbell is best known for his path-breaking work on the elimination of bias in the conduct of research in field settings. Most notable from an evaluation perspective are his papers on experimental and quasi-experimental designs for research (Campbell, 1957; Campbell & Stanley, 1966). The focus on experimental designs (and the more practical quasi-experimental designs) is an attempt to "rule out many threats precluding causal inference" (Shadish et al., 1991, p. 122).

Three major areas of social science research design were advanced by Campbell et al,. First, the authors explained the conditions necessary to conduct a true experimental study, where randomization is the hallmark. Second, they called the degree to which an experiment properly controlled internal validity and referred to how widely applicable the results of an experiment are as external validity. Third, they recognized that experiments are not perfect and that they should not, and cannot, be used in a great many situations. Thus, as an alternative to the true experiment, they describe, in detail, quasi- experimental designs.

Quasi-experimental designs were developed to deal with the messy world of field research, where it is not always practical, ethical, or even possible to randomly assign persons to experimental and control groups. Quasi-experimental designs include some type of intervention or treatment and provide a comparison, but they lack the degree of control found in true experiments. Just as randomization is the key to true experiments, lack of randomization is the defining characteristic of quasi-experiments. **Boruch** (1997) elucidates the distinction between the study designs.

According to Boruch, evaluation involves the systematic application of rigorous randomized research designs for measuring the extent of a social problem and assessing the implementation, relative efficacy, and cost-effectiveness ratio of social intervention programs (Boruch, Synder, & DeMoya, 2000). Boruch is steadfast in viewing randomized field experiments as the most effective way of obtaining the least-equivocal estimate of a social program's effects (Boruch et al., 2000).

Huey Chen acknowledges the attractiveness of controlled experiments in estimating net effects through randomization. But when no effect is shown in a controlled experiment, Chen points out that there is no indication as to whether failure is due to, for example, poorly constructed causal linkages, insufficient levels of treatment, or poor implementation. Chen proposes a solution to this dilemma:

"We have argued for a paradigm that accepts experiments and quasi- experiments as dominant research designs, but that emphasizes that these devices should be used in conjunction with a priori knowledge and theory to build models of the treatment process and implementation system to produce evaluations that are more efficient and that yield more information about how to achieve desired effects". (Chen & Rossi, 1983, p. 300)

Chen recognizes the dominance of the experimental paradigm but strongly believes that it must be supplemented by the development of theoretical models of social interventions: "An unfortunate consequence of this lack of attention to theory is that the outcomes of evaluation research often provide narrow and sometimes distorted understandings of programs" (Chen & Rossi, 1983, p. 284).

A perennial question in social inquiry is which methods are appropriate for the study of society, social groups, and social life and whether the methodologies of the physical sciences, broadly defined, are applicable to social phenomena. Discussions regarding the feasibility and desirability of appropriate methodology for the study of the social world continues, giving rise to heated debates and never-ending accusations of positivism. These debates are related to and reflective of the more general question of the applicability of the methods of the physical sciences to the social sciences. Alternatively, the discipline of anthropology has given rise to ethnographies and qualitative studies of the social world. The distinction between these methods and the methods of the physical sciences is sometimes couched in terms of the distinction between explanation and prediction, on one hand, and interpretation and understanding, on the other.

Valuing is another branch of the evaluation tree. Initially inspired by the work of Michael Scriven (1967), the valuing branch establishes the **vital role of the evaluator in placing value on data** which is perceived by the proponents as the most essential component of the evaluator's work. Theorists on this branch believe that what distinguishes evaluators from other researchers is that **evaluators must place value on their findings and, in some cases, determine which outcomes to examine**.

Scriven is unequivocal in his position that society requires valuing, and it is the role of the evaluator to do that job. He maintains that there is a science of valuing and *that* is evaluation. Scriven (1986) notes, "Bad is bad and good is good and it is the job of evaluators to decide which is which" (p. 19). Scriven (1983) notes that **the greatest failure of the evaluator is in simply providing information to decision makers and passing the buck for final judgment to the non-professional** (p. 248).

Eisner (1998) notes that evaluation "concerns the making of value judgments about the quality of some object, situation or process" (p. 80). Eisner notes that things that matter cannot be measured quantitatively (1976). He argues that while quantitative techniques can provide some useful information, "Evaluation requires a sophisticated, interpretive map not only to separate what is trivial from what is significant, but also to understand the meaning of what is known" (Eisner, 1994, p. 193).

Eisner expands the role of evaluation to include making final judgments about data (or observations) and include making judgments about what questions to ask and what to focus on.

Barry MacDonald recognizes the multiplicity of perspectives held by stakeholders and believes the **evaluator's duty is to present the values of differing stakeholders**. MacDonald (1979) depicts the **evaluator as a "negotiator of perspectives**" (p. 131). "The evaluator will refrain from making judgments of merit but will instead seek to make a program accessible to those who wish to judge its assumptions, its operations, or its achievements. This does not mean that the evaluator will retain the right to make judgment. Rather he will collect and communicate the alternative definitions, perspectives and judgment held by people in and around the program." (pp. 127-128)

According to MacDonald, democratic evaluations are conducted for the sake of informing the community. Here, the evaluator "recognizes the **value pluralism** and seeks to represent a range of interests in its issue formulation. His main activity is the collection of definitions and reactions to the program. The key justificatory concept is 'the right to know'" (MacDonald, 1977, p. 224). MacDonald (1979) advocates the use of democratic evaluations due to their ability to "portray the multiple reality of a program with justice and truth" (p. 131), leaving decision makers with a rich array of perspectives and judgments to consider when making a decision.

Ernest House recognizes that evaluation serves the purpose of providing information to decision makers so that they can determine the legitimate allocation of vital resources. He recommends attempts at being responsive to stakeholders as being superior to prior evaluation conceptions. He deplores the lack of value neutrality in stakeholder approaches, which he says results from the general lack of full inclusion of the represented interests of the poor and powerless in stakeholder groups (pp. 239-240).

House (1991, 1993) argues that evaluation is never value neutral; it should tilt in the direction of social justice by specifically addressing the needs and interests of the powerless. House's evaluator is thus faced with the task of understanding the needs and positions of various stakeholder groups, especially the poor and powerless, and of balancing this information with his or her perception of social justice.

It is important to note that for House, the role of evaluator is not to define value in terms of good or bad, as Scriven does, but in terms of right, fair, and just. In this sense, the value judgments accorded to the least advantaged would receive the utmost importance. Thus, both Scriven and House place the valuing component in a position of eminence, but they do so with a substantially different emphasis.

Egon Guba and Yvonna Lincoln belief that instead of there being one reality, there are multiple realities based on the perceptions and interpretations of individuals involved in the program to be evaluated. Thus, Guba and Lincoln believe that the role of the evaluator is to facilitate negotiations between individuals reflecting these multiple realities.

The third major branch is *use/utilization,* which, with the pioneering work of **Daniel Stufflebeam** and the work of **Joseph Wholey**, focused on an orientation toward evaluation and decision making. The work done by theorists on this branch expresses a concern for **the way in which evaluation information will be used and focuses on those who will use the information.**

This group of theories emphasizes the importance of designing evaluations that are useful and relevant to the intended users. The focus is on identifying and addressing the information needs of stakeholders and using evaluation findings to inform decision-making and program improvement.

Utilization-Focused Evaluation (UFE) is an evaluation theory developed by *Michael Quinn Patton* that emphasizes the importance of designing evaluations that are useful and relevant to the intended users. The focus is on identifying and addressing the information needs of stakeholders and using evaluation findings to inform decision-making and program improvement.

It is based on the premise that the value of an evaluation lies in its use. Therefore, the evaluation design and methods should be tailored to the specific needs and interests of the stakeholders who will use the evaluation results. This requires a collaborative approach to evaluation, where stakeholders are involved in all stages of the evaluation process, from identifying evaluation questions to interpreting and using the evaluation results. Utilization Focused Evaluation theories also emphasize the importance of building capacity for evaluation among stakeholders, so that they are able to participate in and use evaluations effectively. This includes providing training and support

in evaluation methods and data analysis, as well as developing systems and processes to ensure that evaluation findings are used to inform decision-making.

This school of thought involves three principles:

a. Use-Driven: The evaluation is designed to meet the specific information needs of stakeholders and to inform decision-making.
b. Collaborative: Stakeholders are actively involved in all stages of the evaluation process, and their input and feedback is valued and used.
c. Iterative: The evaluation is viewed as an ongoing process of learning and improvement, and the evaluation design and methods are adapted as needed to ensure that the evaluation is meeting the needs of stakeholders.

   This can be applied in a wide range of evaluation settings, including program evaluations, policy evaluations, and organizational evaluations. The goal is to ensure that the evaluation is relevant, credible, and useful to the intended users, and that it leads to positive change and improvement in the program or organization being evaluated.

   Empowerment Evaluation Theory

   Empowerment Evaluation is an evaluation theory developed by David Fetterman that emphasizes the participation of stakeholders in the evaluation process, with the goal of promoting learning, capacity building, and empowerment. The focus is on developing the skills and knowledge of stakeholders to participate in the evaluation and to use the findings to make informed decisions.

   Empowerment Evaluation involves a collaborative and participatory approach to evaluation, where stakeholders are involved in all stages of the evaluation process. This includes identifying evaluation questions, collecting and analyzing data, and interpreting and using evaluation results. The goal is to build the capacity of stakeholders to participate in and use evaluations effectively. Empowerment Evaluation involves three key principles:

1. **Improvement**: The evaluation is designed to promote program improvement and to build the capacity of stakeholders to participate in and use evaluations effectively.
2. **Participation**: Stakeholders are actively involved in all stages of the evaluation process, and their input and feedback is valued and used.
3. **Social Justice:** The evaluation is grounded in a social justice framework, which emphasizes the importance of promoting equity, inclusion, and empowerment.

Empowerment Evaluation is useful for evaluations that aim to promote social change and empower communities or organizations. It is often used in evaluations of community-based programs, where stakeholders have a vested interest in the program's success and are motivated to participate in the evaluation process. Empowerment Evaluation is also used in evaluations of programs that serve marginalized or underrepresented populations, where the goal is to build capacity and promote equity and social justice.

Logic Model Theory

Logic Model Theory is an evaluation theory that emphasizes the importance of developing a clear and logical framework for program planning and evaluation. The theory emphasizes the need to clearly articulate the inputs, activities, outputs, outcomes, and impact of a program in a logical and coherent way, to facilitate program planning, implementation, and evaluation.

In a logic model, the program's inputs are the resources that are available to the program, including funding, staff, and other resources. The activities are the program's interventions, or the actions taken to achieve the program's goals. The outputs are the direct products or services of the program, such as the number of participants served or the number of events held. The outcomes are the short-term and intermediate-term changes that occur as a result of the program, such as changes in knowledge, attitudes, or behaviors. The impact is the long-term change that occurs as a result of the program, such as improved health outcomes or reduced rates of crime.

The logic model provides a visual representation of the program and the relationships between the program's components. It helps to clarify the program's goals and objectives, and to identify the inputs and activities that are most likely to lead to the desired outcomes and impact. The logic model can also be used to guide program implementation and to monitor and evaluate program performance.

Logic Model Theory is useful for evaluations of complex programs or initiatives, where a clear and logical framework is necessary to guide program planning and evaluation. It is often used in program evaluations, policy evaluations, and organizational evaluations, and can be applied to both qualitative and quantitative data.

This explains the theory of how and why an initiative will work. It defines the relationship between actions and expected results. It also explains the assumptions of beliefs or best practices that the project implementers expect to be present or utilized during implementation. Anderson

defines the basic elements of a theory of change to include the following: a pathway that illustrates the relationships among a variety of outcomes that are each thought of as preconditions of the long-term goal, indicators that are defined specifically enough to measure success, interventions that are used to bring about each of the preconditions on the pathway and at each step of the pathway and assumptions that explain why the whole theory makes sense

The logical model approach involves a step-by-step process of developing a project plan and monitoring progress towards achieving project goals and objectives. The process typically involves four key steps:

1. **Problem analysis:** Identify the problem or need that the project is intended to address and the factors that contribute to the problem.
2. **Objective analysis**: Identify the specific objectives of the project and the activities that will be undertaken to achieve these objectives.
3. **Indicator selection:** Identify the indicators that will be used to measure progress towards achieving the objectives. Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor.
4. **Means of verification**: Identify the sources and methods of data collection that will be used to measure progress towards achieving the objectives.

2.4 LITRATURE REVIEW

In Ghana, donors dominate the funding of livelihood enhancement projects in rural areas. These include (USAID) Resiliency in Northern Ghana (RING) Feed the Future project supporting orange-fleshed sweet potato cultivation in 70 communities of 17 districts in the Northern Region, Feed the Future Ghana Agriculture and Natural Resource Management Project (AgNRM) aimed at alleviating poverty in rural communities through increased incomes from natural resource products such as shea and moringa; improved food and nutrition security; increased farmer and community security/access to land and natural resources and strengthened environmental stewardship.

Another donor intervention aimed at enhancing the livelihoods of rural communities is Ghana Agricultural Technology Transfer (ATT) project. This project aims to increase the competitiveness of rice, maize and soybean value chains, and fostering broad-based and sustained economic growth through the increase availability of agricultural technologies and increasing productivity in Northern Ghana

Others include Boosting Green Employment and Enterprise Opportunities in Ghana - also known as GrEEn – which is a four-year joint project from the European Union, the Embassy of the Netherlands in Ghana, the United Nations Capital Development Fund (UNCDF) and SNV. This project aims at supporting the transition of local economies to green and climate resilient development, improve employability and entrepreneurship capabilities of selected people by matching them with market opportunities and mentoring into (self-)employment and enterprise development (focus on green and climate resilient local economies) and strengthen local ecosystems that support youth self-employment and the development of MSMEs

ILO Project on "Productivity Ecosystems for Decent Work" addresses Ghana's main economic challenges, such as low productivity, low competitiveness, and a lack of decent work opportunities for its citizens. It provides support to upgrade production processes, helps firms to transit from informality to formality, train workers and entrepreneurs in more advanced technical skills and ensure that environmental and social standards are adhered to.

The ILO SKILL-UP Ghana Project, funded by the Norwegian Government, aims to move the TVET system from a supply to a demand-driven system by building on existing structures and strengthening institutional resources to promote a better understanding of the skills demanded in economic sectors is.

Another donor funded livelihood project is a five-year Ghana Poultry Program (GPP), funded by the United Sates Department of Agriculture (USDA) and implemented by ACDI/VOCA and TechnoServe. The aim of the project is to increase the competitiveness of the domestic production and processing of poultry meat and eggs. Specific objective of this project is to increase agriculture productivity in the poultry value chain through capacity building, improving input markets, and promoting strategic investments and private-public partnerships and increase the trade of poultry products by improving product quality, increasing production efficiency, and improving market linkages.

Another USIAD funded livelihood project is the Ghana Market Systems and Resilience Activity (MSR), a five-year, $35.9M project to strengthen commercial relationships between market actors, improve the rural entrepreneurship ecosystem to enable greater market participation, particularly for women and youth, expand the availability of agribusiness services, and link targeted policy initiatives to improved local economic governance. These activities will result in competitive, stronger, and more resilient markets, thus increasing inclusive agriculture-led economic growth in northern Ghana**.**

Global Affairs Canada is also funding Modernizing Agriculture in Ghana Project to improve food

security and make the agriculture sector more modern, equitable and sustainable. The project seeks to implement a comprehensive market-oriented approach to farming and to strengthen and modernize agricultural extension services.

FCDO/DFID has also funded Ghana—Market Development (MADE) in Northern Ghana to improve the incomes and resilience of poor farmers and small-scale rural entrepreneurs in the Northern Savannah, with a particular focus on agricultural value chains (the full range of activities that bring a crop to the consumer.

International Fund for Agricultural Development (IFAD) in funding Emergency Support to Rural livelihoods and Food systems exposed to COVID 19 project (2020-2024) with $41M. The expected results of this project include (i) targeted households maintain or increase their production, food security and climate change resilience relative to their pre-COVID-19 situation; and (ii) targeted households maintain or increase their market linkages, sales volumes, and income levels from market participation relative to their pre-COVID-19 situation.

Most of the evaluations done on the effect or relationship of donor support for sustainable rural livelihoods interventions on the livelihoods of rural people assess only the effectiveness regarding the extent to which the project is able to achieve its objectives of income, food security etc and ignore relevance, coherence, sustainability, efficiency and impact.

Aquaculture value chains create jobs, enhance livelihoods, and improve human nutrition; but the evidence through effective evaluation is limited to a few countries (Béné et al., 2016; Golden et al., 2017; Little et al., 2016; Nasr-Allah et al., 2020; Rashid et al., 2019)

The evaluation of the Millennium Villages Project (MVP) in Northern Ghana indicated that most of the project impact is the result of increased use of seeds and fertilizer that was donated by the MVP or provided at highly subsidized rate. This result raises concerns about whether it will be possible to maintain achievements in agricultural outputs when the MVP ends and subsidized inputs are discontinued (Masset E, 2017). A clear indication or manifestation of a gap in institutionalization of sustainability structures at the local level to ensure perpetuation of the gains of the project.

Studies by Belton B. et al, 2014, investigated the extent to which the resource-poor participate in aquaculture, the relationship between participation in aquaculture and landownership and access, the nature and extent of employment associated with different types of aquacultures, how aquaculture affect local food security and the effects of aquaculture development on well-being.

Evaluation of Greater Noakhali Aquaculture Extension Project in Bangladesh, which began in July 1998 as a conventional transfer of technology aquaculture extension project, indicated that, the outcome of the projects has been positive in terms of adoption, adaptation, farmer capacity building, increased productivity and income generation (Thompson et al. 2006, Manjurul K, 2006)

Rosina et al 2010, used Cost Benefit Analysis (CBA) to assess how promising, successful or otherwise of an aquaculture intervention. CBA for an aquaculture enterprise involves comparing initial start-up costs and on-going expenses with a revenue stream that accrues over time, usually at the end of each production cycle. The total cost involved in an aquaculture operation is the total sum of money invested in terms of fixed costs and variable costs. Fixed costs according to Jolly and Clonts (1993) are those costs that must be paid whether there is production or not and they usually accrue before the first production period in the form of start-up costs. They include the cost of capital assets such as the cost of land and costs involved in pond construction. Variable costs include the cost incurred during the operation and they depend directly on the scale of operations. Payments made for inputs such as labour, feed, fingerlings, and transport all come under the variable cost and are either assumed to accrue at the beginning or end of each production cycle. Variable cost is the sum of the quantity of variable inputs used multiplied by the price per input unit. The benefits that are involved in aquaculture operations are attributed to financial gain from selling the finished product at the end of each production cycle. This could be described as the sum of the quantity of outputs at the end of the period multiplied by the price of the output at that period (Rosina et al 2010)

The evaluation of IFAD projects in Ghana in 2011, is among the few Donor project evaluations which applied almost all the Best Practice Evaluation Criteria (relevance, coherence, effectiveness, efficiency, impact and sustainability) for project evaluation. The IFAD evaluation examined the projects on the basis of the internationally recognized evaluation criteria of relevance, effectiveness, efficiency, rural poverty impact—including impacts on household income and assets, human and social capital empowerment, food security and agricultural activity, natural resources and the environment, institutions and policies, sustainability, gender equality and women's empowerment, and innovation, replication, and scaling up (IFAD 2011, Country Program Evaluation)

This section summarizes the findings of the Evaluation:

2.4.1 Effectiveness

According to the findings and results of the evaluation of IFAD livelihood enhancement projects in Ghana, access to lending products did not increase as expected, particularly for small-scale farmers.

The strongest results were achieved around rural enterprise support. IFAD-supported interventions were successful not only in increasing enterprise numbers, output, and profitability, but also in promoting national legislative initiatives that linked support to local government with enterprise development and created opportunities for private-public initiatives to foster microenterprise development.

There were mixed achievements regarding value chains development, hampered by the limited familiarity of project staff with the private business environment. When initiatives focused on existing value chains (e.g., roots and tubers), results were more encouraging and allowed for technological upgrading in the processing of agricultural produce. But value chains in the new business startups (e.g., vegetables) generated high risks for small farmers and entrepreneurs.

2.4.2 Efficiency

Analysis of efficiency seeks to measure the extent to which inputs are converted economically into results. As such, efficiency analysis requires measuring the benefits and costs of a project or, in the absence of benefit-cost analysis (BCA), examining indicators that affect benefits and costs. IFAD used BCA to assess the efficiency of four of the six projects reviewed.

Delays and the amount of lending tend to affect economic benefits in opposite directions, all else being equal. The higher the delay, the lower the expected benefits; and the higher the amount of lending for similar projects, the higher the expected benefits. IFAD projects reviewed by this evaluation (approved between 2000 and 2010) show delays between approval and effectiveness that are 30 per cent higher than those of similar projects approved in the same period by AfDB and almost three times higher than those of the World Bank (IFAD 2010).

The difference in the average delay between approval and start date — almost three times higher for IFAD than for the World Bank—is manifest of: (i) the different preparatory work undertaken by the two institutions before loans are presented to their respective Boards of Directors, (ii) different degrees of conditionality to be resolved before effectiveness, (iii) IFAD's gaps between expected co-financing at project approval and its absence of country presence during most of the period reviewed.

Design weaknesses led to high management costs. The original project design duplicated management functions between a Central Management Unit and the project's Zonal Offices, adding about 30 percent to project management costs without substantial value added to the management system.

Actual unit costs were higher than expected because the number of beneficiaries was lower than expected. Actual unit costs for training, business development services, and wage-job creation

oscillated between 46 per cent and 161 per cent higher than originally targeted, reflecting over-optimistic appraisal estimates. When more realistic expectations prompted a revision of REP II targets downward during implementation, actual unit costs oscillated between 8 per cent lower than at revision for business development services, but still between 46.3 per cent and 78 per cent higher for training and the number of jobs created, respectively.

2.4.3 Relevance

Evaluation of the relevance of the IFAD portfolio was based on a detailed analysis of the components of the six projects reviewed by the Evaluation team. The analysis assessed whether (i) the objectives were aligned with Ghana's policies and IFAD's objectives for agriculture and rural development and the needs of the poor; (ii) the project design features were geared toward achieving those objectives. The overarching goal of IFAD as set forth in its Strategic Framework 2007–2010, is to empower poor rural women and men in developing countries to achieve greater income and food security The overall portfolio objectives were aligned with Ghana's policies and IFAD's goals. Targeting progressively shifted from the poorest geographic areas to the entrepreneurial poor. Sub-component designs are generally relevant to IFAD's overarching goals, operational policies, and national strategies and to the needs of the poor.

Some subcomponent designs lacked specificity in project procedures, client outreach, and target groups. Almost all project designs lacked a strong evaluability plan to provide the rigor necessary to draw appropriate lessons from post-project impact. The overall design was consistent with IFAD's rural finance policy and sectoral needs. It targeted three tiers—the macro, meso, and micro levels. At the "macro" level, it was to support an enabling policy and regulatory environment to foster sector growth and sustainability. At the "meso" level, it was to increase sector-wide capacity and infrastructure.

In terms of the specific sub sector relevance, the Rural Finance Support Project (RFSP) was relevant at the macro and meso levels. At the micro level, the RFSP design had flaws. One of RFSP's main objectives was to create linkages between rural banks and informal credit and savings groups, a model applied successfully in India but unknown in Ghana.

2.4.4 Impact

Evaluating intended intervention outcomes and impacts is not enough. Interventions should also be assessed in relation to their system's level effects and the agenda for supporting ownership.

The criterion for addressing rural poverty impacts is to determine long-term effects, or all

consequences, intended or unintended, direct, or indirect, positive, or negative, that can be attributed to the programme—that is, those that would have not occurred in the absence of the programme (IFAD 2011). According to the evaluation report, the unavailability of required data made it difficult to determine with certainty the impact of the portfolio financed by IFAD in Ghana.

Impact analysis is still seriously limited in Ghana due to (i) a weak monitoring and evaluation system, which, although introduced in each IFAD-financed project, is still in an early stage of development. (ii) the absence of a baseline scenario (and thus data) for establishing an adequate counterfactual; and (iii) the fact that not enough time has passed to determine long-term effect.

Despite these limitations, some useful information exists from beneficiary surveys conducted for the two completed projects evaluated.

The evaluations of two completed projects, RFSP and REP-II, have provided useful inferential information suggesting that the Ghana programme may have generated positive impacts on the incomes and assets of beneficiaries.

The evaluation compared relevant characteristics of small business owners before and after (but not "with" and "without") the project intervention. Both reports suggest increases in household incomes that could be associated with the project activities.

For some of the projects in the portfolio, the Project Performance Assessment (PPA) concluded that there was not enough evidence to rigorously demonstrate that the project had contributed to increases in disposable income or total assets due partly to the fact that, no baseline data on poverty levels were collected at the beginning of the project.

Interviews with REP-II clients showed positive results for asset accumulation. The majority of the 300 clients interviewed by the Evaluation team indicated that assets have been acquired.

Forty (40) per cent of business owners had identifiable increases in assets, such as improved housing, additional stock, business equipment and purchase of a vehicle. About 25% of project clients had increased their personal assets, such as housing or electronic equipment, and/or had been able to invest in their children's education. All project clients interviewed indicated that they had opened bank accounts and now save on a regular (monthly) basis.

2.4.5 Sustainability

Assessment of sustainability determines the likelihood that benefits generated by project -supported activities will continue after they have been completed. It involves, as relevant, issues of institutional, technical, financial, and natural-resource sustainability and the continued availability of key services once project support ends.

The evaluation report indicated that, the interventions in Micro and Small Enterprise (MSE) support services have been evolving into a sustainable, government-mainstreamed system of business support. The Business Advisory Centres (BACs) are an internal structure of the District Assemblies (DAs), which, in turn, assume full operational responsibility after the project is supported. The beneficiary MSEs have a reasonably high survival rate (estimated at 71 per cent in REP II).
The increasingly robust institutional environment for MSEs through the BAC and trade associations has continued independently. The sustainability of Rural Technology Facilities (RTFs), however, presents more risks: RTFs have been expected to serve as training centers and engage directly in commercial activities to achieve cost recovery. This is generating competition between RTFs and the local entrepreneurs they are helping. Enhancing sustainability may require a review of the role of RTFs, focusing on the "public good" they offer (e.g., technology transfer) and revisiting ambitions of full cost recovery which may not be realistic.

Progress on value-chain development has fallen short of expectations, with limited emergence of new value chains. Rural areas have established some connections with markets, primarily within existing value chains. However, these linkages have required gradual development and extensive coaching from Business Advisory Centers to become self-sustaining. The public-private partnerships currently in place for value-chain practices exhibit practical flaws, including inadequate business case analysis, business-plan preparation, and coordination among stakeholders. While public-private partnerships are crucial, they need technical support and business skills to achieve sustainability. The network of rural banks was found to be sustainable both financially and institutionally. By 2007, these banks achieved an average operational/financial sustainability of 119% and a moderate return on equity of 6%. Additionally, 80% of the rural banks were profitable at the time of evaluation. The number of rural banks also increased from 115 in 2002 to 133 by the time of the Country Programme Evaluation.

CHAPTER THREE

3 THE CASE STUDY AND THE RESEARCH METHODOLOGY

3.1 DFID Funded Aquaculture Intervention in Ellembelle District

In 2013, the Western Regional Fisheries Commission recorded a 40% reduction in the number of fish farmers in coastal districts of Ghana. The major cause of this reduction was the perceived non-profitability of the enterprise. However, the non-profitability of the fish farming enterprises in the western region of Ghana stem from underlying constraints relating to access to inputs, lack of technical knowledge in aquaculture best practices, weak relationship with the value chain and lack of business management techniques.

A baseline study by the DFID through Western Region Coastal Foundation (WRCF), which is the implementing organization, revealed that fish farmers do not have access to quality fingerlings to stock their ponds. Farmers also rely on local feeds like local foodstuff and food leftovers. Part of the problem has to do with low market penetration by hatcheries and feed companies. Further, farmers lack technical knowledge and best practices in aquaculture production leading to inefficiencies and high fish mortality. Efficiency in feeding is very poor, averaging around 4.0, instead of a maximum of 2.0. The lack of good feed management and other poor practices have also led to poor water quality deficiency of essential nutrients for optimal production. Poor technical knowledge has also led to high fish mortality. Fish mortality in fishponds in the coastal districts in the western region averages around 60%. This has rendered fish farming inefficient and unprofitable.

Fish farmers in the coastal districts also have weak relationships with the aquaculture value chain at different functional levels. There are poor linkages in the aquaculture value chain, especially with the end market. Marketing of aquaculture produce is a major challenge in the districts. Farmers also lack business management skills and techniques to be able to attract bulk buyers. They therefore sell their produce mostly by hawking to consumers within their localities. Also, fish farmers lack adequate technical and institutional support for their businesses and aquaculture extension and research services are inadequate to provide the needed technical support for farmers. Due to the above production and postproduction constraints, farmers are not able to make profit from their ventures. Also, earnings per production cycle are very low and one production cycle can take up to 9 months. On average, farmers are only able to produce 600 catfish per pond (each weighing 0.8kg) and earn only around GHC4, 800 per pond per production cycle. This situation has made aquaculture unprofitable to farmers and, at the same time, unattractive to many. Many farmers have subsequently abandoned their ponds.

The above constraints notwithstanding, the DFID aquaculture Intervention Project, through its numerous community engagements and stakeholder dialogues, observed that aquaculture has a large potential of contributing immensely to household incomes and poverty alleviation in the coastal districts. It noticed that addressing these constraints is particularly important given that fish production, processing, marketing and associated services constitute a significant source of livelihood in the six coastal districts. Hence this pilot aquaculture intervention.

The main objective of the DFID Aquaculture intervention in the Ellembelle District of the Western Region of Ghana, was to improve socio economic conditions of community members through effective investment in sustainable livelihood interventions and market system development**.** After a rigorous economic assessment conducted in 2015, five value chains, including Aquaculture, were selected as intervention areas with the potential to increase income and jobs for the residents of the Western Region.

3.1.1 Objectives of the aquaculture intervention

The project aimed to significantly boost productivity of low-income fish farmers to meet growing demand for fresh fish by means of sustained access to: (i) quality inputs (feed, fingerlings); (ii) know how on best pond/business management practices; and (iii) diversified markets for farmed fresh fish (catfish and tilapia).

This intervention made the aquaculture industry a much more attractive investment by local farmers and provided a more robust market for aquaculture inputs/outputs despite the low level of production, scattered and distant locations from markets.

3.1.2 Implementation process

As a convener of a multi-stakeholder dialogue among government, industry and communities, the DFID implementer, Western Region Coastal Foundation (WRCF) was well positioned to implement this project to demonstrate the viability and feasibility of aquaculture for possible replication or take-up by oil companies and other stakeholders in the western region. The WRCF leveraged on its numerous dialogues to identify community needs and to negotiate the various contributions of beneficiaries and partner institutions. It is better positioned to implement more representative, tailor-made, and result-oriented interventions such as the aquaculture project due to its use of local knowledge, local expertise and commitments from a pool of stakeholders.

Aside from its position giving it a comparative advantage over others in implementing such interventions, the WRCF is also adept at the use of cross-cutting strategies to enhance project

effectiveness and outcomes. With regards to this intervention, for instance, the Foundation mainstreamed gender in the planning and implementation stages to promote participation and adoption. About 26% of direct beneficiaries (19% for demonstration and 23% for proficiency training only) were females whereas 63% of fish produced was sold to fishmongers, who are predominantly women. Through this, women are now actively and directly engaged in the fish farming business in the coastal districts – a predominantly male occupation.

DFID implemented this intervention in two stages over a period of 18 – 24 months: In the first stage demonstration ponds in selected communities were supported as a mechanism to improve the knowledge of pond farmers in best pond/business management practices and as a platform to promote business relationships between pond farmers, their prospective suppliers of inputs and services and buyers of produce.

With incentives aligned and capacities of all value chain players strengthened, WRCF encouraged other key market actors – new entrants into fish farming, financial institutions, local service providers (pond construction, security, harvesting), educational institutions, the media and local/regional government – to participate directly in advancing the growth of the aquaculture industry in line with their unique interests and capacity.

The intervention provided hands-on technical, bookkeeping and marketing training to the associations. Several classroom and field workshops were held for the farmers to upgrade their skills and also to strengthen their associations. Field exercises were conducted on WRCF demonstrations ponds sited in the districts.

The intervention was carried out with close collaboration with the Water Research Institute (WRI), Environmental Protection Agency (EPA) and Raanan Fish Feed W/A. The collaboration was effective in deploying a proof-of-concept for replication and upscaling.

The project played the role of bringing together key private, public and civil society actors in forging win/win relationships to enhance economic growth opportunities for reducing poverty and improving livelihoods.

3.1.3 Challenges addressed by the intervention.

The project identified the following specific challenges in fish farming before its intervention:

- Poor production knowledge by farmers leads to large feed wastage and poor water quality management —resulting in high production costs of catfish farming.
- About 40% reduction in fish farming (roughly 250 abandoned ponds) recorded in 2013 in the 6 coastal districts

- Weak relationships between the value chain actors at different functional levels (e.g. retailers in Takoradi not aware of catfish production in the coastal districts)
- Subsistence mind-sets among most farmers
- Lack of business and financial management knowledge
- Low access to finance
- Negative returns on investment; insecure livelihoods

3.1.4 Strategies to address the constraints.

The Project developed three key strategies to respond to and address these constraints. These include the following: (a) building capacity for knowledge transfer to boost and increase productivity (b) aquaculture value chain strengthening through improved linkages among actors (businesses, smallholder farmers, smokers, marketers, transporters, financial institutions, research institutes, government, etc.) to boost adoption of better business and management practices. (c) Changing the mindset of fish farmers from subsistence production towards commercial orientation to meet demand from within and outside the region.

This intervention aimed to significantly boost productivity of low-income fish farmers to meet growing demand for fresh fish by means of sustained access to: (i) quality inputs (feed, fingerlings); (ii) know how on best pond/business management practices; and, (iii) diversified markets for farmed fresh fish (catfish and tilapia).

3.1.5 The Project Logic Model and expected results.

The project's expected **impact** is to improve the livelihood and wellbeing of households of fish farmers in Ellembelle District through increased incomes and employment. The programme is based on the following logic and theory of change:

To increase incomes and jobs and livelihoods through improvement in productivity, profitability, and competitiveness. Farmers must develop their capacities in aquaculture management through technical and business training. This will contribute to moving them from subsistence to a commercial orientation to meet high demand coming from within and outside the Region.

When farmers and community members apply their training and knowledge to their activities and have increased productivity and profit, feed and hatchery companies will benefit immensely as farmers will buy more feed and fingerlings. These companies will therefore be motivated to participate in the project to increase their market share.

The intervention was piloted in two stages over a period of 18 – 24 months from 2016 to 2018. The major components of the intervention include the following:

- The project selected beneficiaries from the Ellembelle district and signed MoUs with key partners who play critical roles in the catfish value chain to engage them in the planning and implementation of the intervention.
- Development of a detailed catfish training manual to guide farmers in their fish farming activities.
- Training of 264 fish farmers in improved aquaculture technology throughout the pilot project. Also included in the training is environmental compliance.
- Establishment of 8 demonstration ponds with four farmer-based associations consisting of 120 farmers in total. These associations include Osagyefo Fish Farmers Association; Alhamdallah Fish Farmers Association; Ankasa Conservation Fish Farmers Association; Half Assini/New Kabenlasuazo Fish Farmers Association.
- Strengthening of the value chain by linking farmers to input supplies and buyers. Input suppliers sold inputs such as fingerlings and feeds to farmers at discounted price.

Table 6: The Project Logic Model and expected results.

Logic Model	Results Chain	Indicators	Baseline	Target	Assumptions
IMPACT- Improve the livelihood and wellbeing of households of fish farmers in Ellembelle District through increased incomes and employment	Farmers increase net additional income	Average net attributable income change (disaggregated by gender.	0	50%	Margins increase by GHC10/Fingerling /pond. 50% conversion rate
		# of beneficiaries recording positive change in annual real incomes (disaggregated by gender)	Farmers produce 600 catfish/pond @ 10 GHC/ KG x 4 ponds/ farmer		Farmers produce 1000 fingerlings/pond /6 months, Each farmer will receive training and support from service providers
	Farmers create new employment	No. of new FTE jobs created	3 farm hands/farmer	6 farmhands /farmer	
		No. of farmers improving aquaculture business			
Outcome Fish farmers increase productivity, yield and profitability by applying modern technical and managerial practices in Aquaculture	Farmers increase productivity and production	% of farmers able to increase productivity	120 farmers have been trained to increase productivity;Farmers are now doing 600 catfish/pond at		

			0.8kg/fish		
		No. of farmers able to increase production			83 % up-take rate
	Farmers earn higher margins through increased sales	% Change in profit earned by farmers	Farmers are now doing 600 catfish/pond at 0.8kg/fish	Farmers to adopt 1000 catfish/pond at 12 kg/fish	
		% change in yield by farmers	Farmers are now doing 600 catfish/pond at 0.8kg/fish	83% change in yield	
		No. of famers able to earn higher margins/profit	0	100 out of the 120 farmers to earn higher profit	
	Farmers improve knowledge of production techniques,	% of farmers able to apply the knowledge and advice received.	0	61.5 % use lime, 48.8 use fertilizer , 40.8 use netting , 6.1 use water testing , 32 % drain and fill pond	100 out of 120 farmers trained by the project apply new knowledge
	Farmers produce high quality fish suitable for high-	% of farmers who produce high quality fish for high end	0	100 farmers out of 120 trained will	100 farmers out of 120 trained will adopt good practice

	end consumer demands	consumers		adopt good practice	
	Other farmers who have not been trained adopt new/improved business	No. of other farmers who adopt improved business practices as a result of the project.	0	20 other farmers copy good practices within 6 months	20 farmers from nearby districts adopt good practices from the project
Outputs Farmers increase their capacity to produce and access markets through technical and managerial training	Farmers are trained in technical and managerial skills,	No. of farmers who receive training and advice	0	120 farmers received training	
		Type of training and advice received by farmers			
	Farmers are able to and access attractive markets	No. of farmers linked to market	0	80 out of the 120 farmers will be linked to markets	
	Farmers are supported with productive assets and extension services	No. of famers supported with productive assets and extension services	0		
		Type of services and assets provided to fish farmers	0		
	The project and partners develop linkages with high-	No. of farmers linked to high end wholesalers and retailers	0		

	end wholesalers/retailers,				
Inputs Project engages input dealers and suppliers and trainers to support fish farmers. Fish Farmers are supported by service providers including input dealers, hatcheries and fingerling producers and trainers.	Meetings held with potential service provider to provide services and input to farmers. Service Providers/trainers identified to provide services to the project	No. of partners who participate meetings to plan the support for the beneficiaries No. of trainer/Service Providers engaged to provide training to fish farmers.	0		
	Input dealers identified to partner with the project	Type of input dealers identified to support the aquaculture intervention project	0	Feed producer, hatcheries/fingerling producers, lime producers	
	Training manual in best practice aquaculture production developed.	No. of training manuals development			
	Project beneficiaries are selected to receive support in	No. of beneficiaries selected to benefit from the project support		120	

	good aquaculture practices				
	value chain analysis conducted to select intervention area	No. of value chains selected through the value chain analysis		1	

3.2 Research Design and Methodology

3.2.1 Evaluation Criteria and Key Questions

Conceptually, the evaluation covered the following criteria: appropriateness of programme design in relation to the theory of change, relevance, effectiveness, efficiency, sustainability, impact, and partnership principles. Table 7 summarizes the specific questions for these criteria.

Table 7: Summary of evaluation criteria and key questions

S/N	Criteria	Questions
1	Appropriateness	• Whether appropriate indicators were designed to track progress towards objectives • Whether the indicators were adhered to and used to monitor the programme • Whether the indicators used were specific, measurable, attainable and relevant
2	Relevance	• Consistency of programme with social and economic context of rural western region of Ghana • Identification of programme beneficiaries • Ownership of the programme by partners • Complementarity of programme with other initiatives supported by other donors
3	Effectiveness	• The extent to which the programme achieved its stated objectives – (the results achieved both qualitative and quantitative) • Assess progress towards the achievement of outcomes • The reasons for achievement and non-achievement of results and factors contributing/hindering achievement of the results
		• The extent to which capacities of the beneficiaries and partners have been strengthened. • What are the changes produced by the programme on competitiveness and commercial orientation? • Identify cross cutting strategies used to enhance programme effectiveness. • What is the strategic positioning and comparative advantage of DFID/WRCF in implementing this programme? • What is the psychographics of the early adopters of the best practices – their motivation and capabilities for adoption? • What are the challenges of those who have not been able to adopt the best practices
4	Efficiency	• The optimal transformation of inputs into outputs - efficiency; and the timeliness of the inputs and outputs.

		• Value for money adopted to ensure integrity in programme management and implementation. • How the programme has utilized existing local capacities of farmer-based organizations and institutions to achieve its outcome. • How has WRCF adhered to partnership principles identified in Programme design? • The extent to which technical assistance from Water Resources Institute informed and improved programme implementation. • The viability of the intervention in terms of cost and benefits
5	Sustainability	• The extent to which the programme addresses beneficiary priorities and demand. • Support to the programme by local institutions and integration with local social and cultural conditions • Potential for replication of best practices • Participation of partners in planning and implementation of interventions • Financial/programmatic capacity of partners to sustain the programme results when donor support has been withdrawn. • Extent to which steps have been taken to ensure that activities initiated by the Programme will be completed and continued on cessation of DFID support. • What are the recommendations for scale up of the intervention
6	Impact	• What the intended and unintended, positive, and negative, long-term effects of the programme • The extent to which changes that have occurred as a result of the programme can be identified and measured. • The extent to which the programme enabled the beneficiaries and partners to perform their duties more efficiently.
7	Partnership principles	Assess the partnership performance and outreach between WRCF and partners. • The extent to which partners perceive the partnership as effective for achieving the outcomes. • Assess the choice of stakeholders, manner, and reasons for their involvement. • Assess to what extent the programme has contributed to capacity development and the strengthening of partner. • institutions and programme
8	Underlying factors	• Are there any underlying factors beyond the control of the programme that have influenced the outcome? • What were the key assumptions made?

The ultimate result of the evaluation process is to assess the immediate effects of the intervention and identify potentials for sustainability and scale-up.

3.3 Design and Methodology

3.3.1 Approach and Design

The evaluation used a mixture of with/without and before/after approach to assess the immediate impact of the intervention. Data from the baseline survey report was used to represent the existing conditions of participants and non-participants, where available. Primary data on the post-implementation situation of both participants and non-participants was collected by the Evaluation Team to assess the effects of the intervention. The evaluation adopted a mixed-methods approach – employing both quantitative and qualitative techniques. The survey and case study methods were adopted for data collection and analyses. A cross- sectional survey was to gather the post-implementation data for both quantitative and qualitative analyses. One of the farmers' associations supported by the intervention (Ankasa Conservation Fish Farmers' Association) was studied in detail using the case study to gain more insights into the factors promoting or inhibiting the success of the especially, the pond demonstration.

3.4 Sampling and Data collection

Data was gathered from multiple sources to assess the intervention against the criteria identified above. A desk study to review relevant documents was carried out to aid the development of appropriate indicators and reliable instruments for data collection. These documents include the Baseline Survey Report, Aquaculture Intervention Report, M&E plan and progress reports. Following this, a structured questionnaire, interview guides and checklists, and key questions for focus group discussions (FGDs) were developed. The questionnaire was pre-tested to improve on the reliability of the instrument, validity of data and wording of sensitive questions.

A sample consisting of 82 farmers was surveyed. This fell short of the target of 100 farmers due to spatio-temporal difficulties in locating some of the fish farmers. The detailed distribution of the sample is provided in Table 2. Table 2 indicates that primary data was collected from farmers from 16 communities in the three project districts. The 82 farmers consisted of those who were beneficiaries of only the proficiency training from the WRCF intervention; beneficiaries of both proficiency training and pond demonstration from the WRCF intervention; and those who did not benefit from the WRCF intervention. The team recruited and trained 4 enumerators to use them in the survey.

Further, 4 focused group discussions (FGDs) were conducted with the 4 farmers' association which benefited from the pond demonstration. Key informants from the Fisheries

Commission, Water Research Institute, the Western Regional Coastal Foundation, Raanan Fish Feeds and KPEMLI Hatcheries were purposively selected and interviewed. Staff of oil companies such as the GNPC and the ENI were interviewed on possible adoption of the intervention as a CSR initiative. The Team also embarked on site visits (demonstration pond sites) to observe and triangulate some of the responses in the surveys and FGDs.

Table 8: Category of respondents according to communities.

Name of Community	**Benefit from WRCF Aquaculture project**			**Total**
	Proficiency training only	Proficiency training and demonstration	None	
Ampain	9	0	1	10
Ankasa	1	5	0	6
Anyinase	0	1	0	1
Awiebo	0	2	1	3
Bonyere	0	2	0	2
Elubo	1	3	0	4
Esiama	0	1	0	1
Ezinlibo	0	1	0	1
Half Assini	0	5	1	6
Kamgbunli	5	24	0	29
New Ankasa	0	2	0	2
Nsein	4	2	2	8
Nyamebekere	3	3	0	6
Paradise	0	1	0	1
Takinta	0	1	0	1
Tikobo 2	0	1	0	1
Total	**23**	**54**	**5**	**82**

Source: Aquaculture Evaluation Survey, 2023

3.4.1 Data Analyses

Three main analytical techniques are used to analyze and interpret the data. Much of the survey data was analyzed using descriptive statistics such as frequencies, percentages and means. Bar charts and line graphs as well as cross-tabulations are used to represent much of the data. Some of the more specific effects and impacts of the intervention are analyzed using inferential statistical techniques such as *t*-tests, one-way ANOVA, and ordinary least squares (OLS) regression. The Statistical Package for Social Scientists (IBM SPSS version 24) was used for the quantitative analyses. Thematic analysis was used to interpret the qualitative data gathered from the key informant interviews and the focus group discussions. This offered the opportunity to provide detailed, balanced and insightful information to support the quantitative results as well as to respond to the qualitative criteria in Table 1.

3.4.2 Quality assurance

The team put various measures in place to ensure reliable, quality and valid data. In-depth study of the relevant project documents and the pilot survey aided in the development of reliable evaluation tools. The team also recruited experienced enumerators, properly trained them and supervised them to ensure that valid data is collected. The team leader supervised the enumerators to ensure that they recorded the exact responses from farmers. Also, some of the individual responses were triangulated during FGDs and vice versa. The data was properly coded, entered and edited to obtain a clean and accurate database.

3.4.3 Data validation

A validation meeting was organized with the staff of the WRCF to present the initial findings of the evaluation assignment to confirm and affirm the evaluation findings. This also provided an opportunity for other stakeholders to make valuable inputs into the draft repo

CHAPTER FOUR

4 ANALYSES: RESULTS AND FINDINGS

Overall, the aquaculture intervention, especially the pond demonstration, has been successful in achieving its set goal, objectives, and outcomes.

4.1 Appropriateness

The intervention had two main objectives. The first objective focuses on improving the household incomes of fish farmers within the project districts. The additional net income earned by fish farmers from their fish farming enterprises was used to measure the achievement of this objective. However, the mid-term and end of project tracking of achievement of the intervention used the earnings from the demonstration ponds as a proxy for earnings by farmers. It was anticipated that farmers' earnings (represented by earnings from the demonstration ponds) would increase by 60% at the end of the project – a target which is specific, measurable, attainable, relevant and time-bound (SMART). It should be noted, however, that much as earnings from demonstration pond could be used as a proxy for measuring the achieve of this objective, it would be more appropriate to use actual earnings from the individual ponds of early adopters because earnings from demonstration ponds will not be reflective of the actual earnings per pond by farmers.

The second objective focuses on increasing job creation through fish farming. The achievement of this objective was to be measured by the number additional people entering the fish farming business and the number of jobs created by the 120 farmers who benefited from the demonstration. These indicators are both specific, measurable, attainable and relevant.

4.2 Relevance

The aquaculture intervention was found to be consistent with the social and economic context of the rural western region of Ghana. There is high incidence of poverty in rural western region, especially those in coastal districts. The average regional incidence of poverty in the region is about 19.2%.[17]Excepting the Sekondi-Takoradi Metropolis, poverty incidence in all coastal districts are higher than the regional average. These include Jomoro (30.7%), Ellembelle (19.9%), Nzema East (32.2%), Ahanta West (19.3%) and Shama (21.7%). The primary economic activities of people in these districts are mostly subsistent and traditionally agrarian. These include artisanal fishing and crop farming. These activities have been adversary affected by climate change and extractive

[17] Ghana Statistical Service, 2015. Ghana Poverty Mapping Report. Accra: Ghana Statistical Service

industrial activities such as oil exploration and extraction. Faced by dwindling marine fish stock, decreasing crop yield, and increasing land scarcity, these smallholders are in dire need of alternative and/or supplementary sources of income to mitigate the effect of climate change and land scarcity as well as meet their daily needs. Therefore, this project, which seeks to provide alternative sources of income for households in the coastal districts of the western region, is not only consistent with the socio-economic context of the western region but it is both timely and appropriate in meeting the needs of these rural folks.

The identification of project beneficiaries is critical to the relevance and success of a project. The project targeted people who already have interests in fish farming such as existing fish farmers and dormant fish farmers. Other beneficiaries were new entrants who showed interest in the project during the project formulation and planning stage. The project also used invigorated farmer groups as conduits for reaching target groups. The selection of beneficiaries based on experience or interests and the use of farmer groups greatly influenced participation and adoption.

The evaluation also found that beneficiaries have a high sense of ownership to the project, especially the demonstration ponds. The claim of ownership stems from the substantial contribution the farmer-based organisations made to the intervention. The farmers' associations donated a pond to be used for the demonstration and they provided labour for pond reconstruction, management and marketing. They also kept 60% of the proceeds from the demonstration ponds and used it as a revolving fund. The 40% was to be given to the pond owner who was an active member of the respective association. This strategy has instilled a sense of ownership in the fish farmers.

The WRCF aquaculture intervention was also found to be complementary with other livelihood interventions in the area, including donor interventions. The Jomoro and Ellembele districts had benefited from a government project on fish farming leading to the proliferation of fishponds. However, many of these fishponds had been abandoned due to high cost of production, lack of profitability and lack of technical support. This government project served as a foundation and a steppingstone for the aquaculture intervention. The intervention was also consistent with other livelihood interventions in the coastal districts such as green farming by Asnap (a jubilee partners' livelihood project) and a cassava project by BBovid, both in 2016.

4.3 Partnership principles

The WRCF satisfactorily adhered to its partnership principles in implementing the aquaculture intervention. Partnership performance as rated by partners ranged between 65% and 75%. Overall, all partners were satisfied with the performance of the WRCF in this pilot intervention. Partners partly

attributed the high adoption rate among beneficiaries to the effective coordination by the WRCF. In fact, according to the Water Resource Institute, this is by far the most effective project in the whole of their engagement with fish farmers in Ghana due partly to effective partnership and coordination by the WRCF.

The WRCF involved many stakeholders in the planning and implementation of the aquaculture intervention. Involvement of stakeholders was based on their potential contributions to the success and sustainability of the project. Input dealers such as Raanan and Kplemli supplied inputs to farmers at discount rates whereas the Fisheries Commission and the Water Resource Institute provided the technical expertise in the proficiency training and pond demonstration. The farmers, working through the various associations, provided pond, manual labour and others during the training and demonstration. The WRCF was the lead implementer. These stakeholders were strategically selected to provide the right institutional framework needed for effective project implementation and sustenance.

4.4 Efficiency

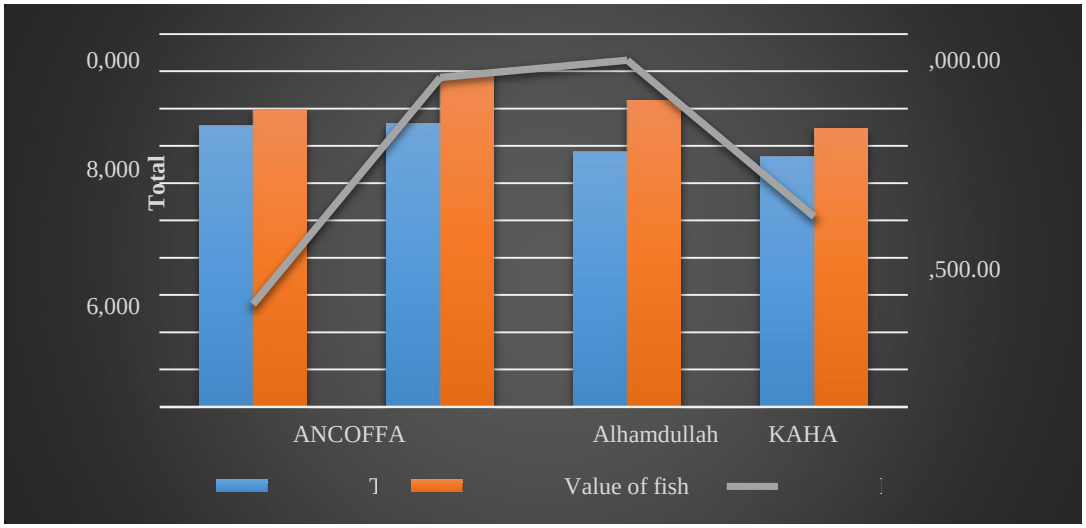
The aquaculture intervention was very timely because existing fish farmers were using rudimentary technology in production, thereby making their ventures unprofitable. Thus, many existing farmers were on the verge of given up on fish farming. More than a quarter of fish farmers had also become dormant, and the venture looked unattractive to new entrants.

Below, the report presents results on the efficiency of the project by drawing on the project completion report as well as key informant interviews.

4.4.1 Input-Output Efficiency

The delivery of project inputs was timely, and this ensured timely commencement of production. Also, though there was breakeven at first, data from the project completion report indicates the transformation of inputs to outputs has been efficient. All the 4 farmer-based associations made profits after the first production cycle, indicating an optimized utilization of inputs. This is captured in Figure 7

Figure 7: Profitability of demonstration ponds according to associations



Source: DFID Aquaculture Intervention Report, 2023

Furthermore, the high level of the adoption of best practices by farmer-based associations led to efficiency in feeding, reduction in fish mortality as well as increase in the weight of fish produced, compared to the baseline. Overall, feeding was very efficient resulting in a feed conversion ratio of 1.4, an improvement on a baseline of 4.0. Also, information from the intervention report indicates that average mortality for the demonstration ponds after the first production cycle was 6.25% - tremendous reduction in a baseline of over 60%. Also, average fish weight was around 1kg indicating an improvement in the prior-project weight of 0.8kg. These indicators point to the conclusion that the transformation of input into output has been very efficient. Current data from the demonstration ponds for ANCOFFA show some improvements in the above efficiency indicators.

4.4.2 Value for money

The intervention was also found to be value for money. In fact, all partners of the project were unanimous on this fact. On value for money, the comment of one of the key informants captures adequately and succinctly the reason for such a unanimous response from partners:

Value for money can be measured at economy, efficiency, effectiveness, and equity levels. At the economic level because the old ponds had sunk cost, the actual money used for the reconstruction was reduced. When you look at efficiency in terms of input output ratios, there is a break-even at the first-year profit subsequently. One aspect of the efficiency gains was the improved feed conversion ratio. As a result of the improved technology adopted at the demonstration farm, you need only small

amount of feed to gain greater number of fish. [In terms of] …effectiveness… only about half of the beneficiaries adopted the new practice in their own farms and

became gainfully employed. In addition to that, some people were also engaged in paid job for constriction of pond including digging, mason work and weeding…..In terms of equity, it provided opportunity for both men and women to participate in some aspects of the jobs – Key Informant

As can be seen later in this report, this comment was well on point and supported by the quantitative analysis presented in this report. Based on the four-fold criteria of economy, efficiency, effectiveness, and equity, it is concluded that the project is value for money. The report is replete with both qualitative and quantitative evidence to support this conclusion (see sections on efficiency, effectiveness and impacts in this report for details).

4.4.3 *4.4.3 Economic viability*

The DFID aquaculture intervention in the Western Region of Ghana is economically viable. As indicated above, demonstration ponds made profits even after the first production cycle. Current data from ANCOFFA shows that the demonstration ponds are still making profit (about GHC 850). This shows that the direct benefits from the demonstration ponds outweigh the direct costs. In addition, the project has indirect benefits such as provision of extra incomes and jobs for fishmongers and input suppliers. At the individual farmer's level, the adoption of improved technology has resulted in increased profitability and household income. It has also created extra jobs for pond diggers, masons, head potters and others. In sum, the project can be described as economically viable because both the direct and indirect benefits far outweigh the total cost of the project.

4.4.4 *4.4.4 Utilization of the technical assistance from the Water Resource Institute*

The technical assistance from the Water Resources Institute was critical to the success of the project. The Institute provided technical backstopping in all aspects of the intervention relating to fish production including: proficiency training, site selection, pond construction, water quality improvement, harvesting and so on. The success of the demonstration ponds can partly be attributed to the technical assistance of the Institute. Some of the mechanisms through which this technical backstopping informed and improved the implementation of the intervention include the following:

- the selection of suitable sites with adequate water supply for pond demonstration as well as for individual ponds (through adoption)
- the selection of site based on soil testing.
- the reconstruction of demonstration ponds to meet standards for optimum production. This subsequently assisted farmer to reconstruct their own ponds to standard.
- construction of monks in demonstration ponds to control water spillage and to improve farmers' bargaining power in selling their produce.
- water quality testing through checking for oxygen levels, water temperature, pH levels, fertility levels and water suitability
- protection of fish from predators by fencing and covering ponds.
- pond sanitation improvement through weeding around ponds and avoidance of chemical usage near ponds

The use of these best practices as advised by the Water Resource Institute helped reduce fish mortality and increased fish weight.

4.5 Effectiveness

The project has made some tremendous progress towards the achievement of its objectives. With regards to improvement in household incomes, fish farming provides about 15.5% of the monthly household incomes of farmers who benefited from the pond demonstration intervention. The survey revealed that fish farming contributes about GHC 220.45 to monthly household incomes among demonstration beneficiaries. With regards to job creation, the intervention has provided new jobs and employment to people in the participating coastal districts. About 21% (19 farmers) of farmers supported by the projects were new entrants. Also, about 60% of new entrants who were non-beneficiaries became fish farmers due directly to the WRCF intervention. Further, about 26% (21) of beneficiaries were also dormant farmers whose fish farming ventures have been revived through the intervention. When revived dormant farmers are considered, the programme can be judged as having achieved its target of 40 additional farmers entering the industry. Job creation by beneficiaries has also increased markedly. Before the intervention, existing farmers employed.

2 to 3 additional hands on their farms. However, beneficiaries were able to employ 4 additional hands on the fish farms within the next past two years. This indicates that the intervention exceeded its target of 3 farm hands per farmer.

4.5.1 Progress towards project outcomes

The project has also made remarkable progress towards the achievement of its outcomes. As noted earlier, the evaluation mainly focused on the outcomes for individual farmers instead of the demonstration ponds. It was found that yield per pond for demonstration beneficiaries has increased markedly. The average yield per pond has increased from 600 catfish per pond to 980 catfish per pond. This represents about 63.3% increment over the baseline. The yield per pond for individual farmers also exceeded the intervention target of 900 catfish per pond. However, the earnings per pond for individual farmers fell short of the target due primarily to low price per a kg of catfish. On average, farmers sold catfish for GHC11/kg, instead of the targeted GHC13/kg. This resulted in an average earning of GHC10,780 per pond after a production cycle instead of the GHC11,700 per pond.

The evaluation revealed a high adoption rate for both active and non-active farmers who participated in the pond demonstration. About 74% of them were satisfactorily adopting best practices in aquaculture. Thus the intervention has exceeded its 60% target. However, not all farmers are currently active. Only 38 farmers (32%) out of the 120 farmers who benefited from pond demonstration are still active. The survey also revealed that every farmer trained has gained improved knowledge in aquaculture best practices. Also, feeding efficiency on individual farms has improved tremendously.

Feed conversion ratio has reduced from 4 to 1.4 for beneficiaries of pond demonstration. Non-beneficiaries (except one) were not able to estimate their feed conversion ratio. Moreover, the cost per pond has reduced markedly. Individual farmers achieved a feeding cost efficiency of GHC7.0/kg of fish thereby exceeding the intervention target **GHC7.6/kg.**[2]

4.5.2 Capacity development and strengthening of partners and beneficiaries.

The intervention was found to have contributed immensely to the development and strengthening of partner institutions and beneficiaries. The Fisheries Commission and the Water Resource Institute have long sought opportunities to reach out to fish farmers. This programme provided the right kind of opportunity. The Water Resource Institute is now planning to roll-out support for farmers with similar interests and enthusiasm. The Fisheries Commission indicated that it is now better placed to support farmers in their activities because they are now well organized into functional associations, thanks to the WRCF intervention. Hitherto, they found it very difficult to support farmers because they were very much disorganized. These two institutions have gained experience in working directly with local farmers at the grassroot. Further, input dealers have expanded their customer net. Kpemli also benefited from the project by using some of the supplied feed for its hatcheries. All these institutions and suppliers are now better placed to function well in the aquaculture value chain in the western region due to the WRCF aquaculture intervention. This notwithstanding some partners expected the WRCF to engage more stakeholders and be much more forthcoming when needed by partners on certain issues relating to the project.

Furthermore, the intervention has strengthened the capacity of farmers in fish farming, thereby reviving a collapsed micro-industry. Farmers are now equipped with best practices in fish farming including improved methods of pond construction; stocking and feeding; water quality management; harvesting; fish processing and marketing. It has been able to unmask the enormous profitability of fish farming to these farmers. Moreover, farmer associations have become organized and functional and are now more equipped to support individual farmers. Membership of associations has increased since the commencement of the intervention.

[2] Feeding cost was estimated as total cost of feed/total kg of fish.

ANCOFFA, for instance, has increased from a prior-project membership of 12 to a membership of 34. Associations like Alhamdullah in Kanbunli now buy feed in bulk and supply them to member farmers thereby reducing transportation cost.

4.5.3 Competitiveness and commercial orientation

Fish farming in the coastal districts has now moved from being predominantly subsistence to a commercial venture. The intervention has changed the mind-set of farmers from producing for subsistence to commercial production. The farmers associations have also assumed a new role – supporting their members to produce for the market instead of for consumption. Some of the changes induced by the project include the following:

- **Increment in stocking levels to produce for the market**: The average stocking capacity for farmers has increased. Intervention beneficiaries now stock more than 1000 fingerlings per pond. Previously, the majority of farmers stocked between 100 and 1000 fingerlings per pond. The increase in stocking is indicative of the commercial orientation of fish farming in the coastal districts.
- **Use of improved feed management and water quality practices to increase fish weight:** Farmers have now adopted improved feed management strategies to increase fish weight and quality. Previously, farmers used to feed fish once with mainly kitchen waste such as leftovers of banku, gari and fish stock. However, farmers now purchase quality feeds from Raanan fish feeds and feed fish thrice a day. They now weigh both feed and fish before feeding thereby reducing over-feeding and under-feeding. They also observe feeding behaviour by fishes during feeding. Likewise, they now check the temperature, oxygen, pH and fertility levels of water and change the water when the water starts to change colour. All these measures are meant to produce quality and healthy fish to make them more competitive on the market.
- **Use of the monk system**: About 22.2% of farmers who benefited from the demonstration are using the monk system to aid harvesting and marketing. In fact, the use of monk was only found among demonstration beneficiaries. The use of the monk system gives farmers more bargaining power in marketing. It ensures that buyers do not take advantage of farmers during harvesting of fish. This goes a long way to demonstrate that farmers are now prepared for the market. In fact, a subsistence and non-competitive production would not need a monk system.

- **Scaling, sorting and grading before pricing according to weight**: Farmers are now selling their fish by weight in kilos. They now scale their fish, grade them and sort them into weight to optimize their sales.
- Supply of produce to fishmongers, restaurants, hotels and other bulk buyers.
- Farmers are now using improved smoking methods acquired from the WRCF aquaculture intervention to preserve colour and taste. This enhances the competitiveness of catfish in the market.

4.5.4 Factors influencing adoption and achievement of results for farmer-based associations: a case study of the Ankasa Conservation Fish Farmers' Association (ANCOFFA).

The Ankasa Conservation Fish Farmers' Association (ANCOFFA) is a farmer-based association in New Ankasa in the Western Region of Ghana. It is a 34-member association with many of its members coming from neighboring communities such as Elubo, Ankasa and Paradise. This association is one of the 4 fish farmers' associations that benefited from the pond demonstration. The technology adoption report revealed that members of this association outperform those of the other three associations in the adoption of aquaculture best practices. Thus, the evaluation sought to identify the success factors.

The average demonstration pond size for ANCOFFA is 97.68m^2. Averagely, farmers spend only an hour on the demonstration pond in a day. The average fingerlings stocked in the latest cycle in the demonstration ponds is 1200, with a mortality rate of only 5%, indicating a rather stable mortality rate since the first production cycle. The association has also been able to maintain a very efficient feeding level, with a Feed Conversion Ratio of 1.5. ANCOFFA is now producing in a production cycle of between 4 and 5 months and it is able to harvest twice in a year. This implies the association has been able to maintain the short production cycle since the commencement of the pond demonstration.

The average weight of catfish harvested by ANCOFFA is 1.5kg, about 50% improvement on the first cycle production. It also sells catfish to bulk buyers at the rate of GHC 12/kg. Though there is a slight reduction in price, the association is able to earn more than before due to more fish weight. It now produces fish valued at about GHC 20,520, exceedingly markedly the intervention target of GHC 11,700 per pond. On average, the association is able to make a profit of GHC 850 after a production cycle. ANCOFFA, however, faced some initial difficulties in marketing their produce. According to the FGD,

"The demonstration was our first commercial experience so that was used to identify market outlets and centers. For that matter we had to travel far and wide outside the district and that increased out marketing cost." – FGD 1

Currently, it takes about 45 days for the association to sell all its fish stock. This notwithstanding, the association has been able to establish nursey ponds to be able to supply timely fingerlings for both the demonstration ponds and for the ponds of individual members.

The FGD revealed that three main factors underlie the high performance of ANCOFFA over other associations with regards to the adoption of best practices and sustenance of the pond demonstration. The most important reason is the high commitment and dedication of its members. The major recurring response during the FGD was the active participation of its members since the project commenced. This has optimized time spent at ponds and improved work efficiency. The FGD revealed that:

"The association has now realized the potential profitability of the aquaculture venture, and this has boosted the active participation of the members in the association's activities. Active membership has increased from 12 to 34" – FGD

At the individual level, some members of the association formed partnerships to pool resources together to circumvent the problem of lack of start-up capital. This demonstration of solidarity energized and motivated members to actively participate in group work and to work together for the common good.

Another reason behind the high adoption and sustenance is the relatively higher educational attainment of members of ANCOFFA. The survey revealed that about 58% of the members of ANCOFFA have at least (senior) secondary education, and this is the highest for the 4 associations. This information is presented in Table 9

Table 9: Educational levels of respondents under various associations

Educational level	Name of Association			
	ANCOFFA (%)	Alhamdallah (%)	KAHA (%)	Osagyefo (%)
No formal education	0.00	3.45	10.00	8.33
Primary education	8.33	10.34	10.00	8.33
JHS	33.33	51.72	50.00	50.00
SHS	25.00	17.24	10.00	16.67
Tertiary	33.33	17.24	20.00	16.67
Total	100.00	100.00	100.00	100.00

Source: Aquaculture Evaluation Survey, 2023

The analysis revealed that farmers with secondary education or higher have a significantly higher rate of adoption than those who do not have at least secondary education (*mean diff.* =

0. 754; t = 2.742; p < 0.05).

The higher educational attainment of ANCOFFA members enabled the members to have a better appreciation of the profitability of aquaculture best practices and the benefits of collective action in achieving a common goal. This facilitated the success of the group.

Another related factor is the association's strict adherence to the skills and knowledge gained from the proficiency training as well as expert supervision during the demonstration.

4.5.5 Factors influencing adoption and achievement of results for individual farmers.

Four main factors were found to influence the achievement of results. Firstly, the project was able to achieve many results because of the willingness of the beneficiaries and the acceptability of the project content to the beneficiaries. The WRCF targeted people with some experience and interest in fish farming. Existing and dormant fish farmers were the main beneficiaries of the intervention, and this influenced the adoption and achievement of expected results. Most of the early adopters (about 79%) were existing farmers who had some rudimentary knowledge in fish farming from a previous intervention by the government. Table 4 captures a summary of some of the results from individual farmers according to their types.

Table 10: Average results for selected indicators from individual fish farms.

Type of fish farmer	**New entrant**	**Dormant farmer**	**Existing farmer**	**Total**
Number of ponds owned	1.38	2.05	3.43	2.72
Average pond size (m^2)	49.56	66.14	115.22	90.99
Number of fingerlings stocked	581.25	509.38	1120.52	907.00
Mortality rates (%)	21.40	12.16	6.79	9.31
Frequency of feeding in a day	2.38	2.59	2.79	2.69
Latest feed conversion ratio	1.50	1.52	1.40	1.43
Average adoption rate (max. 5)	1.40	2.19	3.37	2.61
Frequency of harvesting per year	1.75	1.41	1.66	1.59
Percentage of fish harvested	81.25	77.50	86.72	83.85
Duration of marketing after fish are matured (days)	5.00	9.38	25.38	19.66
Price of a kg of matured fresh fish (GHC)	10.00	9.25	11.56	10.89
Amount of profit in a production cycle (GHC)	80.00	420.00	2220.95	1263.66

Source: Aquaculture Evaluation Survey, 2018.

Table 4 shows that most of the indicators favour existing farmers than dormant farmers and new entrants. More specifically, stocking levels, fish mortality rate, feed conversion rate, adoption of best practices, percentage of fish harvested, price of fish and profit are all in favour of existing farmers.

The second factor influencing achievement of results at the individual farmer level is the early signal of the profitability of the adoption of aquaculture best practices by the WRCF intervention. The intervention was timely because it was implemented at a time existing fish farmers were making huge losses in their business due to procurement of weak fingerlings, high mortality rates, lack of access to inputs and buyers, and above all, the lack of technical knowledge in aquaculture best practices. However, the proficiency training enlightened farmers and made them aware of the causes of losses and low outputs. It also provided the solutions to these problems thereby making farmers hopeful in their ventures. This rekindled their interest in the fish farming business and made them adopt these best practices for improved profitability. This was a unanimous response from individual farmers in the survey and the FGD meetings.

Coupled with the above is farmers' zeal to commercialize their fish farming ventures. The main motivation of the adopters of best practices was their zeal to make profit from their fish farming business to supplement their household incomes. This was moderated by the factors already discussed, viz., the prospect of the improved pond management techniques in facilitating the achievement of their goals. Following are a sample of survey responses by the early adopters:

> *"The training was very good and it improved production and quality of fish." "It looked profitable; it was easy to manage."*

> *"Because the improved management technology is more profitable." "Because I have adequate skills and was assured of profit."*

These responses, among others, shed lights on the main motivation of the early adopters. The main motivation is the unification of the zeal to make profit and the profitability of the improved technology delivered by the WRCF intervention.

Another positive factor is the use of invigorated farmer associations as vehicles for information dissemination, beneficiary selection, and project planning and implementation. This strategy enabled quick sensitization and community awareness creation as well as buy- ins. It also facilitated adoption through peer support in pond construction, access to pump, and technical advice. The lead farmers in the association served as the technical advisers in the absence of experts, thus providing continuous support for farmers. Another factor influencing achievement of results was the sense of ownership to the demonstration ponds due to the substantial contribution made by the farmer-based associations to the demonstration.

The major challenge to adoption is lack of adequate financial capacity to expand ponds and to purchase inputs. The adoption of best practices is capital intensive. Farmers need the kits for testing water quality, weighing feed and fish. They also need the initial capital to purchase the large quantities of fingerlings and feed needed for optimum production. High feeding cost, in particular, is a major obstacle to adoption. As noted earlier, only 32% of demonstration beneficiaries are still active in fish farming. Almost every beneficiary who is not active in fish farming pointed to the lack of capital as the major factor leading to non- adoption. Below is a sample of survey responses to this effect:

"I am currently not active because of financial difficulties." "I need logistical support to be able to start producing. "I am now managing to get a pond. "I am not producing because of lack of capital."

The above responses are just a few of the responses from non-adopters showing the role financial capacity plays in the achievement of intervention results. In fact, those who had the requisite capital were able to expand their ponds, increase stock capacity and purchase feed.

4.5.6 Immediate effects at the level of the individual farmer

Individual farmers in the survey are categorized into three groups. These include beneficiaries of proficiency training and pond demonstration; beneficiaries of only proficiency training; and non-participants (none). Thus, the analyses in this section compare these three groups for each indicator with a major emphasis on beneficiaries of both proficiency and demonstration.

4.5.7 Adoption of improved aquaculture technology

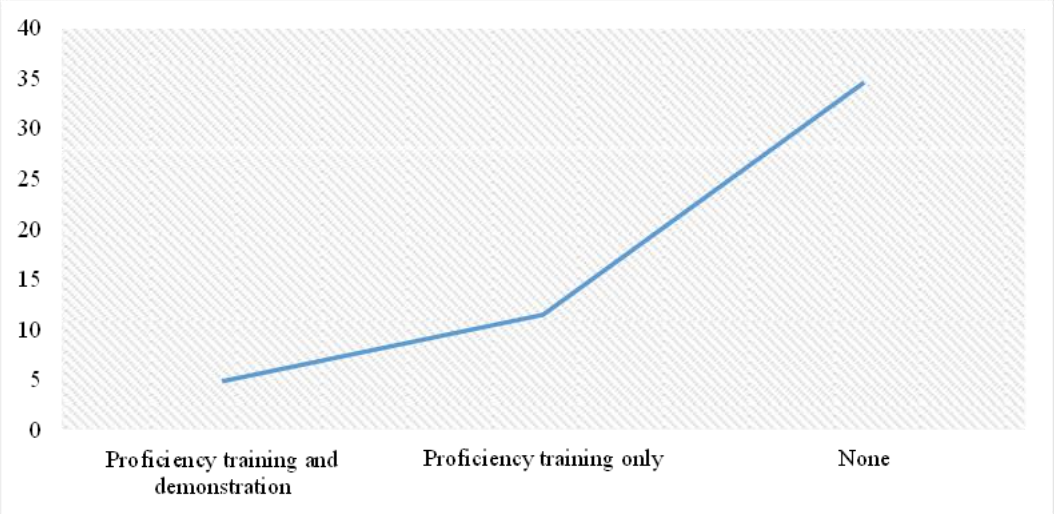
The survey revealed that farmers have been adopting improved aquaculture technology due to the project intervention. Farmers who benefited from the pond demonstration are adopting improved aquaculture technology than those who benefited from only the proficiency training. Beneficiaries of only proficiency training were in turn, adopting best practices more than non-participants. Put together, the analysis revealed that demonstration beneficiaries were significantly adopting best practices as against non-beneficiaries of pond demonstration ($t = 2.820$; $p < 0.01$). The details of improved aquaculture technology are considered in the analyses with the average rate of adoption by the three groups.

4.5.8 Stocking, Fish mortality and Feeding efficiency.

The survey revealed that the intervention has increased farmers' stocking levels. The average prior stocking quantity by farmers was 600 fingerlings. However, the average quantity of fingerlings has increased markedly to 1005 fingerlings per pond, as against 664 fingerlings for proficiency-only beneficiaries and 650 for non-participants.

Fish mortality rate has reduced tremendously for demonstration beneficiaries as against non-beneficiaries of demonstration. This is captured in Figure 2.

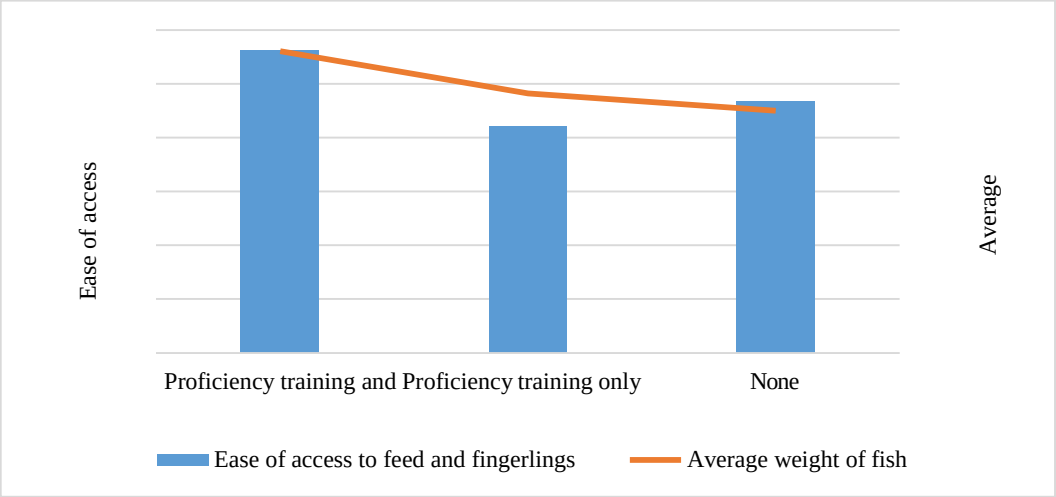
Figure 8:Average mortality rate by category of respondents



Source: Aquaculture Evaluation Survey, 2023.

Figure 8 reveals that whereas the average fish mortality rate has reduced from 60% prior- project to only 4.83%, that of those who only benefited from proficiency reduced to 11.46% whereas that of non-participants reduced to 34.62%. The effect of the project on fish mortality is evidently seen when that of project beneficiaries are compared with non- beneficiaries.

Figure 9: Ease of access to fingerlings and average fish weight



Source: Aquaculture Evaluation Survey, 2023

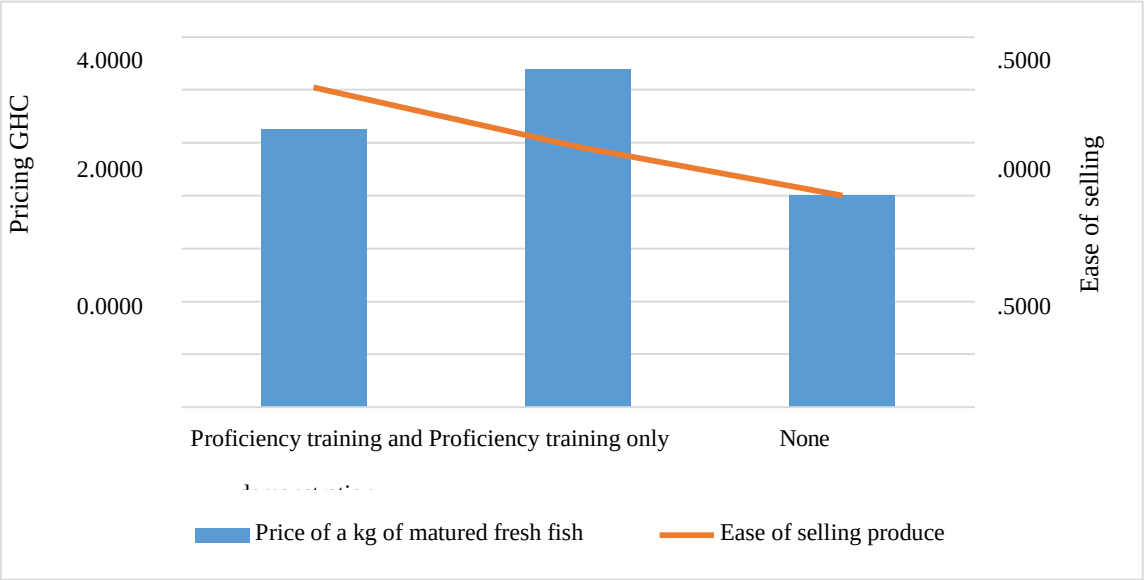
The WRCF aquaculture intervention has also improved access to quality feeds and fingerlings. Farmers' attitude towards feeding has been altered by the intervention. They no longer feed fish with food waste such as Banku, fufu and gari but now purchase quality feeds. They now feed fish three times a day. The driving force behind this change in feeding behaviour is the ease of access to feeds. This is illustrated in Figure 3. Beneficiaries of the demonstration have a higher ease of access to feed and fingerlings than others.

Furthermore, the project has helped improve feeding efficiency among individual farmers. Feed conversion ratio (FCR) has improved from 4.0 prior to the project to 1.4 after the project. This has further improved the weight of fish produced for the market. Figure 4 shows that the average weight of harvested fish for demonstration beneficiaries has increased from 0.80kg prior to the project to 1.12kg after the project. This is contrasted with 0.96kg and 0.90kg for proficiency-only beneficiaries and non-participants respectively.

4.5.9 Marketing

The intervention has improved the marketing of the produce of fish farmers in the project districts. The WRCF linked farmers to potential bulk buyers such as fishmongers, chop bars, restaurants, and hotels to ease marketing. Due to this, demonstration beneficiaries have ease of access to buyers than proficiency-only beneficiaries, who in turn have higher ease of selling produce than non-participants. This is shown in Figure 4.

Figure 10: Average fish price and ease of selling fish

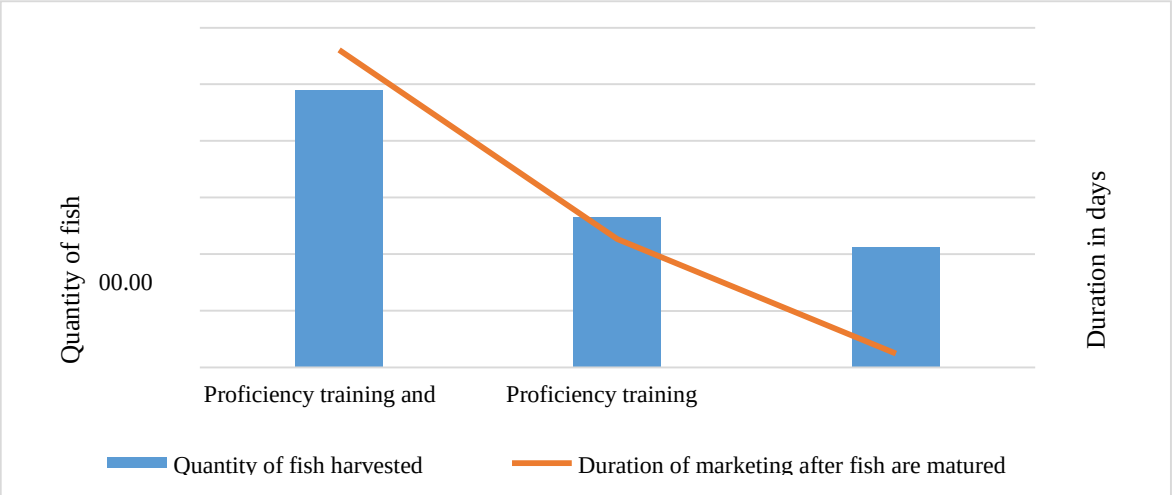


Source: Aquaculture Evaluation Survey, 2023

Notwithstanding the ease of access however, Figure 10 reveals that demonstration beneficiaries have lower prices per kg of fish than proficiency-only beneficiaries. Whereas demonstration beneficiaries sold a kg of catfish for GHC 11, proficiency-only beneficiaries sold fish for GHC13/kg. However, the price for demonstration beneficiaries was higher than that of non-participants. The main reason behind the disparity between price per kg for demonstration beneficiaries and proficiency-only beneficiaries is the increased yield accompanying the adoption of best practices by demonstration beneficiaries. As captured in Figure 10 demonstration beneficiaries have about 84.56% more yield than proficiency-only beneficiaries, and 130.59% more yield than non-participants. This has resulted in long duration of selling all fish after they are matured. For this reason, farmers have sought to be more competitive by beating down the price to be able to sell all their produce and start a new

production cycle. Thus, the reduced price is seen to be a marketing strategy rather than a direct adverse effect of the demonstration intervention.

Figure 11: Quantity of fish harvested and duration of marketing.



4.6 IMPACTS

The goal of the intervention is to improve household incomes and create jobs in the coastal districts of the western region. Below, the report discusses the impacts of the intervention with regards to household income, job creation and others.

4.6.1 Contribution to household income

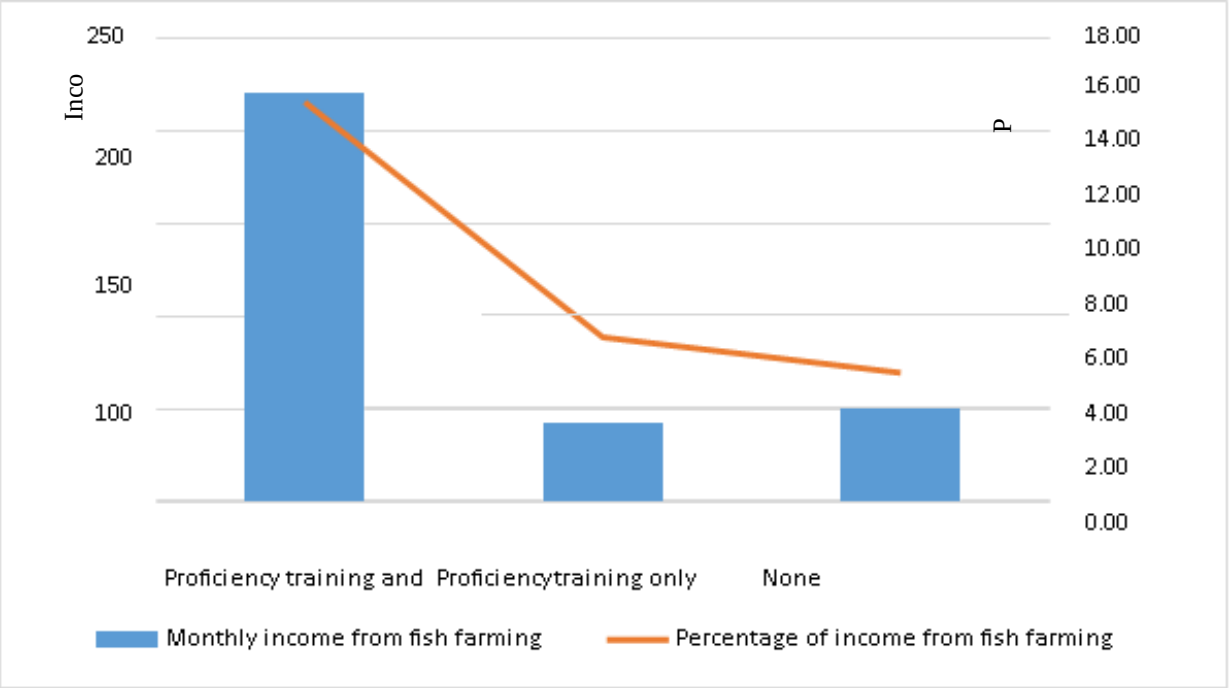
The WRCF intervention has improved the profitability of fish farming in the project districts. Participants in the demonstration intervention have significantly higher profit than farmers who did not participate in any aspect of the intervention (***F-ratio = 4.635; mean diff. = 1198.70; p <0.05***). In terms of household income, farmers who benefited from the demonstration ponds have more household income than non-beneficiaries of the demonstration ponds. This is summarised in Table 11

Table 11: Contribution of fish farming to monthly income.

Beneficiary Category	Monthly Income (GHC)	Contribution fish farming to monthly income (GHC)	Percentage of income from fish farming
Proficiency training and demonstration	1420.19	220.45	15.52
Proficiency training only	671.74	42.86	6.38
None	1000.00	50.00	5.00

Table 11 and Figure 12 show that fish farming contributes more to the household incomes of demonstration beneficiaries than non-beneficiaries of the demonstration intervention. Demonstration beneficiaries have 177.59% more income from fish farming than proficiency- only beneficiaries, and 170.45% more income than non-participants. Also, whereas fish farming contributes 15.52% to the household incomes of demonstration beneficiaries, it contributes only 6.38% and 5% to the household incomes for proficiency-only beneficiaries and non-participants, respectively. The inferential analysis showed the differences in the contribution of fish farming to monthly income between demonstration beneficiaries and others to be significant (*F-ratio = 5.560, mean diff. = 177.59, p <0.03 for proficiency-only beneficiaries; and F-ratio = 5.560, mean diff. = 170.45, p <0.08 for non-participants*).

Figure 12: Contribution of fish farming to monthly income



Source: Aquaculture Evaluation Survey, 2023

An ordinary least squares (OLS) model was fitted to examine the relationship between monthly household income and participation in the pond demonstration among other factors. The results of the OLS model are captured in Table 6.

Table 12: Results of the OLS model on total monthly income

Variables	Coefficients	t
(Constant)	-136.243 (853.257)	-0.165
Benefit from Pond Demonstration	706.825 (358.270)	1.942*
Secondary education	744.992 (419.500)	2.222
Sex	-384.896 (279.866)	-0.962
Age	14.373 (15.915)	1.096
Number of hours spent on fish farming a day	-96.796 (153.600)	-1.058
Quantities of fingerlings purchased at a time	0.558 (0.308)	2.856*
Average pond size	3.314 (2.253)	2.601**
Number of bags of feed purchased per month	-24.824 (13.047)	-2.271*
R^2		0.405
Adjusted-R^2		0.304
F-ratio		4.006****

*p <0.10; **p <0.05; ***p <0.01; ****p <0.001. Standard error in parenthesis and bootstrapped using 95% bca.

Source: Aquaculture Evaluation Survey, 2023.

The OLS model shows that at a margin of error of 0.10 participation in the demonstration intervention significantly increases the total monthly household incomes of fish farmers in the coastal area (β = 706; t = 1.942; p = 0.068)[18]. Other significant contributors to household incomes among fish farmers are quantity of fingerlings stocked, pond size and number of bags of feed purchased. These factors are indirectly impacted by the WRCF intervention. It can therefore be concluded that the WRCF intervention has significantly contributed to the improvement in household incomes in the coastal districts.

4.6.2 Contribution to job creation

The WRCF has contributed to employment and job creation in district. The intervention has created jobs and will continue to create jobs for the people in the coastal districts. As already indicated, about 48.78% of the farmers surveyed were either new-entrants or dormant farmers whose ventures have been revamped by the intervention. This is gainful employment. Further, it has significantly increased employment on fish farms. Averagely, beneficiaries of the demonstration employed about 4 persons

in the past two years whereas non-beneficiaries employed only 1 additional person on the farm. The difference is statistically significant indicating that the intervention has created jobs in the coastal communities (***t=4.043, p<0.01***). Also compared with baseline, employment by participants has increased by between 1 and 2 persons whereas that of non-participants has decreased by between 2 to 3 persons.

4.7 Other Effects

The project has mainstreamed gender in fish production and on-farm employment. The intervention has empowered women to directly engage in fish farming in the coastal districts. The survey revealed that none of the non-participants are women whereas 26% and 19% of proficiency-only and demonstration beneficiaries are women, respectively. Not only has the project encouraged women to take up fish farming but about 23% of those employed by the beneficiaries of the intervention were females. Apart from gender mainstreaming, the project effects have trickled down to non-participants with regard to peer learning and support.

It was observed from the evaluation that long-term and indirect changes may be difficult to identify and measure due to the presence of other intervening factors. As shown in the OLS model, other factors come to play when measuring the impact of the DFID intervention. However, direct changes regarding pond management can be readily measured because many of the best practices now employed by farmers are as a result of the intervention. Almost every farmer had given up production until this project came to their rescue. Yet still, moderating factors relating to the financial capacities of farmers (including quantity of fingerlings purchased, pond size, quantity of feeds purchased) should be controlled for when measuring changes by the intervention.

4.8 Sustainability

Adequate steps were inculcated in the project design and execution to ensure sustainability. Further, certain steps have been put in place by partners and beneficiaries to ensure sustainability. This section discusses the sustainability of WRCF project.

4.8.1 Addressing the priorities and demands of beneficiaries.

It was observed that the project satisfactorily addressed the priorities and demands of its beneficiaries. Farmers were making losses due to the use of inappropriate practices. They also lacked access to

good sources of quality feeds and fingerlings, and markets for their produce. The proficiency training and pond demonstration have adequately met these needs. Also, farmers have now been linked to sources of good feeds and fingerlings. Market linkages have also been created by the intervention. Notwithstanding this, farmers' need for adequate capital to adequately adopt the improved technology was not satisfactorily met. Also, marketing seemed to be a challenge for some farmers due to the increased yield.

4.8.2 Participation of beneficiaries and partners in the intervention

The survey revealed a high sense of participation among beneficiaries and partners. Beneficiary farmers perceived their participation in the project to be active. They were actively involved in the activities of their various associations in planning and implementing the project. Farmer associations were actively involved in the planning of the pond demonstration intervention, disseminating project information, organizing members for training sections, selecting demonstration sites, providing labour for pond construction and management and selling of fish produced from the demonstration ponds. Some beneficiaries provided financial support for group activities relating to the demonstration. Partners such as the Fisheries Commission, Water Resources Institute and input dealers saw their participation in the planning and implementation of the project to be high.

4.8.3 *Integration of the intervention with socio-cultural conditions*

The survey revealed that the support by local institutions in the intervention was minimal. Traditional authorities and local government representatives did not actively participate in the project. Also, the district assemblies of the respective districts were not actively involved in the implementation of the intervention. Part of the reason for this was that the WRCF targeted institutions that are directly critical to and connected to the aquaculture industry and value chain.

Nonetheless, the evaluation team found that despite the cultural attachment to artisanal fishing, aquaculture has a high potential of replacing artisanal fishing as the primary occupation of some smallholders and the main income generating activity for many. Respondents were of the view that the dwindling fish stock in the sea, seasonal shortages leading to economic hardship, and the danger associated with marine fishing all combine to make traditional fishing less reliable. More importantly, artisanal fishing is presently not friendly to women due to associated dangers and manpower required.

This is contrasted to fish farming that is safe, easy, controllable, reliable, profitable and above all, women- friendly. Respondents believe fish farming, with adequate institutional support, will either displace traditional fishing or subordinate it in the local economy in these districts. Majority of respondents also indicated that fish farming takes less time (man-hours a day) than artisanal fishing

and can therefore be taken on as a secondary or supplementary source of income or a part-time job. Averagely, active farmers spend about 3 hours a day working on their fish farm. This makes it possible to be taken up together with other sources of income such as crop farming, artisanal farming, and other paid employment in the civil and public sectors. In fact, about 35% of fish farmers surveyed are doing it as a secondary income generating activity, with some being artisanal fishers.

4.8.4 Potential for replication

The evaluation discovered a high potential of replication of best practices. All non- beneficiaries were willing to support the replication of the project by providing ponds for demonstration, labour or pumps. Also, about 95% of those who benefited from only the proficiency training were also willing to support the project. Indeed, fertile ground has been created by the demonstration intervention. The pilot project has created awareness and kindled local people's interests in fish farming. Therefore, any replication will have high acceptability and participation. Moreover, experts believe that the area is better placed for catfish production because of the good water supply. These coastal districts are also good for farmers using earthen ponds due to good soil quality. Key institutions such as the Fisheries Commission, the Water Resource Institute, feed industries and hatcheries have also indicated the availability of their support should the project be replicated in other communities. Thus, with such high sense of awareness of the profitability of best practices; high acceptability and willingness among non-beneficiaries; favorable natural conditions; and high institutional support, there is great potential for a successful replication of the aquaculture demonstration intervention at a large scale.

4.9 Steps and programmes to sustain and scale-up the intervention.

Overall, the evaluation identified several steps put in place to continue the intervention at the cessation of donor support. The associations are maintaining their demonstration ponds for refresher training of existing members and new entrants to master the improved technology. They are now using their earnings from the demonstration ponds to restock their demonstration ponds and continue training and supporting their members. Indeed, the farmer- based associations have now been strengthened by the intervention to continue to give technical support to their members. The trainers among them will be able to continue to build the capacities of individual members. Some associations (e.g., ANCOFFA) have also gone a step further to establish and maintain nursery ponds to supply timely and quality fingerlings to members. Associations are also actively marketing the product of their individual members on information centres whereas others continue to link their members to feed sources and buyers. The team anticipates that the demonstration ponds will continue to function and serve its purpose after the withdrawal of DFID support.

At the individual level, farmers now have plans to expand their existing ponds, establish more ponds and employ more people in their fish farming businesses. This will ensure the sustainability of the gains made. Also, the Fisheries Commission has indicated its readiness to provide continuous support for fish farmers through the invigorated fish farmers associations. The Water Resource Institute revealed that it is making future plans to support fish farmers in the western region (especially the project districts) due to the high potential of adoption and profitability.

Other opportunities exist outside the current partners for a possible scale-up. Some institutions and companies have expressed interest in supporting a future scale-up of the WRCF aquaculture interventions. The GNPC has indicated its willingness to support scale-up of the aquaculture intervention in the future. An excerpt of the response of the representative of the GNPC is quoted below:

> *"we are now planning to role our livelihoods interventions and if aquaculture proves to be a viable and sustainable livelihood option we will definitely support its scale-up to benefit the coastal communities."*

However, it is currently not implementing any livelihood interventions directly in the coastal districts but there are plans to roll-out livelihood interventions in the future. In contrast to GNPC, it is a little doubtful if the ENI will support any further scale-up of the intervention though it is aware of its positive effects. To the ENI:

> *"[It is] not too sure [of supporting any scale-up of the DFID aquaculture intervention] at the moment since we are providing similar support to our project affected persons in our catchment communities."*

They were of the view that they already have people they are supporting in their catchment area to take up aquaculture.

Furthermore, the Ghana Export Promotion Authority (GEPA) has taken keen interest in the WRCF aquaculture intervention at Kangbuli. According to key informants in the Alhamdallah Fish farmers Association, they have made a number of visits to the ponds and have provided technical advice on how to take advantage of the export market by producing to meet export market standards. Some of the technical advice relate to meeting sanitary requirements for the export market. Further, the GEPA has hinted at providing them with more structured training to build the capacities of farmers to take export market opportunities. It is envisaged that export-oriented capacity building will extend to the other 3 beneficiary associations as well as non-beneficiary associations in the coastal districts.

Some of the lessons learnt from the study include the fact that:

- Commitment and dedication to fish farming is key to improved technology adoption.
- Initial start-up capital plays a key role in the adoption of aquaculture best practices among individual fish farmers.
- High cost of feeding (using imported feeds) is one of the major difficulties fish farmers are facing in their ventures.
- Government institutions such as the Water Resources Institute and Fisheries Commission are ready to support the replication of the scale-up of the project.
- The GNPC and the Ghana Export Promotion Authority (GEPA) are potential partners for a possible scale-up of the aquaculture intervention.

CHAPTER FIVE

5 RECOMMENDATIONS AND CONCLUSION

5.1 RECOMMENDATIONS

Based on the evaluation findings and lessons, following recommendations are prescribed for possible scale-up:

- A possible scale-up should factor in plans to train farmers on local feed formulation to reduce the cost of production.
- Provision should be made for additional financial support to associations to be used as a revolving fund for members. This will solve the problem of inadequate capital that led to lack of adoption among many of the intervention beneficiaries.
- A possible scale-up should make adequate provision for the marketing of the produce. Farmers are struggling with the marketing of their produce in the face of increased output. Though the intervention linked farmers to buyers, this was not enough to curb problems with the marketing associated with bumper harvests. A cold store needs to be established to serve as a depot for the fish or to buy fish from farmers and distribute them to bulk buyers where necessary.
- Farmers need continuous refresher training to farmers to update them on modern aquaculture best practices. The Water Resources Institute is regularly undertaken research on best practices. Farmers may need to be updated on new findings that are likely to improve production, especially for the export market.
- Scale-up should also include plans to establish hatcheries to provide fingerlings for farmers because some of the feed sources are not reliable.
- Future scale-up can also target tilapia farming because some farmers have shown interest in tilapia rearing.
- Future scale-up should actively involve the district assemblies in the project districts in planning and implementation. This will link fish farmers to the Business Advisory Centres (BACs) in the Assembles. The BACs can provide continuous business-related advice and support to farmers to enhance their fish farming business. The BAC can also organise food fairs using the produce of fish farmers to create awareness and taste for catfish in the districts. The MoFA offices of the district assemblies also have fisheries desk officers who can provide continuous extension support to fish farmers.

- Some institutions have shown interest in the aquaculture intervention. The WRCF can leverage on its comparative advantage to partner with the GNPC in the future to scale- up aquaculture in oil-affected communities in the western region. Also, the WRCF can partner with the GEPC to scale-up the project in the districts with a focus on producing for the export market.

The high adoption of the improved aquaculture technology and its accompanying increase in yields and subsequent contribution to household income make a scale-up of the aquaculture intervention indispensable. Therefore, this section of the report suggests some practical strategies for scale-up focusing on "crowding in" external funding, sustaining, and improving the progress made by existing farmers and extending the intervention to more areas in the coastal districts (refer to Annex 2 for a summary of strategies for following up on the recommendations).

The project ought to prepare a technical and financial proposal for the scale-up of the aquaculture intervention in the coastal districts. The technical proposal will include, but not limited to, the following activities:

- Establishment of feed mills owned and operated by farmers' associations.
- Continuous refresher trainings for fish farmers and their trainers
- Establishment of a cold store to buy and distribute excess fish from farmers
- Establishment of hatcheries owned and operated by farmers' associations.
- Training and support for tilapia production
- Linking farmers to the BAC and MoFA offices for business development support and regular extension support
- Establishment of a revolving fund to provide soft loans to farmers using farmers' cooperatives.
- Facilitation of access to loans from decentralised financial institutions
- Liaise with BAC to organise food fair featuring catfish and tilapia produce.

  The proposal will highlight the readiness of the existing partners (in the pilot intervention) to support any scale-up as well as their potential contributions. The proposals will then be used to solicit funding from potential donors.

Solicitation of external funding

Funding is the cornerstone of any scale-up of the pilot aquaculture intervention. Without adequate external funding, the WRCF will not be able to effectively scale-up the pilot intervention. The following strategies can therefore be adopted to solicit funding:

1. *Organization of a multi-stakeholder symposium.*

Besides its regular Multi-Stakeholder Dialogue Platforms and taking advantage of such, the WRCF will organize a major aquaculture symposium in the Western Region targeting key or potential stakeholders and partners to present the intervention results from both the internal and external evaluation reports. The purpose of this symposium is to present and prove the viability of the intervention as a development intervention and alternative livelihood activity for the six coastal districts. Potential participants in the symposium will include:

- Oil extraction and ancillary companies (GNPC, ENI, and others);
- Public institutions such as the Fisheries Commission and the Water Resources Institute.
- Decentralized Institutions including the District Assemblies (MOFA and BAC);
- The Ghana Export Promotion Authority (GEPA);
- Input dealers (feeds, fingerlings, lime, equipment and others);
- Farmers represented by their associations.
- Potential Donor partners
- Media partners (for publicity)
- Local CSOs
- Community leaders (traditional authority and local government representatives);

The WRCF will provide the technical and financial plan for scale-up to the symposium attendees in addition to a presentation demonstrating the intervention's feasibility. Next, it will call for presentations from the pilot project's partners outlining their support for both the initial pilot and any future scale-ups as outlined in the technical proposal. To illustrate their preparedness to offer the same level of technical support for the scale-up, the Fisheries Commission and the Water Resource Institute, for example, should separately present the technical help they offered for the pilot intervention. Reenan, Kpemli, Carmeuse, and other input dealers ought to follow suit and emphasize that they are prepared to provide inputs at a reduced cost throughout the scale-up.

Farmers should also be given an opportunity to make a presentation of the benefit obtained from the pilot intervention and make a case for the continuation of the intervention and scale-up. The GEPA can also present its plans for supporting existing and new farmers in a possible scale-up to produce for the export market.

Following these presentations, the WRCF will make a brief presentation on the potential funding support participating oil and ancillary companies can provide to implement the scale up, highlighting the enormous comparative advantage of multi-actor partnership in promoting aquaculture in the coastal districts. It is anticipated that the availability of willing partners outside the oil industry can boost the willingness of oil companies to fund scale-up due to the potential for substantial reduction in the cost of aquaculture intervention if they were to wholly implement it as part of their alternative livelihood interventions in their catchment areas without partner support (as the ENI is doing).

2. *Regular follow-up meetings and correspondence with potential funders*

The project team ought to schedule frequent follow-up meetings with possible donors, oil and ancillary industries (particularly the GNPC, Tullow and ENI), and other potential funders. The main goal of the sessions is to persuade these possible donors to back the scale-up initiatives.

To inform other donors and the public about the viability of the intervention and the necessity for donors to support the six coastal districts, policy briefs that serve as guidelines for scaling up aquaculture in the Western Region should be regularly prepared and published on the organization's website and other social media platforms. To gain their support, the project should communicate with potential donors on a regular basis via email, sharing proposals and policy briefs.

5.2 CONCLUSION

Comprehensive evaluation of a sustainable rural livelihood project can provide a holistic assessment of the design and implementation regarding the extent to which the intervention responds to the needs of the target beneficiaries, its efficiency in terms of value for money, its effectiveness regarding how it has achieved its intended objectives, impact, and prospects for sustainability.

Adopting a quasi-experimental design and using the OEDC criteria of evaluation, it has been observed that, aquaculture can be a very effective, efficient, and profitable alternative income generating source for interested and committed people living in rural communities with favorable conditions. Its viability, profitability, and ability to improve livelihoods and household income has been demonstrated by the DFID aquaculture intervention in the Ellembelle and Jomoro districts. Apart from providing gainful secondary or alternative employment, it has the potential for creating indirect jobs to the youth and women, from pond construction to marketing of fish. More importantly, there is a high level of acceptability and interest in aquaculture within the communities in the project Districts.

A possible scale-up of this project will contribute immensely to poverty reduction and livelihood enhancement in the project districts and its environs. It is therefore recommended that the project leverages on and catalyzes on the lessons learned from this project to elicit buy-in from relevant state and non-state actor including oil and Gas industry and other business support institutions to support replication and a possible scale-up.

GNPC and the GEPA have already expressed interest in supporting replication and scale up of the project. It will be more impactful if other players such as Tullow and ENI are brought onboard to undertake a large-scale replication of this project.

The evaluation of the DFID aquaculture project in the Western Region of Ghana has revealed that Fish farming can be taken up as a profitable secondary occupation due to the minimal time involved in the activity. It has brought to the fore that:

- Aquaculture is more women-friendly than artisanal fishing and can be a strategy for gender mainstreaming in the coastal districts of the western region of Ghana.
- The local people believe that aquaculture can displace artisanal sea fishing in the coastal districts if the necessary support is provided.

The survey revealed that the project received very little cooperation and support from the local government and traditional authorities since the District Assemblies and the chiefs were not actively

involved in the implementation of the project. This has far reached implications for project sustainability.

As a lesson, the next phase should endeavor to integrate the project into the local traditional, political, economic, and social systems to engender longevity of gains after the end of project support.

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