EFFECTS OF PROJECT DESIGN PRACTICES ON IMPLEMENTATION OF POVERTY-ALLEVIATION MARICULTURE PROJECTS IN THE COAST OF KENYA

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Effects of Project Design Practices on Implementation of Poverty Alleviation Mariculture Projects in the Coast of Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university

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DEDICATION

This work is dedicated to my wife, Carren Odhiambo, who despite having gone through a major surgical procedure, continued to provide unwavering support, took care of our children when I travelled from Mombasa to the University at Juja and reminded me of the opportunity cost of my investment in the PhD studies.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
ARCIS	American Red Cross International Services
CARE	Cooperative for American Remittances to Europe
Df	Degrees of Freedom
DFID	Department for International Development
ESP	National Economic Stimulus Programme
FAO	Food and Agriculture Organization of the United Nations
ICRC	International Committee of the Red Cross
ILO	International Labour Organization
IPTRID	International Programme for Technology and Research in Irrigation and Drainage
KMO Index	Kaiser-Meyer-Oklin Measure of Sampling Adequacy
KMFRI	Kenya Marine & Fisheries Research Institute
KMFRI-KCDP	Kenya Marine & Fisheries Research Institute-Kenya Coastal Development Project
M&E	Monitoring and Evaluation
NASCSP	National Association for State Community Services Programmes
NGOs	Non Governmental Organizations
NORAD	Norwegian Agency for Development Cooperation
OXFAM	Oxford Committee for Famine Relief
PCA	Principal Component Analysis
PCM	Project Cycle Management
P-P plots	Normal probability plots

SD	Standard Deviation
SI	Sampling interval
SMART	Specific, measurable, achievable, relevant and time-bound.
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNDG	United Nations Development Group
UNDG WGPI	United Nations Development Group Working Group on Programme Issues
UNSD	United Nations Statistics Division
USAID	United States Agency for International Development
VIF	Variance inflation factors
WIOMSA	Western Indian Ocean Marine Science Association
SPSS	Statistical Package for the Social Sciences

DEFINITION OF TERMS

Aquaculture This is the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants, in natural or controlled marine or freshwater conditions (Edwards, 2000; Samah & Kamaruddin, 2015).

Capacity building This refers to the process by which core competencies, key technical skills and management systems are obtained, improved, and retained to ensure that the project can respond to clearly defined priorities (International Labour Organization (ILO), 2010).

Dependent variable This is a variable that is expected to be caused or influenced by the independent variable (Nachmias & Nachmias, 2004).

Evaluation This is a systematic and objective assessment of the relevance, performance and success of on-going and completed projects, programmes or policy, its design, implementation and results at selected stages (International Federation of Red Cross and Red Crescent Societies (IFRC), 2011; United States Agency for International Development (USAID), 2008).

Factor analysis This is a data reduction technique that takes a large set of variables and summarizes it using a smaller set of factors or components.

It can also be used to reduce a large number of related variables to a more manageable number before using them in other analyses such as multiple regression analysis (Pallant, 2007; Tabachnick & Fidell, 2007; Yong & Pearce, 2013).

Independent variable This is a variable that is manipulated or controlled by the scholar and its effects examined. It is independent of the outcome being measured (Nachmias & Nachmias, 2004).

Livelihoods These are the capabilities, assets (stores, resources, claims and access) and activities required for a means of living (Chambers & Conway, 1992).

Mariculture This is the farming or production of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants in marine and estuarine (brackish) waters (Convention on Biological Diversity (CBD), 2004).

Monitoring This refers to the routine collection and analysis of information to track progress against set plans and check compliance to established standards (IFRC, 2011) with the aim of providing the project stakeholders with early indications of the quality, quantity and timeliness of progress towards delivering intended results (United Nations Development Programme (UNDP), 2011).

Poverty This refers to the inability to achieve a socially acceptable standard of living by a society at a given time (Bellù, 2005). It is a condition characterized by deprivation of basic human needs such as food, safe drinking water, shelter, clothing, medical care, education, and safety which are essential for survival and human dignity (Bradshaw, 2006; United Nations, 1995).

Poverty alleviation This refers to the strategic use of education, health and income redistribution to improve the livelihoods and overall quality of life of the poor by governments and international development organizations. Reduction of mass poverty can stimulate healthy economic expansion by providing incentive to public participation in the development process (Todaro & Smith, 2012).

Project This is a mechanism or structured action to solve a problem or a combination of human and nonhuman resources pulled together in a temporary organization to achieve a specified purpose or objective (Cleland & Kerzner, 1985). It has a defined timeframe and completion date, a specific preordained goal or expected level of performance, a series of complex or interrelated activities, and a specific amount of resources, and benefits a specific group (Cleland & Kerzner, 1985; Pinto & Slevin, 1987; Steiner, 1969).

Project design This is the systematic identification and prioritization of problems, their causes and consequences, and the planning of interventions that will address these issues (American Red Cross International Services (ARCIS), 2006). It covers project situation analysis, formulating strategy and structure, preparing implementation plan and planning a monitoring and evaluation system (ILO, 2010; USAID, 2007).

Project cycle management (PCM) This refers to the process of planning and managing programmes and projects. It is a results-based decision-making tool which is premised on the fact that every project has to follow a series of phases including design, appraisal, approval, implementation and monitoring, and final evaluation, that allow the process to be guided from problem identification to the final solution (International Committee of the Red Cross (ICRC), 2008; IPTRID, 2008).

Project cycle This refers to the way in which projects are planned and carried out following a series of phases of a project from assessment and problem identification to final solution (ICRC, 2008; IPTRID, 2008).

Problem analysis This consists of using a systematic process of exploring a complex community issue by identifying the negative aspects of an existing situation, establishing the causes and effects of the existing problems, helping to achieve consensus among the target group and establishing criteria for selecting interventions (ILO, 2010; USAID, 2007).

Project implementation This is the coordination and allocation of resources to make the project operational (USAID, 2007).

Stakeholder analysis This is a process of systematically gathering and analyzing qualitative information to determine the parties whose interests should be taken into account when developing and/or implementing a project, policy or program (Bryson, 2004; Golder, 2005; Schmeer, 1999; USAID, 2011).

Sustainable development This refers to development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. It reflects the need for careful balance between economic growth and environmental preservation (Todaro & Smith, 2012).

Target group This is a group of people including households who are likely to benefit from a mariculture project. It may be composed of all the residents in a specific location (Nachmias & Nachmias, 2004) where a mariculture initiative is being implemented and are the focus of the project.

ABSTRACT

This research was carried out in Kwale, Mombasa and Kilifi counties in the coast of Kenya. The general objective of this research was to assess the effects of project design practices on implementation of poverty alleviation mariculture projects in Kenya. The specific objectives of the present study were to examine the effect of situation analysis practices on implementation of poverty alleviation mariculture projects in the coast of Kenya, establish the effect of project formulation practices on implementation of poverty alleviation mariculture projects in the coast of Kenya, determine the effect of implementation planning practices on implementation of poverty alleviation mariculture projects in the coast of Kenya, evaluate the influence of monitoring and evaluation planning practices on implementation of poverty alleviation mariculture projects in the coast of Kenya, and examine the moderating effect of attitudes of local communities towards mariculture enterprises on the relationship between project design practices and implementation of poverty alleviation mariculture projects in the coast of Kenya. The research was based on the logical framework, results based approach, capabilities approach, and participatory development that provide the foundation for project design and implementation. A combination of quantitative and qualitative research approaches was adopted for this study. The quantitative approach involved the application of survey method in the form of a cross sectional design. A sample size of 189 was targeted and a response rate of 96.3 percent (182 respondents) obtained. The qualitative approach included in-depth interviews and key informant interviews that were conducted using interview guides. Descriptive analysis, factor analysis, regression analysis were carried out. Pilot study, reliability and validity tests were performed. Reliability was gauged against the recommended minimum Cronbach's alpha of 0.7. Suitability of the dataset for factor analysis was tested using the Kaiser-Meyer-Oklin Measure of Sampling Adequacy which ranges between 0 and 1 with an index of 0.6 and above considered suitable for factor analysis. The Bartlett's Test of Sphericity which requires a significance level of less than 0.05 for factor analysis to be considered suitable was also applied. The findings from factor analysis revealed that the dependent variable, implementation of poverty alleviation mariculture projects can be adequately measured by satisfaction and outcome effectiveness. These two measures can be collapsed to form one factor which was named effectiveness. Based on the pattern matrix, situation analysis practices had two important factors namely stakeholder analysis and needs assessment, project formulation practices had three factors namely food security, political goodwill and project ownership. Implementation planning practices had two important factors, appropriate budgeting and assignment of responsibilities. Monitoring and evaluation planning had two factors, tracking progress and timeliness. Attitude toward mariculture was a moderating variable with two factors namely attitudes towards benefits of mariculture and attitudes towards costs of mariculture. Combined multiple regression analysis revealed that there was a significant positive relationship between monitoring and evaluation planning (as measured by tracking progress and timeliness) and implementation of poverty alleviation mariculture projects. Further, there was a significant positive relationship between situation analysis practices as measured by stakeholder analysis and implementation of poverty alleviation mariculture projects. There was a significant direct moderating effect of attitude towards the benefits of mariculture on project design practices and implementation of poverty alleviation mariculture projects. It was concluded that implementation of poverty alleviation mariculture projects is influenced by project design practices with the multiple regression model explaining over 80 percent of the variation in mariculture project implementation. It was recommended that proper situation analysis and monitoring and evaluation planning should be made mandatory in the design of poverty alleviation mariculture projects. In addition, future research should cover both mariculture and freshwater aquaculture to bring out differences that the two branches of aquaculture may reveal with respect to the effects of project design practices on project implementation, and future research should take a more qualitative approach so that knowledge in this area is enhanced by comparing results from a qualitative study with findings of the present study.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

This chapter introduces the study by describing project design, project implementation, and mariculture in Kenya and its implementation issues. It also presents statement of the problem, objectives of the study, the hypotheses that were formulated and tested, justification of the study, significance of the study and scope of the study. The study focused on the effects of project design practices on implementation of poverty alleviation mariculture projects along the coast of Kenya.

1.1.1 Project Design

A project is defined as a structured action to solve a certain problem or a planned set of coordinated and interlinked activities to deliver agreed outputs over a fixed time period and within certain cost and other limitations. These outputs are expected to contribute to outcomes and impact (United Nations Environment Programme (UNEP), 2013), which in the present study is poverty alleviation among the coastal communities in Kenya. A project must have a definite timeframe, a specific predetermined goal or expected level of performance, a series of activities, and a limited budget (Cleland & Kerzner, 1985; Pinto & Slevin, 1987; Steiner, 1969; UNEP, 2013). At a minimum, all projects need to have well defined objectives and resources to carry out all the required tasks. Mariculture projects have been implemented along the coast of Kenya in order to address poverty among the coastal communities.

Project design is the process by which solutions to clearly identified problems are identified and structured in a way that makes them implementable and ways of assessing project outcomes prepared (Adams & Barndt, 1983; American Red Cross International Services (ARCIS), 2006; Pinto & Slevin, 1987; United States Agency for International Development (USAID), 2011). It has been recognized as one of the World Bank Projects success factors besides monitoring, coordination, training and environment (Ika et al. 2012). It is the starting point and the most crucial phase of the project cycle which generally has five phases namely design, appraisal, submission for approval, implementation and monitoring, and final evaluation. It provides the structure of the project and clearly presents what has to be achieved in terms of goals of the project, how it is to be implemented and the means of verifying progress. Its quality influences the subsequent stages in the project cycle (USAID, 2007).

Project design has four components namely situation analysis, formulation of strategy and structure, preparation of implementation plan and planning a monitoring and evaluation system (Caldwell, 2002; USAID, 2007). ARCIS (2006) has however merged the last three components and broke down the design process into two main components namely: understanding the problem(s) and designing the solution(s). The United Nations Development Programme (UNDP) has considered situation analysis to be part of formulation of the project concept note (National Development Planning Agency and UNDP Indonesia, 2009).

Project design begins with a clear understanding of the existing situation namely: the problem to be addressed and its causes and consequences, the affected persons or groups of persons as well as the other key stakeholders that are involved, and the needs of the target groups. These key factors are understood through stakeholder analysis, problem analysis including a critical analysis of causes and consequences of the identified problems, and a needs assessment. These analyses combined constitute the first stage of project design. Based on these analyses, appropriate strategies and interventions are selected and defined (USAID, 2007) in the subsequent stages of project design namely: formulation of strategy and structure, preparation of implementation plan and planning a monitoring and evaluation system. Among the key stages of project design, situation analysis (which consists of stakeholder analysis, problem analysis, and a needs assessment) is the most important stage of the project cycle because it anchors the project activities on needs and priorities of the target group (UNDP, 2013).

Formulation of strategy and structure which is the second component of project design involves establishment of concrete outcomes to be achieved, outline of the actions to be taken and the resources needed, and establishment of proper indicators for each objective. It is based on the information generated during the situation analysis and sets out the expected benefits from the intended action. Project formulation is usually done using the logical framework which contains a summary of the project design and its indicators, provides a formal structure for defining project components and their relationships for project management and monitoring and evaluation (M&E) purposes, and provides the basis for defining the measurement of project implementation. The outputs from the stakeholder, problem, objective and alternative analyses are used as the core ingredients of the logical framework matrix. The final logical framework must show what must be achieved, how it will be achieved, the resources required, and the timeframe needed (ARCIS, 2006; Caldwell, 2002).

Implementation plan which is the third component of project design demonstrates project feasibility in terms of responsibilities, schedule and resources and is the basis for monitoring project operations. It consists of a work break-down matrix which lists the activities and specific tasks, a responsibility matrix which sets out responsibilities, a calendar of activities which states when each activity will be completed, a resource plan which sets out the requirements for staff, equipment and materials and for the budget preparation, giving the cost of the resources needed (ARCIS, 2006, 2006; Caldwell, 2002).

The last component is planning a Monitoring and Evaluation (M&E) system. It is necessary to build M&E into the design of the project and to allocate resources for it from the start. M&E is about comparing what was originally planned with what actually happens in order to track progress at each level of the logical framework: activities, outputs, outcomes and impacts (objectives). M&E has four key concepts: comparison, measurement, verification, action (Oxford Committee for Famine Relief (OXFAM), 2013; UNDP, 2011; UNDP, 2013).

The quality and success of project design also depends on the willingness of the project proponent to invest financial resources and time. For project design to succeed there is need for upfront investment to improve quality of analysis and identification of real needs of the project. However, quite often little attention is given to project design either because of lack of willingness to invest in it or because the financial resources are scarce. When less effort and investment is put in project design, its quality is compromised resulting in serious problems during implementation. It is therefore important to allocate a considerable amount of resources to the design stage in order to facilitate and improve the quality of analysis and identification of real needs. If financial resources are not available, alternative resources such as time should be adequately devoted to stakeholder engagement, understanding the context in which the project is being designed, and the main problems and challenges (ILO, 2010). The other important factor that influences success in project design is availability of professionals/expertise in project design (USAID, 2011). If project design is left to people who do not have the necessary expertise then the output may be less useful.

1.1.2 Project Implementation

Project implementation refers to the concrete implementation of the activities planned in the approved project document (UNDP, 2011; USAID, 2007). It is based on the implementation plan which is also commonly called the work plan. The implementation plan is normally prepared at the formulation stage of project design in order to assess the project's feasibility in terms of responsibilities, schedule and plan for the project needs in terms of material, human and financial resources as well as time. The implementation plan can be reviewed once a project is funded as a first step in project implementation. Project implementation is usually organised with a fixed budget, limited material and human resources and specific timelines. Since these resources and time are scarce it is important to use them optimally in order to achieve the best results in terms of outputs, outcomes and impact.

Projects that go through situation analysis, formulation and implementation planning phases have lower risks in implementation. The budgeted resources are more likely to be used to implement activities and achieve the intended results and objectives (UNEP, 2005). The development of an M&E plan is part of the overall project design process. An M&E Plan is a systematic plan for the collection, analysis and interpretation of all data needed for project management, including resources and activities required to implement the M&E activities. The execution of the monitoring plan however is part of project implementation. Implementation of M&E Plan helps to refine the logical framework and ensure realistic expectations for M&E aspects of the project. Monitoring and evaluation is therefore part of an overall project continuum. The project cycle consists of problem identification, project design, project implementation, and project close-out. Monitoring and evaluation activities play an integral role in each of these phases of the cycle and each phase of the cycle is equally important (UNEP, 2013).

1.1.3 Project design effects on implementation

The quality of project design influences the subsequent stages of the project cycle (ILO, 2010; USAID, 2007). Project design includes the initial assessment and additional considerations about implementation, as well as development of a monitoring and evaluation plan which is used during implementation. Logical frameworks and results frameworks that are developed at the design phase are essential tools for linking design, implementation, and monitoring and evaluation (ARCIS, 2006). Consequently, project implementation is smooth when a project has been appropriately designed. On the other hand, many challenges arise at implementation when projects are poorly designed.

The initial assessment during design includes stakeholder analysis, problem analysis and needs assessment. Stakeholder analysis is a process of systematically gathering and analyzing qualitative information to determine whose interests should be taken into account when developing and/or implementing a project, policy or program (Schmeer, 1999). It generates useful and accurate information on project stakeholders which can be used to develop action plans to increase support for a mariculture project, or guide a participatory consensus-building process. Stakeholder analysis identifies all primary and secondary stakeholders and their interests in the issues in the project (Bryson, 2004; Golder, 2005; USAID, 2011). The analysis can help a mariculture project identify the interests of all stakeholders who may affect or be affected by the project; potential conflicts or risks that could jeopardize the project; opportunities and relationships that can be built on during project implementation; groups that should be encouraged to participate in different stages of the project; appropriate strategies and approaches for stakeholder engagement; and ways to reduce negative impacts on vulnerable and disadvantaged groups (Golder, 2005). It ensures that a project is adapted to the needs and capacities of the stakeholders and helps to ensure project "buy-in" and the long-term sustainability of the effort. Smooth and effective implementation of projects requires that all stakeholders that are likely to be affected by the project either positively or negatively be identified and their potential involvement in it be analyzed right from the beginning (Bunce et al, 2000; UNDP, 2013; USAID, 2011).

Problem analysis consists of using a systematic process to explore or unpack a complex community issue. It involves identifying the core problem of the target group and digging deep into the root causes of the problem and the effects that the problem has on the target group. This analysis can be represented diagrammatically by constructing a problem tree showing the relationship between the problem and multiple root causes, where the causes are structured by clustering similar ones and developing a hierarchy of causes. Project implementation is then guided by clearly defined interventions that address the root causes of the problem. Problem analysis is therefore important both for actual implementation and monitoring of a project (Bunce et al, 2000; Örtengren, 2004).

Needs assessment is undertaken to ensure that a project meets community needs and makes the best use of available resources. It seeks to identify the gaps, examine their nature and causes, and suggest priorities for future action. It often highlights key issues or constraints that help to identify the main problems and opportunities on which the project interventions will focus. It involves systematic collection of data from the target group in order to get an unbiased look at their views about the issue being addressed, finding out about the community's history to check whether the community has had experience with similar projects, and establishing what worked or what did not work with these projects. It tells the project design team what the target group requires in order to benefit from a project and therefore forms the basis for selection of interventions and budgets (Caldwell, 2002).

Formulation provides the logical framework which is a tool for improving the planning, implementation, management, monitoring and evaluation of projects. The logical framework is a way of structuring the main elements in a project and highlighting the logical linkages between them (Jensen, 2010). It should be used during all phases of a project cycle (that is design, implementation and evaluation). When the logical framework analysis is done, the plans that are made should be used and followed-up actively during implementation (Örtengren, 2004).

The work break-down matrix, a responsibility matrix, a calendar of activities and a resource plan that constitute the project implementation plan allow the project execution team to monitor the implementation of the project activities and outputs once the project is operational (ILO, 2010; ARCIS, 2006). A work breakdown matrix provides improved reporting on obligations and actual expenditure to carry out implementation and achieve the project outputs. The responsibility matrix sets out who is responsible for each activity thus helping in coordinating the work of team members, contractors or partners during implementation.

Monitoring is a continuous process that aims primarily to provide the project stakeholders with early indications of the quality, quantity and timeliness of progress towards delivering intended results (UNDP, 2011). It helps to identify trends and patterns (IFRC, 2011) that allow timely decision-making so that successes are consolidated and mistakes are corrected (USAID, 2008). There are three types of monitoring namely implementation monitoring, impact monitoring, and reporting. These types of monitoring take place at different levels of the logical framework and serve different functions. Implementation monitoring tracks project operations including activities and outputs to ensure that implementation is on track. It provides information on how resources are used to support implementation of project activities and to ensure that activities are carried out within the planned time frames and outputs are obtained and delivered as necessary. It can be used for short-term project progress reporting. Impact monitoring focuses on the immediate objectives.

Reporting on the other hand concerns the preparation and submission of periodic reports to the stakeholders, particularly donors (Perrin, 2012). Both monitoring and reporting provide information for evaluation. Evaluation is a time-bound exercise that systematically and objectively assesses the relevance, performance and success of on-going and completed programmes or projects at selected stages (USAID, 2008).

1.1.4 Mariculture in Kenya and its implementation issues

In Africa, aquaculture has developed with freshwater aquaculture accounting for 95% of aquaculture production while mariculture accounts for only 5% of the production (Satia, 2011). Aquaculture is the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants, in natural or controlled marine or freshwater environments. It relies upon the use land, water, seed and feed resources (Edwards, 2000; Samah & Kamaruddin, 2015; Satia, 2011). Mariculture on the other hand is a branch of aquaculture that involves the farming or production of marine organisms, including fish, molluscs, crustaceans and aquatic plants in marine (open ocean, an enclosed section of the ocean) and estuarine (brackish) waters.

A review by Brummett and Williams (2000), however revealed that past development initiatives failed to achieve sustainable increases in mariculture production. The development of mariculture in Africa has experienced several setbacks including low output and high cost of production (Christensen, 1995). Mariculture in Africa is still limited and undeveloped compared to South East Asia where it often forms the backbone of the local economy (Mirera & Samoilys, 2008). While mariculture development is still at its infancy in Africa, its introduction in the coast of Kenya has provided economic opportunities that enhance the freedom of poor rural coastal communities to access an additional or alternative source of livelihood that makes them happier thus bringing about development (Mirera & Ngugi, 2009).

Mariculture development in Kenya began three and half decades ago (Troell, et al., 2011). Mariculture was introduced through several development, research and conservation programs (Mirera, 2011; Mwaluma, 2002) with few success stories (Mirera & Samoilys, 2008). The main culture species include milk fish, mullets, mud crabs, seaweeds and prawns (Mirera, 2011, 2014; Mirera & Ngugi, 2009; Mwaluma, 2002; Wakibia et al., 2011). Most mariculture initiatives have been implemented in the coast of Kenya with donor support. The mariculture initiatives involve production systems operated by self-help groups consisting mainly of female farmers (Mirera & Ngugi, 2009). Unfortunately, most of these mariculture initiatives have collapsed or remained at pilot stage for many years pointing towards implementation problems that probably could be associated with poor project design.

It has also been observed that mariculture has lagged behind in the coast of Kenya due to negative beliefs (Brummett & Williams, 2000; Mirera & Ngugi, 2009; Mirera, 2011). Shrimp pond culture began in the mid 1980s at Ngomeni in Kilifi County with funding from Food and Agriculture Organization of the United Nations (FAO) (Balarin, 1985; Mirera, 2011; Munguti et al., 2014; Ronnback et al., 2002; UNEP, 1998) to carry out trials for development of mariculture. The shrimp culture project collapsed due to implementation challenges. Mud crab farming in the coast of Kenya began in the late 1990s in the form of small-scale community interventions that could act as a source of livelihood and income (Mirera, 2011). Some level of success was achieved by introducing it to local communities, although it has been documented that mud crab farming was hindered by limited knowledge of mud crab biology and unreliable funding to support the programs (Mirera, 2011). Seaweed farming began on an experimental scale in the 2000s in the south coast of Kenya. It is mainly carried out by women and employs 100-400 farmers (Wakibia et al., 2011).

1.2 Statement of the problem

Many community-based mariculture initiatives have been implemented along the Kenya coast to address the widespread poverty and livelihood needs with varying degrees of success and failures (Mirera, 2011; Munguti et al., 2014). Project design has provided guidance to implementation of mariculture initiatives such as seaweed and milkfish farming that have been successfully implemented in Kilifi, Mombasa and Kwale

Counties of the coast (KMFRI-KCDP, 2015). However, some mariculture projects such as the shrimp culture at Ngomeni and oyster farming at Gazi Bay ran into implementation challenges and collapsed despite having financial resources that were set aside for their implementation (Balarin, 1985; Munguti et al., 2014). Other mariculture projects such as mud crab farming that began in the late 1990s (Mirera, 2011) have stagnated at the pilot stage for many years but the causes of their stagnation have not been established.

The implementation challenges that led to collapse or stagnation of mariculture projects along the coast of Kenya have not been investigated. USAID (2007) has, however, observed that the quality of project design which includes situation analysis, project formulation, implementation planning, and planning a monitoring and evaluation system, influences the subsequent stages of the project cycle including implementation. Ika et al. (2012) also observed that effective design and monitoring are important factors for World Bank funded international development projects but the effect of these factors on implementation of mariculture has not been studied. Effective project design is conducted through a participatory process to capture the views of the intended project beneficiaries and key stakeholders to create ownership and improve project implementation. If participation of stakeholders is not embraced at the design phase, it may lead to lack of ownership and ineffective implementation monitoring. This has been reinforced by Troell et al. (2011) who observed that lack of stakeholder involvement in the design of many mariculture projects has made mariculture to be viewed as a scientific activity rather than a source of livelihood. This study therefore seeks to establish the effects of project design practices on implementation of mariculture initiatives along the coast of Kenya.

1.3 Objectives of the study

1.3.1 General objective

The overall objective of the present study was to assess the effects of adherence to project design practices on implementation of poverty alleviation mariculture projects in the coast of Kenya.

1.3.2 Specific objectives

The specific objectives were:-

1. To examine the effect of situation analysis on implementation of poverty alleviation mariculture projects in the coast of Kenya.
2. To establish the effect of project formulation on implementation of poverty alleviation mariculture projects in the coast of Kenya.
3. To determine the effect of implementation planning on implementation of poverty alleviation mariculture projects in the coast of Kenya.
4. To evaluate the effect of monitoring and evaluation planning on implementation of poverty alleviation mariculture projects in the coast of Kenya.
5. To examine the moderating effect of attitudes of local communities towards mariculture enterprises on the relationship between project design practices and

implementation of poverty alleviation mariculture projects in the coast of Kenya.

1.4 Research questions

The study sought to address the following research questions:-

1. How does situation analysis influence implementation phase of poverty alleviation mariculture projects in the coast of Kenya?
2. To what extent does project formulation influence implementation of poverty alleviation mariculture projects in the coast of Kenya?
3. To what extent does implementation planning influence implementation of poverty alleviation mariculture projects in the coast of Kenya?
4. How does planning a monitoring and evaluation system affect implementation of poverty alleviation mariculture projects in the coast of Kenya?
5. What is the moderating effect of attitudes of local communities towards mariculture enterprises on the relationship between project design practices and implementation of poverty alleviation mariculture projects in the coast of Kenya?

1.5 Hypotheses

In this study, the following hypotheses were tested:

1. H_o: Situation analysis does not affect implementation of poverty alleviation mariculture projects in the coast of Kenya.

2. H_o: Project formulation does not influence implementation of poverty alleviation mariculture projects in the coast of Kenya.
3. H_o: Project implementation planning does not influence implementation of poverty alleviation mariculture projects in the coast of Kenya.
4. H_o: Monitoring and evaluation planning does not influence implementation of poverty alleviation mariculture projects in the coast of Kenya.
5. H_o: There is no moderating effect of attitudes of local communities towards mariculture enterprises on the relationship between project design practices and implementation of poverty alleviation mariculture projects in the coast of Kenya.

1.6 Justification of the study

Mariculture provides alternative and supplementary livelihood and income to the rural poor communities thus addressing economic poverty that according to Sen (2000), robs people of the freedom to satisfy hunger and other basic needs such as clothing, shelter, nutrition and health care. This research provides an understanding of the effects of project design on implementation of mariculture initiatives by assessing and analyzing how the various design components can lead to success or failure of mariculture projects. The information generated from this research will be used to prevent frequent failures of mariculture initiatives and increase the contribution of mariculture initiatives to poverty alleviation, and provision of livelihood and income to the coastal communities. The research information generated would guide Government Agencies, Non-Governmental Organizations, Community Based Organizations and other stakeholders who are involved in the development of mariculture in the coast of Kenya. The information generated will also be used by the relevant government agencies such as the State Department responsible for fisheries development in Kenya, Kenya Fisheries Service and the Fisheries Departments at Kwale, Mombasa and Kilifi Counties to formulate policy on development of mariculture in Kenya. The research also generated knowledge and contributed to science with respect to project design and implementation.

1.7 Significance of the study

This research provides information that improves knowledge on the relationship between project design and implementation and promotes mariculture projects to address poverty among coastal communities in Kenya. It provides recommendations on how to improve success in the implementation of mariculture projects and address the needs of the target communities. The research output is useful to the Government agencies at national and county Government levels, non-governmental organizations and financiers who are involved in design and implementation of mariculture projects.

1.8 Scope of the study

The present study covered all mariculture projects along the coast of Kenya. A list of the mariculture projects had been developed by KMFRI-KCDP (2015) with a clear indication that the mariculture projects are run by organized community groups. The study was carried out in Kwale, Mombasa and Kilifi Counties of the coast of Kenya because these counties have existing or collapsed mariculture initiatives. The present study did not cover inland water aquaculture which has taken off due to targeted intervention by the Government of Kenya through the National Economic Stimulus Programme (ESP). In addition, it did not cover all counties along the coast of Kenya since the other three coastal counties namely Taita Taveta, Tana River and Lamu Counties did not have mariculture initiatives. The target population included all community self-help groups and individuals that are engaged in mariculture as well as different Government and Non-Government agencies that are involved in the development of mariculture.

1.9 Limitations of the study

Some respondents were cautious while responding to the questionnaire because they thought that the information provided could be used to reduce funding to their projects. To address their fear, the researcher gave them assurance about the confidentiality of the information that they provided. In addition, a few respondents who had been chosen through random numbers were not readily available in their homes and at the mariculture farms because they only engaged in mariculture as a supplementary livelihood source and spent part of their time in other economic activities. This was addressed by booking appointments through phone calls a few days before the questionnaires were administered.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This study sought to investigate project design and its effects on implementation of mariculture projects geared towards poverty alleviation among coastal communities in Kenya. This chapter presents the theoretical framework and the conceptual framework that shows the variables in the study. The empirical studies that are related to this study are also reviewed.

2.2 Theoretical Framework

The theoretical framework outlines the genesis of the variables studied by looking at existing theories. Theory is an abstraction representing certain aspects of the empirical world; it is concerned with the how and why of empirical phenomena, not with what should be (Nachmias & Nachmias, 2004). It is "an explanation of a phenomenon or an abstract generalization that systematically explains the relationship among given phenomena, for purposes of explaining, predicting and controlling such phenomena". The objective of this theoretical framework is to define a broad framework within which the study was conducted. The theoretical framework enhances overall clarity of the research and helps to get through the research faster by ensuring that only the information that falls within the theoretical framework is collected and irrelevant information is avoided.

2.2.1 The Logical Framework

The logical framework is a project design, implementation, monitoring and evaluation methodology that provides a systematic structure for identifying, planning and managing projects. It was originally developed in the United States for United States Agency for International Development towards in 1969 as a project design and evaluation tool and has been widely adopted all over the World since 1970s (Örtengren, 2004). The objective of logical framework was to provide a common vision and understanding of a project (Couillard et al. 2009) and address the problem of poor planning and monitoring of development projects.

The logical framework enables the main elements of a project to be concisely summarized and brings structure and logic to the relationship between project goal, purpose and intended inputs, planned activities, and expected results (Jensen, 2010). Through the main elements, the logical framework summarizes why a project should be undertaken (goal), what it intends to do (purpose), the expected outputs and end results of the project, the inputs required to obtain the outputs, and the assumptions that must be fulfilled for the project to succeed (Couillard et al. 2009). The logical framework requires that the situation of the proposed project be analyzed. The project should be placed in the context of historical background of issues relating to the proposed project;

the current situation; needs and interests of various stakeholders; and future options (Jackson, 1997).

The logical framework is based on a logic of cause-effect relationships and promotes participatory engagement between all parties throughout the project life-cycle. It provides the logic and rationale behind how change is brought about. It states that certain activities produce outputs that further contribute to producing immediate outcomes and lead to development objectives (Jensen, 2010; Örtengren, 2004). It helps to organize thinking; relate activities and investment to expected results; set performance indicators; allocate responsibilities; and communicates information on the project and ensures that the project being developed is results-based (ILO, 2010).

Being an aid to structured thinking at the design stage and a tool for ongoing project management and evaluation, it is highly valuable for ensuring the successful design and running of poverty alleviation mariculture projects. In this study, it is recognized as a methodology for presenting the results of the situation analysis (stakeholder, problem analysis and needs assessment) as well as the relevant quantitative and qualitative information underlying a poverty alleviation mariculture project in such a way that it is possible to set out the project objective systematically and logically as observed by Department for International Development (DFID) (2009).

The logframe is an expression of the Results-Chain. It requires that data and analysis be current, consistent and as accurate as can be reasonably achieved. The Results Chain is based on evidence about what has worked in the past, hence it provides a real opportunity to consider lessons learnt, evaluation and research evidence available that underpins the design of a project. The evidence provides baselines that make it possible to identify realistic targets. The logframes also require milestones which act as an early-warning system indicating how a project is progressing along the predicted trajectory (DFID, 2009).

A study by Akroyd (1999) on restrospective application of the logical framework approach to the planning of a small-holder rice production project in the Gambia concluded that the use of logical framework approach in the planning of agricultural and rural development projects makes it easier to formulate good quality projects and should therefore be adopted at each stage of the project cycle.

2.2.2 Results Based Approach

Results based approach is a management strategy that focuses on performance and the achievement of results. Through this approach, all actors who contribute directly or indirectly ensure that their processes, products and services contribute to the achievement of desired results (UNDG WGPI, 2010). The approach provides a structured and logic model for identifying expected results in the poverty alleviation mariculture projects along the coast of Kenya and the inputs and activities that are required to realize these results. It is based on the results chain which indicates the causal sequence for a development intervention, such as a poverty alleviation mariculture project, from input to the desired results. An intervention begins with a set of inputs moving through activities and outputs that culminate into outcomes. The outcomes contribute to the impacts and attract feedback (UNDG, 2011). The logic model is divided into six levels; inputs, activities, outputs, immediate outcomes, intermediate outcomes, and ultimate outcome. Each of these levels represents a distinct step in the causal logic of a project. The inputs, activities, and outputs address the process towards achieving the desired results, whereas the three outcome levels constitute the actual results that are realized (International Committee of the Red Cross (ICRC), 2008).

Results based management framework involves defining realistic expected results based on appropriate analysis. It further involves clear identification of project beneficiaries and designing of interventions to meet their needs; selection of indicators to measure success; progress monitoring using appropriate indicators (both quantitative and qualitative) (UNDG WGPI, 2010); identifying assumptions and mitigating risk that may influence success or failure; integrating lessons learnt into decisions; analysis, evaluation, and reporting on the results achieved and resources involved; and implementing activities and delivering outputs (Asian Development Bank, 2013). In addition, the results based management has three key principles namely accountability, national ownership and inclusiveness. Achieving and upholding the highest levels of accountability is essential for the success of any development project such as mariculture projects that are geared to alleviate poverty among coastal communities in Kenya. It is also important to ensure that ownership in poverty alleviation mariculture projects goes beyond a few select persons to include as many and diverse stakeholders as possible. Inclusiveness is another important result based management principle that lays emphasis on the need to engage stakeholders to discuss and agree on the project milestones and commit themselves to realize the milestones (UNDG, 2011).

2.2.3 The Capabilities Approach

Capabilities Approach has been described by Robeyns (2005) as a broad normative framework for the evaluation and assessment of individual well-being and social arrangements, the design of policies, and proposals about social change in society. Well-being is best understood in terms of capabilities; that is, a person's ability to do and to be the things he/she has reasons to value (Sen, 2000). Therefore, the higher the level of a person's capabilities, the higher is the level of his/her well-being. The capabilities approach can be used to evaluate several aspects of people's well-being, such as inequality, poverty, the well-being of an individual or the average well-being of the members of a group. It can also be used as an alternative evaluative tool for social cost–benefit analysis, or as a framework within which to design and evaluate policies, ranging from welfare state design in affluent societies, to development policies by governments and non-governmental organizations in developing countries (Robeyns, 2005).

The capability approach has provided the theoretical foundations of the human development paradigm. It is however worth noting that it is not a theory that can explain poverty, inequality or well-being; but instead, it provides a tool and a framework within which to conceptualize and evaluate these phenomena. The capabilities approach draws on an account of what it means to be a human being. It conceptualizes human beings as being able to convert resources into functionings (functionings include working, resting, being literate, being healthy, being part of a community, being respected, among others) and the ability of humans to convert resources into functionings differs, depending on personal heterogeneities, social and environmental circumstances (Voget-Kleschin, 2013).

The capability approach has a key analytical distinction between the means and the ends of well-being and development, with the ends having intrinsic importance while means are instrumental to reach the goal of increased well-being, justice and development. However, in real situations these distinctions are often not clear, since some ends are simultaneously also means to other ends (Robeyns, 2005). It views goods and services as means to a certain quality of life (Anand & Sen, 2000; Sen, 2000). It also recognizes the influence of social and environmental conditions and conceives capabilities as the solution for evaluating quality of life for human beings (Voget-Kleschin, 2013). Capabilities can be enhanced through a number of interventions including enhancing peoples' choices and involving people in the development of poverty reduction strategies. Since poverty can be understood in the widest sense as a very low level of well-being, it can also be seen as the failure to achieve certain basic needs (Osmani, 2005).

Ibrahim (2006) has emphasized the intrinsic and instrumental importance of social structures; the significance of collective freedoms and collective agency, and the roles of collective action, institutions and social capital in generating new collective capabilities as opposed to individual capabilities. He recognized the fact that development is perceived as the process of expanding people's capabilities to help them achieve the lives they value. This process of capability expansion is highly dependent on the social, economic and political contexts in which these individuals live, and in many developing countries the use and exercise of human capabilities usually takes place in a collective setting. For example, the self-help initiatives among the poor in many developing countries illustrate how individuals can choose to act collectively to support each other and create economic or social opportunities, thereby showing the importance of collective efforts in enhancing human capabilities.

The concepts of freedom and agency in the capabilities approach are relevant for self-help analysis. Self-help initiatives are defined as any informal income-generating or social activity initiated by a poor community to achieve permanent improvements in their individual and communal wellbeing. Self-help is based on the freedom of the poor to choose the lives they value, and their ability to use their agency to effectively achieve these desired lives. Self-help is linked to Sen's five main instrumental freedoms:

political freedoms, economic facilities, social opportunities, transparency guarantees, and protective security (Sen, 2000). Self-help generates income for the poor while widening their social opportunities and helping them challenge the unequal power relations in their communities. Self-help initiatives are mostly built on trust and reciprocity and are therefore dependent on transparency and accountability among the group members. Through self-help, the poor can enhance their security and economic ability by mutually helping each other, especially at times of crises as observed by Ibrahim (2006). Since the current study was based on the mariculture initiatives that are run by the self-help groups in the coast of Kenya that have been formed to maximize collective capabilities, the capabilities approach provides an invaluable theoretical framework.

2.2.4 Participatory Development

Participatory development approach is a departure from the modernization theory of development which was premised on the universal prescription of identical development packages to different regions without considering the uniqueness of each region's problems. Participatory development recognizes that different regions are different in terms of resource endowments as well as the problems that confront them. It therefore seeks to promote indigenous knowledge by embracing community participation, environmental sustainability, domestically-induced growth and good governance (Dipholo, 2002). In participatory development, the development process is both a process for and by the people for their own sustained growth and therefore requires that the priorities of the poor be put first (Chambers, 1997). In this case, it is essential to realize the need for transformation of communities into dynamic and self-reliant entities, with effective organization and development capacities and internal momentum, capable of solving most of their development problems on their own on a continuing basis (Dipholo, 2002).

Participatory development aims at giving the beneficiaries of development an opportunity to exercise their choice and determine which direction of development they want to take, according to their capacity and the resources available to them. Participation is expressed in terms of empowerment of local people by strengthening their capacity, skills and knowledge. Participatory development is underlined by participation as the main operational principle that underpins all development activities. Therefore, participation must be embedded in project development rather than an activity that is undertaken periodically to create interest from the local communities. According to UNDP (1993), greater participation helps to maximize the use of human capabilities and is therefore a means of increasing levels of social and economic development.

2.3 Conceptual Framework

Conceptual framework has been defined by different authors differently but all definitions are closely related (Guba & Lincoln, 1989; Miles & Huberman, 1994; Reichel & Ramey, 1987; Smith, 2004). Conceptual Framework places descriptive categories systematically in a broad structure of explicit propositions, statements of relationships between two or more empirical properties, to be accepted or rejected.

In this study, the Conceptual Framework was presented as a model. A model is a representation of reality; it delineates those aspects of the real world that are considered relevant to the problem being investigated and makes the significant relationships among those aspects explicit (Nachmias & Nachmias, 2004). A model was used to gain insight into phenomena that cannot be observed directly (Nachmias & Nachmias, 2004). In the present study, the model was presented schematically to convey concepts and propositions through the use of boxes and arrows as shown in Figure 2.1. The independent variables include situation analysis practices, project formulation practices, implementation planning practices, and monitoring and evaluation system planning practices. Attitude towards mariculture enterprises is a moderating variable. The dependent variable is implementation of poverty alleviation mariculture projects.

Independent Variables **Moderating Variable** **Dependent Variable**

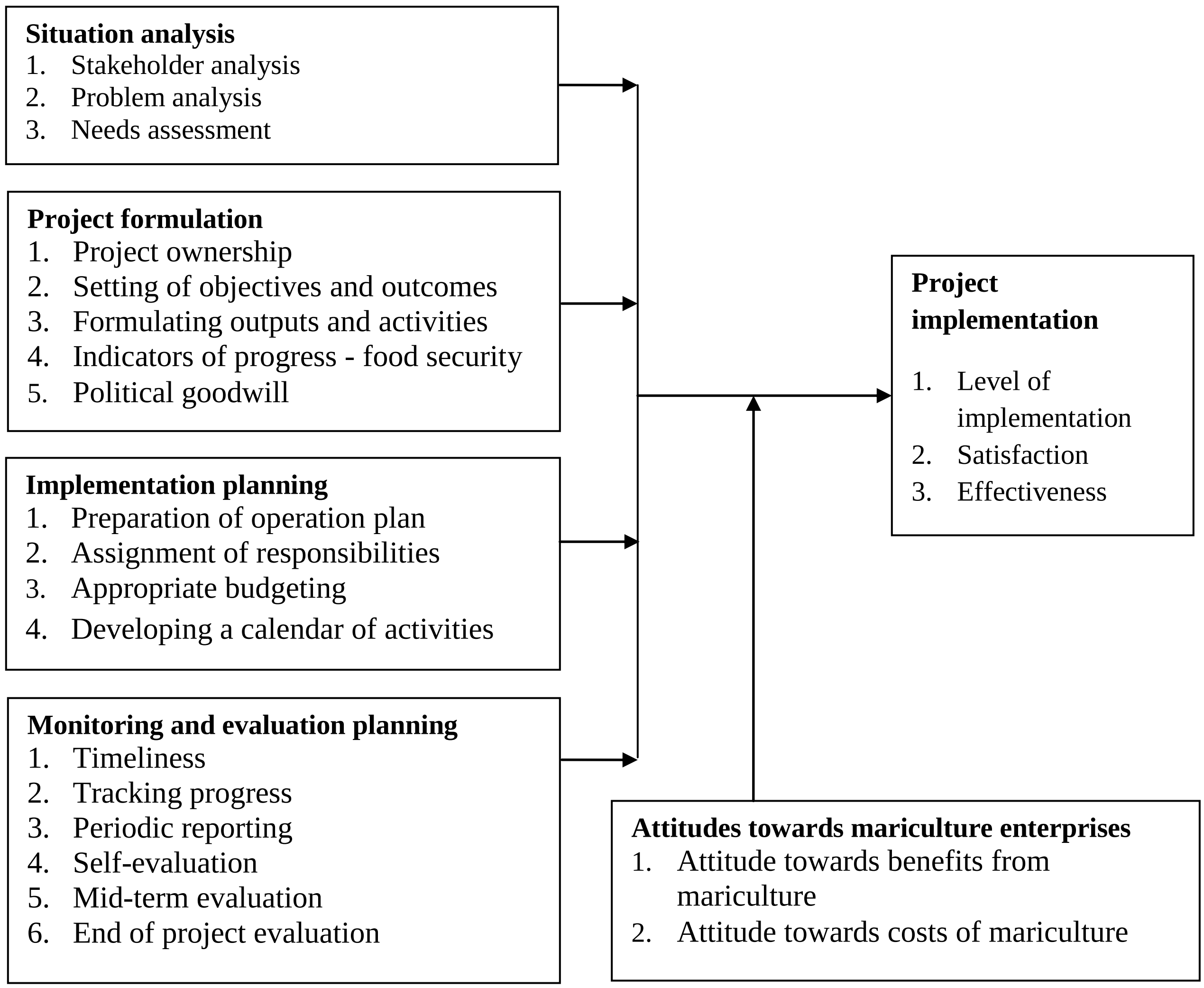

Figure 2.1: Conceptual framework showing the independent and dependent variables

2.3.1 Situation analysis

Situation analysis involve stakeholder analysis, problem analysis and assessment of the needs of the target groups. Schmeer (1999) defined stakeholder analysis as a process of systematically gathering and analyzing qualitative information to determine whose interests should be taken into account when developing and implementing a project. Bryson (2004) and Golder (2005) have taken this definition further by arguing that stakeholder analysis identifies all primary and secondary stakeholders and their interests in the issues in project. The stakeholder analysis can therefore help a mariculture project identify the interests of all stakeholders who may affect or be affected by the project; potential conflicts or risks that could jeopardize the project; opportunities and relationships that can be built on during project implementation; groups that should be encouraged to participate in different stages of the project; appropriate strategies and approaches for stakeholder engagement; and ways to reduce negative impacts on vulnerable and disadvantaged groups (Golder, 2005). In the present study, stakeholder analysis was visualized by Income earning. According to Bunce et al. (2000), stakeholder analysis ensures that a project is adapted to the needs and capacities of the stakeholders. Smooth and effective implementation of projects requires that all stakeholders that are likely to be affected by the project either positively or negatively be identified and their potential involvement in it be analyzed right from the beginning.

Problem analysis consists of using a systematic process to explore or unpack a complex community issue. It involves identifying the core problem of the target group and digging deep into the root causes of the problem and the effects that the problem has on the target group. This analysis can be represented diagrammatically by constructing a problem tree showing the relationship between the problem and multiple root causes, where the causes are structured by clustering similar ones and developing a hierarchy of causes. Project implementation is then guided by clearly defined interventions that address the root causes of the problem. It is therefore important both for actual implementation and monitoring of a project (UNDP, 2009). In the present study, problem analysis was measured by poverty alleviation.

Needs assessment is undertaken to ensure that a project meets community needs and makes the best use of available resources. The goal of a needs assessment is to identify the assets and resources of a community and determine the potential concerns that it faces (Sharma et al., 2000; National Association for State Community Services Programmes (NASCSP), 2011). It involves systematic collection of data from the target group in order to get an unbiased look at their views about the issue being addressed, finding out about the community's history to check whether the community has had experience with similar projects, and establishing what worked or what did not work with these projects. It tells the project design team what the target group requires in order to benefit from a project and therefore forms the basis for selection of interventions and budgets. The dependent variable is measured by the effect of the independent variable. In this study, the dependent variable is the implementation of mariculture initiatives. Needs assessments require active planning and involvement from key players in the targeted community. They must also consider a community's social or political context, which can determine the acceptance and integration of a mariculture project into the community at large (Shea et al., 2012).

2.3.2 Project formulation

Project formulation involves creation of project ownership, setting of objectives and outcomes, formulating outputs and activities, identifying indicators of progress which has been visualized by food security and political goodwill. Creation of project ownership is undertaken through inclusion of all stakeholders in project formulation. Project design should be a product of negotiation and consensus with all interested parties. The logical framework is the most useful and effective tool for project formulation. The outputs of stakeholder, problem, objective and alternative analyses are used to develop the logical framework matrix which shows what must be achieved, how to achieve it, the resources required and the timeframe (Jackson, 1997; Jensen, 2010; Örtengren, 2004).

Project formulation often begins with formulating the impact statement which explains why the work is important by capturing the ultimate development results. The second step is setting of objectives and formulating the outcome statement which captures medium-term development results created through the delivery of outputs of the project. The outcome statement should take into account the need to measure progress in relation to the outcome and to verify when it has been achieved. It should be specific, measurable, achievable, relevant and time-bound (SMART). The third step is to formulate an output statement. Outputs are short-term results produced by project and non-project activities. These results must be achieved with the resources provided and within the time-frame specified. The fourth step is the formulation of activities, which describe the actions that are needed to obtain the stated outputs. The activities include coordination, technical assistance and training tasks organized and executed by project personnel. The fifth step is the formulation of inputs such as time of staff and stakeholders, money, consultants, equipment, technology, and materials. The final step is formulating the performance indicators which describe the way to track the intended results and are critical for monitoring and evaluation (UNDP, 2009). Political goodwill is a precondition that should be considered during project formulation. It visualizes the factors beyond the control of the project that should be recognized during project formulation.

2.3.3 Implementation planning

Project implementation planning includes preparation of operation plan as a sub-variable that covers definition of strategies and activities that are required to implement a project. Assignment of responsibilities with clear planning of the actual work effort for implementation, developing a communication/training plan, and developing an implementation schedule for the completion of tasks and communication/training is another sub-variable under implementation planning. The third sub-variable is appropriate budgeting which involves realistic scheduling of time and resources for the project. If prepared well, appropriate budget links resources and activities to results. The fourth sub-variable is developing a calendar of activities which shows when each activity will be completed. In addition, proper implementation planning requires documentation of project objectives within an implementation plan to help to clarify to stakeholders what the project will accomplish as well as its priority in relation to competing endeavours. The implementation plan should also communicate the potential impacts resulting from the project implementation and how this relates to the needs of other projects. A good implementation plan should also include the approaches for addressing the project implementation.

A good implementation plan helps optimize the use of project resources and limits the time spent on resolving problems during implementation. Two levels of project implementation plans are prepared namely a life of project work plan and an annual work plan. A life of project work plan describes the general activities and general time frame for executing each activity along the entire life of a project. It is a multi-year action plan that covers the life of project period. It draws on the activities listed in the logical framework, and also includes activities such as knowledge management, branding and marketing that may not be part of the log frame. An annual work plan on the other hand is a detailed plan of activities to achieve a specific set of results during a particular year. It is also derived from the project logical framework. It also builds a foundation for decision-making, routine planning and performance reporting throughout the year. It should identify who does what, why, when, how, where and with what resources (CARE, 2007).

2.3.4 Monitoring and evaluation system planning

The monitoring and evaluation (M & E) system provides the information needed to assess and guide the project strategy, ensure effective operations, meet internal and external reporting requirements, and inform future planning. It is an integral part of project design as well as project implementation and completion. The M & E system planning practices show that there are four key components that inform M & E planning for projects. These key components of an M & E system include a causal analysis framework which should be based on a careful problem analysis for the project, a logical framework (an understanding of the differences between project inputs, outputs, outcomes, and impact is essential since the indicators to be measured under the M & E system reflect this hierarchy), an indicator matrix which expands the logical framework to identify key information requirements for each indicator and summarizes the key M & E tasks for the project, and a data collection and analysis plan which describes in detail how data and information will be defined, collected, organized, and analyzed (Chaplowe, 2008).

The monitoring and evaluation system planning has six sub-variables namely timeliness, tracking progress, periodic reporting, self evaluation, mid-term evaluation and end-term evaluation. Timeliness involves tracking the operations of poverty alleviation mariculture projects from activities and outputs to outcomes to ensure that implementation is on track with respect to the use of resources, working within the planned time frames and realization of target outputs. Tracking progress involves impact monitoring which tracks the immediate objectives and outcomes while reporting is carried out as planned. Periodic reporting takes place at different levels of the logical framework and serves different functions. Self evaluation is planned to ensure that the data and information generated from monitoring is used by members of the project team to conduct self assessment. Mid-term evaluation is planned so that external evaluators can be engaged to conduct mid-term review and advice stakeholders on the progress in the implementation of the project. An end of project evaluation is planned to establish whether a project has realized its objectives or not (Perrin, 2012).

The key components of M & E system planning have further been elaborated by Cooperative for American Remittances to Europe (CARE) (2012) in 10 modules that represent different aspects of M & E system design. The first module is about conducting M & E system client mapping to identify and prioritize the people or groups that will use information generated by the measurement system. The second module describes the development, review and refining of the causal model to illustrate the causal pathways that link the planned interventions to the end goal. This is consistent with the causal analysis framework presented by Chaplowe (2008). The third module describes the assessment of the resources and capacity required to make good decisions during the M & E system design process. The fourth module discusses the selection of performance indicators that will be tracked through the M & E system. These indicators include those to be tracked through traditional, routine measurement as well as routine observation. The fifth module describes the selection of data collection tools for the indicators to be tracked through routine observation as well as those to be tracked through routine measurement. Developing analysis and feedback loops that meet the needs of M & E clients is critical and is the subject of the sixth module. The seventh module is about conducting a reality check in order to quickly review the realism of the plan and make adjustments as necessary to ensure the plan is feasible and able to deliver maximum value for as many M & E clients as possible. The other practices include integrating other design features into the M & E System to ensure the smooth functioning of the system and the validity of M & E information, training and capacity building for all personnel responsible for M & E Activities, and reviewing and revising the M & E System (CARE, 2012).

According to Chaplowe, (2008), the key components of the M & E system have a logical sequence from hypotheses on how the project will bring about change in a specific sector, to the specific objectives needed for these changes, methods for measuring the project's achievement of its stated objectives, and protocols for collecting and analyzing data and information used in the measurement. These components are interdependent. M & E planning should begin during the project design stage (CARE, 2007) and should involve those using the M & E system to ensure feasibility, understanding, and ownership. Early planning informed the project design and allow for sufficient time to arrange for resources and personnel prior to project implementation. An M & E system is built on the key parameters of a project namely the overall goal or desired change or effect, the main beneficiaries or audience that the project seeks to benefit, the hypotheses or assumptions that link the project objectives to specific interventions or activities, the project scope and size, the extent of participation in and capacity for M & E, the project duration, the overall project budget.

2.3.5 Attitudes towards mariculture enterprises

Attitudes of local communities towards mariculture initiatives are determined by expected benefits from mariculture enterprises, anticipated costs of implementing mariculture projects and the local cultural setting. Attitudes towards mariculture therefore formed an important variable during the present study. It has been observed that mariculture has lagged behind in the Coast of Kenya due to negative beliefs and attitudes of the local communities (Brummett & Williams, 2000; Mirera & Ngugi, 2009; Mirera, 2011). In the current study, it was anticipated that project designers and implementers should follow local customs for them to gain acceptance. Since the project implementers are not part of the local community, they may be perceived as disruptive and a potential threat to established power structures and this may influence attitudes of the community towards mariculture projects. Following the local customs helps to ensure the team is accepted by the local community and can work in an atmosphere that is relatively free of tension (Bunce et al., 2000).

2.3.6 Project implementation

Project implementation is considered successful on the basis of four criteria namely whether the project comes on schedule hence time criterion, whether the project is delivered within the budget hence the monetary criterion, whether the project achieves all the goals that were originally set for it hence the effectiveness criterion, and whether the project is accepted and used by the target beneficiaries hence satisfaction criterion (Pinto & Slevin, 1987). These four criteria therefore define the sub-variables that are usually considered to measure the success of project implementation. In the present study, project implementation consisted of three sub-variables namely level of implementation, satisfaction which is associated with degree of project success and effectiveness which relates to the degree to which the project has realized the intended objective. Project implementation involves the actual implementation of the project activities as documented in the approved project document (UNDP, 2011; USAID, 2007). It is based on the implementation plan which is normally prepared at the formulation stage. It is usually organised with a limited budget, limited human resources and specific timelines.

2.4 Empirical Review: Project design practices and implementation

This section presents an empirical review of studies that are relevant to this study. Dayahka (2007) described empirical research as a way of gaining knowledge by analyzing previously conducted research quantitatively or qualitatively. This section therefore covered previous studies conducted on the dependent and independent variables as highlighted in the conceptual framework.

Ika et al. (2012) investigated the relationship between critical success factors including project design and the success of the World Bank projects as perceived by World Bank Task Team Leaders. The exploratory factor analysis highlighted a specific set of five critical success factors: monitoring, coordination, design, training, and institutional environment. The study showed that there is a statistically significant positive relationship between each of the five critical success factors and project success. The results confirmed that the most prominent critical success factors for project supervisors are design and monitoring which is consistent with theory and practice. A conclusion was therefore drawn that the World Bank project supervisors and managers should strengthen project design and monitoring in order to improve project implementation as well as the chances for project success (Ika et al., 2012).

Yang et al. (2010) studied critical success factors for stakeholder management in construction projects of Hong Kong and concluded that managing stakeholders with social responsibilities, assessing the stakeholders' needs and constraints to the project, and effective and freguent communication with the stakeholders are the top three ranked factors. Managing stakeholders with social responsibilities was considered by the project managers to be the most important factor for the success of stakeholder management.

Khang and Moe (2008) examined a conceptual life-cycle model that identifies different sets of project success factors for each phase of the life-cycle for not-for-profit interventional development projects and concluded that effective consultation is the most influential factor on project management success. A study by Pinto and Prescott (1990) on planning and tactical factors in project implementation, grouped the critical success factors into planning and tactical categories with project schedule/plan and client consultation being placed under planning category.

Akroyd (1999) recognized the importance of conducting a detailed situation analysis at the project design stage to get a clearer understanding of the socio-cultural conditions that would be critical for the success of a development project. The study also analyzed the application of monitoring and evaluation in a small-holder rice production project in the Gambia concluded that monitoring and evaluation targets should and pragmatic. Collection of a lot of data much of which may not be processed, analyzed and used for decision making should be avoided.

CARE (2007) assessed the relationship between project planning (which is a component of project design) and project implementation. It concluded that project implementation is carried out following the already laid down implementation plan or work plan in order to realize outputs and immediate objectives of the project. Effective planning enables the project team and key stakeholders to agree on tasks, responsibilities, timelines and mechanisms for smooth implementation of a project. A good implementation plan ensures efficient use of project resources and limits the time spent on resolving problems during implementation. An effective preparation of project implementation plan is crucial for establishing a shared vision and consensus among the project team regarding the purpose of the project. The process of preparing an implementation plan helps participants understand implementation challenges, and strategize on how to address them to achieve the desired results. It is important to involve all in the process of preparing a project implementation plan to ensure common understanding (CARE, 2007).

Brock and Columbia (2008) discussed how the components of project design (situation analysis, project formulation, developing project planning framework, developing a project monitoring and evaluation plan, and developing a project budget) influence project implementation in the context of a programme named "Youth reproductive health integration cycle". Within this programme, a youth-serving organization named YouthExcel evaluated its livelihood training programme and established that about one-third of female students had dropped out of the training. The evaluation showed that a number of girls left the training due to pregnancy. In response, the organization opted to prevent early pregnancy among girls by addressing it within the livelihood programme. In order to integrate youth reproductive health effectively in the programme, the programme staff obtained more information about the problem by reviewing available survey reports and national data related to youth reproductive health. Focus group discussions were also conducted with young people to understand their needs in reproductive health. The data and information that was gathered from both secondary sources and focus group discussions indicated that many issues contributed to the problem of early pregnancy among girls. To prioritize the issues and identify the ones that the organization could address, the program staff needed to conduct a comprehensive situation analysis including analysis of the problem, analysis of reproductive health of stakeholders and assessment of organizational capacity in regard to youth reproductive health (Brock & Columbia, 2008). This further shows the critical importance of situation analysis to project formulation and implementation.

Studies by Brycesson, (2002) and Troell et al., (2011) indicated that mariculture production in the Western Indian Indian Ocean region is characterized by a small number of high value species that are produced for international markets, and species generating larger biomass from low input. Both can yield benefits for local communities in terms of improved food security through increased production of low cost nutritionally rich fish, generation of income and employment throughout the value chain.

2.5. Research Gaps

The research gaps that have been identified from the literature that has been reviewed include the fact that many mariculture initiatives that are introduced to provide livelihood, income and food to the local communities in Kenya have collapsed and no study has been conducted on community participation in these mariculture initiatives. Furthermore, the effects of project design on the implementation of mariculture projects have not been comprehensively covered in a single study. Similarly, while it is known that situation analysis influences project implementation, the magnitude and significance of this influence has not been tested. This research will therefore attempt to establish this information. There is no comprehensive study on the root causes and effects of failures in the implementation of poverty alleviation mariculture projects along the coast of Kenya.

2.6 Summary

The literature review has covered theoretical framework, conceptual framework and empirical review. The theoretical framework that guided this study consisted of the logical framework, results based approach, the capabilities approach and participatory development approach. Logical framework is a project design methodology based on a logic of cause-effect relationship. It promotes participatory engagement of all parties. Results based approach is a management strategy that focuses on performance and achievement of results and involves defining realistic expected results based on appropriate analysis, clear identification of project beneficiaries and designing interventions to meet their needs.

Capabilities approach is a broad normative framework for evaluation and assessment of individual well-being and social arrangements, the design of policies, and proposals about social change. This study taps on the application of the capabilities approach in self-help analysis that focuses of maximization of collective capabilities which is directly applicable to implementation of poverty alleviation mariculture projects. Participatory development approach seeks to promote indigenous knowledge by embracing community participation, environmental sustainability, domestically induced growth and ggod governance. The study is premised on a conceptual framework which was presented in a model with on project design practices as the independent variables, attitudes of local communities towards mariculture as the moderating variable and mariculture project implementation as the dependent variable.

The empirical review has covered studies by Ika et al. (2012) which concluded that design and monitoring and evaluation are critical success factors in World bank projects, Yang et al. (2010) concluded that managing stakeholders with social responsibilities was considered to be the most important factor for the success of stakeholder management, Khang and Moe (2008) concluded that effective consultation is the most influential factor on project management success. A study by Pinto and Prescott (1990) concluded that project schedule/plan and client consultation are critical and are placed under planning category. CARE (2007) assessed the relationship between project planning and implementation and concluded that the quality of project planning determines the outcome of project implementation.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research design for the present study, target population, sampling frame, sample and sampling technique, research instruments used in this study, data collection procedures, pilot test, validity and reliability. Data processing and analysis including the multiple regression model and testing of hypotheses, and variable measurement were also described.

3.2 The Research Design

Research design refers to the arrangement of conditions or plans and procedures for research including methods of collection and analysis of data in a manner that joins relevance to the research objective (Creswell, 2014; Kothari & Garg, 2014). In the present study, a combination of quantitative and qualitative approaches was used. The quantitative approach involved the application of a survey method. A cross sectional survey design was adopted with questions being asked once in the entire period of the research as described by Saunders et al (2007). Cross sectional studies are suitable where the objective is to establish whether significant relationships exist among the study variables at some point in time (Mugenda & Mugenda, 2008). In the present study the objective was to establish whether significant relationships exist between project design practices and implementation of poverty alleviation mariculture projects. Adoption of cross sectional survey further made it possible to collect data in short duration of time. The cross sectional survey had also been used successfully by a number of researchers including Marendi (2015) and Sasaka (2016) to come up with credible findings and conclusions.

A survey is an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables. Survey research is therefore a self-report study which requires the collection of quantifiable information from a sample (Mugenda & Mugenda, 2003). Survey method was used in this study because it has been successfully used in similar studies and it involves large scale sampling to ensure precise estimate of the population characteristics. Furthermore, the survey method is one of the most important data collection methods in the social sciences and is used extensively to collect information on numerous subjects of research (Nachmias & Nachmias, 2004).

This study was both descriptive and explanatory hence survey was used because of its suitability for both purposes. It offered the most effective means of social description and provided extraordinary details and precise information about a large heterogeneous population. It also allowed the inclusion of wide ranging topics in the questions. In addition, it was able to handle several hypotheses at a time.

The qualitative approach on the other hand is empirical research where data is not in the form of numbers (Punch, 1998). In the present study, the qualitative approach was exploratory in nature and used to gain an understanding of the social and cultural reality of individuals and groups that were involved in mariculture projects, in order to understand the underlying reasons, opinions and motivations for them to engage in mariculture projects. It was used to study people in their natural settings to provide insights in to the research problem and formed a basis for quantitative research. The qualitative data collection methods used in the present study included unstructured individual in-depth interviews and key-informant interviews. In-depth interview is one of the main methods of data collection used in qualitative researchand in this study, it involved conducting intensive individual interviews with a small number of respondents to explore their perspectives on the socio-cultural and economic situation (Boyce & Neale, 2006) as well as their involvement in poverty alleviation mariculture projects in their respective areas. In-depth interview is interactive in nature and therefore allowed the factors that underpin the interviewees' answers to be explored fully. Key informant interviews were carried out on some key institutional stakeholders to provide expert perspective on the mariculture projects.

3.3 Target Population

The target population refers to the total items about which information is desired (Kothari & Garg, 2014). The target population covered the communities that are engaged in fish, crustacean and seaweed farming in Kwale, Mombasa and Kilifi

Counties of the coast of Kenya. These communities consisted of 12 organized community groups with a total of 372 members (KMFRI-KCDP, 2015). These organized community groups were either formed by Non Governmental Organizations (NGOs) to specifically implement mariculture projects (as part of environmental conservation or for livelihood) or by communities themselves being influenced by their neighbours that have benefitted from group formations. The target population also covered 15 representatives of the non-governmental organizations, government agencies, researchers and financiers that support mariculture projects in different ways in the three counties.

3.4 Sampling Frame

A sampling frame is the ordered list of individuals in the population of interest to the researcher (Nyariki, 2009) from which a sample is drawn (Leary, 2001). In this study, the sampling frame consisted of the list of all 372 individuals in the 12 community groups that were engaged in mariculture in Kilifi County (Dabaso Conservation Group, Umoja Self Help Group, Abent Conservation Group, Ihaleni Conservation, Kadzuoni Artemia Society, Ngomeni Conservation), Mombasa County (Majaoni Youth Development Group, Kidongo Beach Management Unit, Makumba Self Help Group) and Kwale County (Baraka Self Help Group, Kibuyuni Seaweed Farmers, Stahimili Women Group) in the coast of Kenya. The sampling frame included nine representatives of the government and non-government agencies and six scientists that have been involved in mariculture in the coast of Kenya.

3.5 Sample and Sampling Technique

3.5.1 Sample Size

In the present study, a sample was selected from a sampling frame that consisted of a complete listing of sampling units (all the 372 individuals who are members of the organized community groups as well as government agencies, non-governmental organizations, and researchers which are engaged in mariculture in different capacities). From the sampling frame of the members of 12 community groups that were engaged in mariculture in the three selected counties (Kilifi, Mombasa and Kwale), sample size was calculated using the following standard formula for infinite population (Daniel, 1999; Naing et al., 2006):

$n = z^2p(1- p)/e^2$ .... Equation 1

Where:

n = sample size

z = the statistical certainty usually chosen at 95% confidence level, that is z = 1.96 for an error risk of 5%

p = estimated level/coverage to be investigated, usually p = 0.5 is chosen

e = precision desired, expressed as a fraction of 1, usually e = 0.05 is chosen for the confidence interval, the rest of the values are given above

Substituting the values into equation (1), the estimated sample size for infinite population was obtained as follows:

$n = (1.96)^2 (0.5 \times 0.5)/(0.05)^2$

$n = (3.84)(0.25)/(0.05)^2$

$n = 384.16.$

Correcting for finite population, the following formula was used (Daniel, 1999; Naing, et.al., 2006):

$n^1 = n/(1+n/N)$ .... Equation 2

Where:

n^1 = sample size for finite population

N = the target population = 372

n = calculated sample size from infinite population = 384.16

Substituting these values into equation (2):

$n^1 = 384.16/(1+384.16/372)$

$= 384.16/2.03$

$= 189.24$

Therefore, the sample size was 189.

The sampling interval (SI) was calculated by dividing the total population by the sample size (n^1=189). The target population in the study area was 372, obtained by summing up the target population in each of the three Counties (Table 3.1).

$SI = \sum Xi/\ n^1 = 372/189 = 1.97.$

Therefore, the sampling interval was 1.97 which was rounded off to 2.

In the qualitative approach, interviewees for in-depth interviews were selected by considering a sample that best represents the diverse mariculture stakeholders and their opinions. The selection was guided by the general rule that when the same information starts to be heard from a number of stakeholders then enough has been done. For representatives of government and non-government agencies, financiers and researchers that are involved in mariculture whose target population was 15, the entire population of 15 was interviewed.

3.5.2 Sampling Technique

The simple random sampling was used to select the number of subjects that represent the target population in the survey. The respondents were randomly picked from the sampling frame using random numbers to ensure that there were equal chances for each of the respondents to be included in the study. According to Kothari (2008), random numbers ensure that the sample is randomly selected with all individuals in the population having an equal chance of being picked. This sampling technique provided an efficient system of capturing the variations or heterogeneity that existed in the target population. This random sampling is the key to obtaining a representative sample and allows generalization to a larger population with a margin of error that is statistically determinable and the usage of inferential statistics. Table 3.1 below shows the distribution of sample size across the 12 mariculture groups.

Table 3.1 Distribution of the sample size by mariculture groups along the Kenya coast

S. No.	County	Name of mariculture group	No. of members	Proportion (No. X 100) 372	Sample size (proportion x 189)
1	Kilifi	Dabaso Conservation Group	28	8%	15
2		Umoja Self Help Group	83	22%	42
3		Abent Conservation Group	17	5%	9
4		Ihaleni Conservation	24	6%	12
5		Kadzuoni Artemia Society	25	7%	13
6		Ngomeni Conservation	22	6%	11
7	Mombasa	Majaoni Youth Development Group	27	6%	12
8		Kidongo Beach Management Unit	25	7%	13
9		Makumba Self Help Group	37	10%	19
10	Kwale	Baraka Self Help Group	22	6%	11
11		Kibuyuni Seaweed Farmers	49	13%	25
12		Stahimili Women Group	13	4%	7
TOTAL			372	100%	189

3.6 Data Collection Instruments

In this study, the questionnaire and the interview guides were the main research instruments. A questionnaire is a tool that consists of a number of questions arranged in a definite order on a form or set of forms, which can be administered to the respondents (Kothari & Garg, 2014). A questionnaire was constructed taking into account the objectives and hypotheses of the research (Kothari, 2008; Nachmias & Nachmias, 2004; United Nations Statistics Division (UNSD), 2005). A likert scale type of questionnaire was adopted for this study and each question was assessed on a 5-point likert scale from strongly disagree (1) to strongly agree (5). An interview guide was also developed with open-ended questions and discussion points designed to generate qualitative information (Bunce, et al., 2000). Both questionnaire and interview guides are attached as Appendix 1 and 2.

3.7 Data Collection Procedures

Guided questionnaire administration was adopted in this study. The guided questionnaire administration was preferable since it provided the opportunity to capture a representative sample of the target population and control for non-verbal behaviour. The questionnaire was administered in the mariculture farms, other places of work or houses.

In-depth interviews involved conducting intensive individual interviews with a small number of respondents to explore their perspectives on the design and implementation of mariculture projects and their contribution to poverty alleviation. The participants and others associated with the mariculture projects were asked about their experiences and expectations related to the mariculture projects, and their thoughts concerning mariculture project operations, processes, and outcomes. Key informant interviews with mariculture researchers, fisheries officers, officials of Non-Governmental Organizations that are involved in mariculture activities and mariculture project financiers were carried out (Bunce, et al., 2000). These key informants were selected purposively to provide expert perspective on the mariculture initiatives and on the study area as a whole. Appointments were booked with the key informants and the interviews were conducted in their offices or work places.

3.8 Pilot test

Pilot study was carried out to evaluate the suitability of the questionnaires. The purpose of a pilot study was to identify areas of weaknesses in the questionnaires and establish clarity of the questions. Sample for the pilot study was obtained from Junda community-based mariculture group in Mombasa, which was not part of the target population. Questionnaires were administered to 15 respondents during the pilot study. The pilot study helped to detect flaws in the administration of the questionnaires and therefore helped ensure reliability and validity of the questionnaires.

3.8.1 Reliability of the instrument

Reliability indicates the extent to which a measure contains variable errors. Reliability of the questionnaire that was used for data collection in this study was evaluated using the

Cronbach's Alpha and split-half method (Pallant, 2007). The computed Cronbach's Alpha for the entire data set was 0.978. A computed Cronbach's Alpha of 0.70 is considered sufficient for research instrument (DeVellis, 2003; Pallant, 2007) hence the questionnaire that was used in this study was above the required threshold thereby confirming its reliability. The split-half method that assesses the internal consistency of questionnaires was also computed. The Spearman-Brown Coefficient – equal length was 0.923 and unequal length was also 0.923 confirming that there was high correlation which is required for a reliable test. The computed Guttman Split-Half Coefficient was 0.877 which was also more than 0.80 thereby indicating that the questionnaire that was used was reliable.

3.8.2 Validity of the instrument

Validity was tested since it underlies the sources of measurement error. Content validity was assessed in the present study through a subjective assessment of the survey questionnaires' appropriateness and the extent to which the questionnaire captured the variables and indicators from the objectives of the study and the conceptual framework that needed to be measured. Before the questionnaire was used to collect data, three experts evaluated it in terms of the percentage of questions that they considered relevant for them and the average score from the three experts was calculated. The first expert gave it 100%, the second expert gave 95% and the third expert gave 90%. This yielded an average congruency percentage of 95% which is greater than the lower limit of 90% hence the content validity of the questionnaire's was confirmed. Empirical validity was supported by comparisons with measurements made by other questionnaires. Construct validity was established by relating the survey questionnaire to a general theoretical framework. Data from the pilot test and the actual survey were further subjected to Kaiser-Meyer-Oklin Measure of Sampling Adequacy and the Bartlett's Test of Sphericity before factor analysis was performed. According to Kaiser (1970, 1974), the Kaiser-Meyer-Oklin Measure of Sampling Adequacy ranges between an index of 0 and 1 with a lower limit of 0.6 and the closer the index is to 1 the better. The Bartlett's Test of Sphericity on the other hand relates to the significance of the study and therefore shows the validity of responses obtained in relation to the problem that the study seeks to address. It is recommended that the test statistic be less than 0.05 (Pallant, 2007; Tabachnick & Fidell, 2007).

3.9 Data Processing and Analysis

The data processing included coding and classification of the collected data, cleaning the raw data and organizing data according to emerging themes. Coding was carried out before data was entered in to Statistical Package for Social Scientists (SPSS) version 22.0 for analysis. The code was consistent across cases. Information on what each code means was listed in a codebook that accompanied the dataset. For the data to make sense, coding rules were observed by ensuring that numbers assigned make intuitive sense for variables that were to be rank ordered, the coding categories were mutually exclusive with each unit of analysis fitting in only one category, the coding scheme were exhaustive for every response to fit into a category, and categories were specific enough to capture differences using the smallest possible number of categories. After coding was completed, data entry was done in an SPSS spreadsheet. Data cleaning was carried out by proofreading the collected data to capture and correct errors and inconsistent codes. Wild codes were finally checked by generating a frequency distribution which showed the pattern of responses for each variable, and the cleaned data was organized into emerging themes using Statistical Package for Social Scientists (SPSS).

Descriptive statistics particularly mean and standard deviation were computed. An exploratory factor analysis was performed to identify patterns in data, reduce the data table and number of variables to a few interpretable linear combinations of the data, avoid multicollinearity and check the integrity of the key variables. The necessary tests which involved checking the correlation matrix for evidence of correlation coefficients greater than 0.3, computing Kaiser-Meyer-Olkin Measure of Sampling Adequacy which is required to be above 0.6 (Kaiser 1970, 1974), and the Bartlett's Test of Sphericity which should be significant at $p < 0.05$, were carried out to confirm the suitability of the dataset for factor analysis.

The three requirements were met hence supporting the need for factor analysis to be performed. After conducting the necessary tests, the principal factor analysis was conducted using principal components as the main factor extraction technique. The analysis of principal component involved using the Kaiser's criterion, screeplot and parallel analysis to determine the number of components to retain. The rotated factor solutions were generated for interpretation. The component correlation matrices were generated alongside oblique rotations to estimate the correlation coefficient (r). The Pearson's correlation analysis was carried out to determine the nature and strength of the relationships between the independent variables and the dependent variable.

The multiple regression analysis was carried out as elaborated by Christensen (1996) and Tabachnick and Fidell (2007) to estimate the effects of independent variables on the dependent variable and test the hypotheses of the study while observing the following assumptions:

i. Sample size must be large. This was observed by ensuring the sample size satisfied the condition $n > 50 + 8m$ (where, m = number of independent variables) (Tabachnick & Fidell, 2007).
ii. Multicollinearity and singularity – multicollinearity refers to high correlation between explanatory variables ($r = 0.9$ and above), and singularity occurs when one explanatory variable is a combination of other variables.
iii. Outliers – This was observed by conducting initial screening to eliminate outliers and standardized residual plots were used.
iv. Normality, linearity, homoscedasticity – refer to distribution of scores and the nature of the relationship between the variables. Normality and linearity were observed through the normal probability (P-P) plots and scatterplots.

The following regression equation was used:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_{4+} \beta_5 X_5$$

Where:

Y = the dependent variable

X_1, X_2, X_3, X_4, X_5 = independent variables which are situation analysis, project formulation, implementation planning, monitoring and evaluation planning, and attitudes towards mariculture which is a moderating variable.

a = the intercept point on the Y axis for X_1, X_2, X_3, X_4, and X_5.

β_1, β_2, β_3, β_4, β_5 = the slope of the regression line for each independent variable, controlling for the other (multiple regression coefficients).

The multiple regression coefficient measures the amount of change in the dependent variable associated with one unit change in the independent variable while controlling for all other variables in the equation (Nachmias & Nachmias, 2004). Therefore, β_1 reflects the amount of change in Y associated with a given change in X_1, holding X_2, X_3, X_4, and X_5 constant; β_2 is the amount of change in Y associated with a given change in X_2, holding X_1, X_3, X_4, and X_5 constant; β_3, is the amount of change in Y associated with a given change in X_3, holding X_1, X_2, X_4, and X_5 constant; β_4 is the amount of change in Y associated with a given change in X_4, holding X_1, X_2, X_3, and X_5 constant; and β_5 is the amount of change in Y associated with a given change in X_5, holding $X_{1,}$ X_2, X_3, and X_4 constant.

Qualitative data from in-depth interviews and key informant interviews were analyzed using content analysis. The content analysis involved synthesizing the qualitative data by checking out key concepts, emerging patterns and themes that seem to dominate the findings. Interpretation of the meanings and implications of the content was carried out by looking at the research problem from a new perspective, exploring new relationships and understanding basic motivations.

3.9.1 Testing of hypotheses

The coefficient of determination (R^2) was used to establish the combined effect (percentage of the variation explained by all the independent variables in the multiple regression equation) of the independent variables on the dependent variable. The null hypotheses were tested using multiple regression analysis as follows:

1. H_o: Situation analysis does not affect implementation of mariculture projects.

   This null hypothesis was tested using p-value and Analysis of Variance (ANOVA) test of significance.

2. H_o: Project formulation does not influence implementation of mariculture projects.

   p-value and ANOVA test of significance were used to establish relationships between the variables.

3. H_o: Project implementation planning does not influence project implementation.

   Testing of the null hypothesis was done using p-value and ANOVA test of significance.

4. H_o: Monitoring and evaluation planning does not influence implementation of mariculture projects.

   The null hypothesis was tested using p-value and ANOVA test of significance.

5. H_o: Attitudes do not constrain the implementation and adoption of mariculture initiatives.

   p-value and ANOVA test of significance were applied to test the null hypothesis.

3.10 Variable Measurement

Variable measurement was carried out at three levels namely nominal, ordinal, and interval scales. Nominal level of measurement involved assigning symbols to categorize responses. Ordinal level of measurement involved the application of Likert Scale questionnaire. The interval level of measurement was used to indicate cases where quantity of the variable is present.

Situation analysis was measured on ordinal scale using the Likert scale items in questionnaire. The sub-variables under situation analysis includes stakeholder analysis, problem analysis and needs assessment. Measurement of each sub-variable involved identifying techniques and procedures that are followed. Stakeholder analysis was based on analysis of the primary targets of mariculture projects and their expectations which are in terms of benefits that accrue in the form of income increases. Stakeholder analysis was therefore measured by analysis of the income changes accruing from the mariculture project.

The problem analysis involved analysis of the core problem, root causes of the problem and effects of the problem. In the case of mariculture projects, the core problem that the projects aim to address is poverty. Project interventions in this case were guided by analysis of the root causes of poverty. Therefore problem analysis was measured in terms of analysis of the root causes of poverty. The key indicators under needs assessment are identification and examination of gaps and assessment of community's past experience with similar projects in terms of lessons learnt. Gaps are in the form of capacity in terms of ability (skills and knowledge) to run and sustain mariculture. On the other hand, community's past experience is measured by assessing lessons learnt from similar projects by communities. These indicators were measured on an ordinal scale using the Likert scale items in questionnaire.

Project formulation were measured on ordinal scale using the Likert scale items in questionnaire. The measurement of variables was based on the procedures that are followed in project formulation. These procedures include stakeholder inclusion, setting of objectives, defining outputs and activities, identifying indicators of progress, and stating key assumptions. Stakeholder inclusion was measured through analysis of level of participation by different stakeholders in mariculture projects. Setting of objectives was measured through analysis of changes in livelihoods and income generation. Defining outputs and activities was measured through analysis of resources and time used to deliver the identified outputs namely livelihoods, nutrition and food security. Progress indicators were measured by confirming the presence of a system of measuring and recording the achievement of objectives particularly generation of income and level of satisfaction. Key assumptions were measured through analysis of the factors beyond the control of the project particularly political goodwill that may affect achievement of the desired output.

Implementation planning was measured on ordinal scale. Variable measurement was based on the following procedures that are followed: preparation of operation plan, setting who is responsible for each activity, developing a calendar showing when each activity will be completed and developing a plan that sets out resource requirements. Based on these procedures, the indicators that were measured include the work break-down matrix, responsibilities schedule, implementation schedule, implementation budget. Monitoring and evaluation were measured on ordinal scale. The measurement of variables was based on the following techniques and procedures that are followed: implementation monitoring, impact monitoring, periodic reporting to the main stakeholders, self-evaluation by members of the project team, mid-term external evaluation, end of project evaluation. The main indicators that are associated with these techniques and procedures are: analysis of progress in the realization of outputs, analysis of the impact of the mariculture project in terms of poverty alleviation, frequency of reporting to stakeholders, use of data and information for decision making, and analysis of the relevance of mariculture projects.

The moderating effect of attitudes towards mariculture projects was measured on ordinal scale. Attitudes are influenced by expected project benefits, expected costs and culture. Therefore measurement was based on analysis of level of support for the project by the different stakeholders, analysis of costs associated with mariculture, and analysis of gender influence on attitudes and its effect on mariculture.

Project implementation was measured on ordinal scale using the Likert scale items in questionnaire that covered level of implementation, degree of success and degree to which the project has addressed poverty. Level of implementation was measured by analysing employment opportunities created by each of the mariculture projects. Degree of success was measured by analysing the level of satisfaction by beneficiaries while degree to which the project has addressed poverty was measured through analysis of changes in livelihoods, nutrition and food security.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

The study investigated project design practices and their effects on implementation of mariculture projects geared towards poverty alleviation among coastal communities in Kenya. This chapter presents the results and discussion based on analysis of data collected from the field using questionnaires and interview guides. Data was collected from members of the community-based mariculture groups in Kwale, Mombasa and Kilifi Counties in the coast of Kenya. The results and discussion are based on the six concepts and propositions that show the relationships between mariculture project implementation and situation analysis practices, project formulation practices, implementation planning practices, monitoring and evaluation planning and attitudes towards mariculture.

4.2 Response Rate

In this study, a total of 182 respondents answered the questionnaires against an estimated sample size of 189 respondents. This resulted in a response rate of 96.3 percent as shown in Table 4.1. The high response rate of 96.3 percent was realized because the researcher followed up the target respondents, whose names had been pre-selected through random numbers, booked appointments with them in advance via phone calls and conducted guided administration of questionnaires. A list and contacts of members of the community-based mariculture groups were obtained from the Kenya Coastal Development Project that had prepared an inventory of mariculture projects in the coast of Kenya. A high response rate enhances validity of the results and the response rate in this study should be considered excellent based on recommendations of Mugenda and Mugenda (2003, 2008), Babbie (2004) and Zikmund et al. (2010) that a response rate of 70 percent and above is very good for analysis.

Table 4.1 Distribution of sample size and response rate by mariculture groups in the coast of Kenya

Name of mariculture group	Sample size	Response	Response rate (%)
Dabaso Conservation Group	15	15	100
Umoja Self Help Group	42	42	100
Abent Conservation Group	9	7	78
Ihaleni Conservation	12	12	100
Kadzuoni Artemia Society	13	13	100
Ngomeni Conservation	11	11	100
Majaoni Youth Development Group	12	12	100
Kidongo Beach Management Unit	13	9	69
Makumba (Mazombeni) Self Help Group	19	19	100
Baraka Self Help Group	11	11	100
Kibuyuni Seaweed Farmers	25	24	96
Stahimili/Nyumba Sita Women Group	7	7	100
Total	**189**	**182**	**96.3**

4.3 Demographic characteristics

The study sought to establish the demographic characteristics that are relevant to implementation of community based mariculture projects. These demographic characteristics were analyzed using descriptive statistics in order to understand the characteristics of the respondents who were mainly the mariculture project implementers and beneficiaries.

4.3.1 Gender of respondents

The study sought to find out the gender composition of the respondents who were the mariculture project implementers and beneficiaries. The findings (Table 4.2) revealed that female respondents accounted for 59 percent while the male respondents accounted for 41 percent. The findings are in tandem with the observations by Luxton & Luxton (1999) and UNEP-Nairobi Convention and WIOMSA (2015) that women were involved in seaweed mariculture as the main beneficiaries of production in the Line Islands, Central Pacific and in Zanzibar.

Table 4.2: Frequency distribution of respondents by gender in twelve mariculture groups

Gender	**Frequency**	**Percent**
Female	107	58.8
Male	75	41.2
Total	**182**	**100.0**

4.3.2 Age of respondents

The study sought to find out the age of respondents in order to establish whether the poverty alleviation mariculture projects are run by workers who fall in the economically active age. From the results in Table 4.3, majority (about 74 percent) of the respondents were aged between 19 – 50 years. On average, most (55 percent) of the mariculture project personnel were between 31 and 50 years old hence indicating that poverty alleviation mariculture projects are run by workers in active middle age category when they could undertake the hard work in the mariculture farms. This finding is consistent with the findings by Dey et al. (2008) and Ng et al. (2013) that the average age of aquaculture farmers (including mariculture farmers) in Malaysia were in the age of 38 years to 50 years, which was considered the most productive age in terms of capital and energy to work optimally. A study by Samah and Kamaruddin (2015) on the influence of socio-demographic characteristics on the level of good aquaculture practices in Malaysia revealed that age had a significant positive relationship with the level of good aquaculture practices; with older farmers having higher level of good aquaculture practices than younger farmers. In this study, the youngest person was below 18 years implying that they were still in school and were therefore not involved in mariculture project activities.

Table 4.3: Frequency distribution of respondents by age among mariculture groups in the coast of Kenya

Age of respondent	Frequency	Percent
Under 18 years	1	.5
19-30 years	35	19.2
31-40 years	57	31.3
41-50 years	43	23.6
Above 50 years	46	25.3
Total	**182**	**100.0**

4.3.3 Level of education attained by respondents

The level of education attained influences a person's ability to make decisions and acquire skills necessary for mariculture project implementation. Consequently, level of education attained by mariculture project implementers and beneficiaries was investigated in this study. The findings (Table 4.4) showed that most of the respondents (about 86 percent) who were the project implementers and beneficiaries had attained different levels of primary education. This implies that poverty alleviation mariculture projects were run by workers who had low levels of education. The low levels of education particularly among women who were involved in mariculture had also been observed in South East Asia, where women had assumed a critical role in aquaculture development (Nash, 1995; Ahmed & Lorica, 2002). Hurtado-Ponce et al. (1996) observed that most of the seaweed planters in Panagatan Cays, Caluya and Antique in

Philippines, had not finished primary education. While most of the work in mariculture along the coast of Kenya was manual and did not require high academic and professional qualifications, some critical decisions were made at different levels and such decisions often required some higher levels of education which was lacking. Studies by Rahm and Huffman (1984) and Saha et al. (1994) concluded that level of education attained by farmers influences their technology adoption decisions. Studies by Ifijika et al. (2007) and Ali et al. (2010) also concluded that education can influence modernization of fish farming techniques by enabling farmers to understand new developments in fish farming technology. However, it is also worth noting that higher levels of formal education can be a barrier to effective management and technology adoption in mariculture since it may reduce the time a farmer may spend in the mariculture enterprise by opening more attractive employment opportunities away from the mariculture enterprises.

Table 4.4: Frequency distribution of respondents by level of education among mariculture groups in the coast of Kenya

Level of education	Frequency	Percent
Class 8 or less	157	86.3
Incomplete secondary	7	3.8
O-Level certificate	9	4.9
A-Level certificate	2	1.1
Tertiary	7	3.8
Total	**182**	**100.0**

4.3.4 Respondents' employment status

The study investigated employment status of the respondents because employment status determines a person's availability to work in mariculture projects. About 93 percent of respondents stated that they were unemployed (Table 4.5). This means that they were able to work in the mariculture projects. People who are employed elsewhere do not have time to participate fully in implementation of mariculture projects. A study by Hurtado-Ponce et al. (1996) also found that majority of seaweed farmers in Panagatan, Caluya and Antique in the Philippines were formerly crop farmers or fishermen in their original places of residence, who shifted to seaweed mariculture as a livelihood. The results also imply that the respondents so far did not recognize their engagement in the poverty alleviation mariculture projects as employment probably because of low earnings from these projects.

Table 4.5: Respondents' employment status

Employment status	Frequency	Percent
Unemployed	169	92.9
Employed	13	7.1
Total	**182**	**100.0**

4.3.5 Respondents' previous experience in mariculture

The study sought to establish if the respondents had any previous experience in mariculture. Previous experience was considered an important quality because it endowed people with the necessary capacity and awareness of the working procedures that are essential for effective implementation of mariculture projects. The results in Table 4.6 showed that about 62 percent of the respondents did not have any previous experience in mariculture. This implies that most of the actors in the poverty alleviation mariculture projects were not endowed with the experience necessary for effective implementation of mariculture projects. A study by Salau et al. (2014) also found that farmers who had little experience were less proficient in management of aquaculture farms.

Table 4.6: Frequency distribution of respondents by previous experience in mariculture

Previous experience	Frequency	Percent
Had previous experience	70	38.5
Had no previous experience	112	61.5
Total	**182**	**100.0**

4.3.6 Training given to respondents

The study sought to establish if the respondents had been given any training on mariculture to improve their skills and ability to participate effectively in the implementation of community based mariculture projects. About 81 percent of the respondents had obtained some training on mariculture while 17 percent lacked any training (Table 4.7). This implies that the nature of work that they performed in mariculture as well as tasks assigned to each member of a mariculture group required skills that could be built through training. It also confirmed the findings of Mirera et al. (2014) that groups which had little training in mud crab mariculture experienced higher mortalities of crabs in their culture systems due to poor handling, poor construction of culture structures, inadequate feeding and feeding at wrong times. The losses incurred due to high mortalities resulted in loss of hope among group members. People should therefore be adequately trained before they are given technical tasks to perform in mariculture enterprises. Training has also been recognized as a critical success factor for international development projects (Ika et al., 2012) and should therefore be factored in the design of mariculture projects to ensure that the right quality of labour is provided for the mariculture project implementation.

Table 4.7: Training acquired by respondents in mariculture in the coast of Kenya

Training acquired in mariculture	Frequency	Percent
Training acquired	148	81.3
No training acquired	31	17.0
Missing	3	1.6
Total	**182**	**100.0**

4.3.7 Sources of capital for mariculture

The study sought to find out the sources of capital for the on-going community based mariculture projects with the aim of understanding whether the community groups were making any direct financial contributions to the projects. Results in Table 4.8 revealed that most of the mariculture projects were exclusively funded through donor funding as observed by about 49 percent of the respondents. On the other hand, approximately 28 percent of the respondents observed that some mariculture projects were exclusively funded by contributions from members while about 18 percent of the respondents felt that some projects were funded by both donor funding and members contributions. This means that 46 percent of the mariculture projects are likely to experience strong ownership by beneficiaries because they contributed funds towards their implementation.

According to Hurtado & Agbayani (2002), seaweed farming practices in three major producing areas of Zamboanga City in Philippines were operated as family entrepreneurship, hired labour and shared capital. Those who lacked initial capital to start seaweed farming borrowed money from relatives, friends or exporters. Initial capital was used to purchase inputs for seaweed mariculture. Sources of capital for mariculture project are likely to influence sustainability of mariculture projects as it determines level of ownership of projects by beneficiaries. Projects that are fully externally funded are likely to have less ownership from the beneficiaries and therefore less sustainable than projects that are co-funded by beneficiaries. According to Agence Francaise DeDeveloppement, European Commission and Deutsche Gessellschaft fur Internationale Zusammenarbeit (AFD, EU & GIZ) (2017), it is important to build ownership through both participation and contribution and beneficiaries should be encouraged to contribute in cash or in kind through provision of labour while discouraging communal or collective site development and giving of gifts.

Table 4.8: Sources of capital for mariculture

Sources of capital	Frequency	Percent
Exclusively from members contribution	50	27.5
Partially donor and partly members contributions	32	17.6
Exclusively from donor funding	90	49.4
Not aware	10	5.5
Total	**182**	**100.0**

4.3.8Availability and ownership of land for mariculture

Mariculture projects require suitable land or sea space hence the study sought to determine availability and adequacy of land for mariculture expansion. Where land or sea space was available, it was also essential to establish who owned it to avoid conflicts that may stall implementation of mariculture projects. Results in this study (Table 4.9) indicated that there was a general feeling from about 95 percent of the respondents that land was available for implementation of mariculture projects. However, in terms of ownership of the identified land, approximately 56 percent was public land while 20 percent was community land and 16 percent was private land. This implies that before implementation of a mariculture project begins, ownership of the identified land should be clarified. The importance of availability of land for mariculture projects was also recognized by Hishamunda et al. (2009) who observed that in South East Asia, further development of mariculture and aquaculture in general could be limited by the unavailability of land. According to AFD, EU and GIZ (2017), successful mariculture is dependent upon access to coastal land or sea space in areas that often have considerable alternative economic value hence it is important to secure long term tenure of such land or sea space with full support of the Government agency that allocates production rights.

Table 4.9: Availability of land for mariculture in the coast of Kenya

Availability of land	Frequency	Percent
Available	172	94.5
Not available	10	5.5
Total	**182**	**100.0**

4.3.9 Sources of seed for mariculture

The importance of access to quality and affordable seed for mariculture cannot be over stated. Supply of seed is a crucial factor and often a major constraint in the adoption of mariculture. Sources of seed for stocking mariculture farms must therefore be determined before actual implementation of mariculture projects. About 92 percent of the respondents observed that they obtained seed from the wild. This was attributed to the fact that no marine fish hatchery has been established in Kenya and therefore the community based poverty alleviation mariculture projects thrived on seed collected from the wild whose sustainability and reliability of supply was not guaranteed. The scope for expansion of community based mariculture projects therefore remained limited until hatcheries are established. A study by Edwards (2000) established that local seed production is essential and can enhance poverty reduction by reducing cost, improving the quality of seed, and providing employment and income at local level.

4.3.10 Sources of feed for mariculture

Sources of feed for mariculture projects was investigated since fish feed is an important input in any mariculture project. About 83 percent of the respondents observed that feed was available, with 58% of the respondents stating that it was available seasonally and 25 percent stating that it was readily available throughout the year (Table 4.10). Qualitative interviews with the project managers revealed that commercial fish feeds were generally expensive and poorly distributed while the quality of alternative cheap feeds which were locally available was often low. The findings were in agreement with studies by Hishamunda et al. (2009) which indicated that shortage and price of good quality feed was a constraint to further development of aquaculture including mariculture in Southeast Asia. Studies by Mirera et al. (2014), Mirera and Samoilys (2008) and Mirera and Ngugi (2009) also indicated that the poverty alleviation mariculture projects involved small scale production systems using locally available feeds hence confirming that the commercial fish feeds were costly and were therefore not used by small-scale mariculture enterprises.

Table 4.10: Availability of feed for mariculture projects in the coast of Kenya

Status of feed availability	Frequency	Percent
Scarce	32	17.6
Available seasonally	105	57.7
Readily available all year round	45	24.7
Total	**182**	**100.0**

4.3.11 Theft control

The respondents observed that mariculture projects had suffered from theft and required security arrangements to protect the mariculture farms from theft. About 73 percent of the respondents (Table 4.11) suggested that the security arrangements which were put in place by the farmers, were largely effective in curbing theft. In Kenya, theft has been identified as a major problem in mariculture projects (Mirera et al., 2014) hence provision of security is essential for successful implementation of mariculture projects. Theft has also been identified as one of the problems affecting mariculture projects in different parts of the world. In the Philippines, there is rampant theft of seaweed stocks as well as operational and planting implements such as boats, engines and harvesting baskets at the three major seaweed producing areas of Zamboanga City (Hurtado & Agbayani, 2002).

Table 4.11: Effectiveness of security provided for mariculture projects in the coast of Kenya

Level of effectiveness of security	Frequency	Percent
Not effective	31	17.0
Effective	92	50.5
Very effective	40	22.0
No idea	6	3.3
Missing in the system	13	7.1
Total	**182**	**100.0**

4.3.12 Grievance handling mechanisms

Mariculture projects were mainly implemented by community groups and emergence of conflicts regarding the sharing of benefits or commitment to work are expected. It therefore became necessary to understand how these groups were positioned to handle grievances/conflicts between group members. About 66 percent of the respondents stated that grievance handling mechanisms exist within the community based mariculture groups while 19 percent felt that no grievance handling mechanisms exist (Table 4.12). This implies that some community based mariculture groups are more organized and have put in place grievance redress mechanisms while others do not have such mechanisms.

Table 4.12: Availability of conflict management mechanism for poverty alleviation mariculture projects in the coast of Kenya

Availability of mechanism	Frequency	Percent
No mechanism for handling grievances exist	35	19.2
Grievance handling mechanism exists	120	65.9
Other	27	14.8
Total	**182**	**100.0**

4.4 Results of Pilot and Other Diagnostic Tests

A pilot study was undertaken to pretest the data collection instrument. During the pilot study, the questionnaire was administered to 15 respondents from one community based mariculture group in Mombasa County. The pilot study was carried out in a mariculture group that was not part of the target population. The respondents were randomly picked using random numbers to ensure that there were equal chances for each of the respondents to be included in the study. It has been observed that random numbers ensure that the sample is randomly selected with all individuals in the population having an equal chance of being picked (Kothari, 2008).

4.4.1 Reliability

Reliability indicates the extent to which a measure contains variable errors. Reliability of the questionnaire that was used for data collection in this study was evaluated using the

Cronbach's Alpha and split-half method (Pallant, 2007). The computed Cronbach's Alpha for the entire data set was 0.978. A computed Cronbach's Alpha of 0.70 is considered sufficient for research instrument hence the questionnaire that was used in this study was above the required threshold thereby confirming its reliability. The split-half method that assesses the internal consistency of questionnaires was also computed. The Spearman-Brown Coefficient – equal length was 0.923 and unequal length was also 0.923 confirming that there was high correlation which is required for a reliable test. The computed Guttman Split-Half Coefficient was 0.877 which was also more than 0.80 thereby indicating that the questionnaire that was used was reliable.

Reliability of the independent variables (situation analysis practices, project formulation practices, implementation planning practices, monitoring and evaluation planning), moderating variable (attitudes towards mariculture) and the dependent variable (project implementation) was tested by computing the Cronbach's Alpha coefficient. The reliability statistic for each of the variables is presented in Table 4.13. It is evident that the Cronbach's Alpha for each of the variables was above the lower limit of 0.70 (DeVellis, 2003; Pallant, 2007). This implies that the variables had a high level of reliability.

Table 4.13: Reliability Test results

Variable	Number of items	Cronbach's alpha	Conclusion (reliable/unreliable)
Project implementation	14	0.961	Reliable
Situation analysis practices	12	0.919	Reliable
Project formulation practices	23	0.908	Reliable
Implementation planning practices	12	0.899	Reliable
Monitoring and evaluation planning	27	0.960	Reliable
Attitudes towards mariculture	9	0.737	Reliable

4.4.2 Validity

Validity of the constructs was tested by subjecting the survey data to suitability tests for factor analysis. Before the extraction of factors, the suitability of the questionnaire data set for factor analysis was assessed using the Kaiser-Meyer-Oklin Measure of Sampling Adequacy and the Bartlett's Test of Sphericity. According to Kaiser (1970, 1974), the Kaiser-Meyer-Oklin Measure of Sampling Adequacy ranges between an index of 0 and 1 with a lower limit of 0.6 and the closer the index is to 1 the better. The Bartlett's Test of Sphericity on the other hand relates to the significance of the study and therefore shows the validity of responses obtained in relation to the problem that the study seeks to address. It is recommended that the test statistic be less than 0.05 (Pallant, 2007). Results of the Kaiser-Meyer-Oklin Measure of Sampling Adequacy and the Bartlett's Test of Sphericity are presented in Table 4.14. The computed Kaiser-Meyer-Oklin index is 0.871 which is above 0.6 and is thus acceptable. The Bartlett’s Test of Sphericity shows a significance level of 0.000 which is less than 0.05 hence acceptable.

Table 4.14: Kaiser-Meyer-Olkin and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.871
Bartlett's Test of Sphericity	Approx. Chi-Square	17022.380
	df	4656
	Sig.	0.000

4.4.3 Multicollinearity Test

Multicollinearity occurs when there is a high degree of association between independent variables (Mugenda & Mugenda, 2012). It results in large standard errors of the coefficients that are associated with the affected variables in regression analyses. A good regression model requires that a strong correlation exists between the independent variables and the dependent variable but the independent variables should have minimal if any correlation with each other. In this study, collinearity statistics (Table 4.15) indicate that multicollinearity was not found to be a problem in the model.

It is evident from Table 4.15 that the tolerances were above 0.20 thereby falling above the lower limit of 0.10. A tolerance value which falls above 0.10 shows there is no multicollinearity (Pallant, 2007; Tabachnick & Fidell, 2007). The variance inflation factors (VIF) were below 10 further indicating that multicollinearity was not a problem. Multicollinearity is associated with VIF above 10 and tolerance values below 0.10. The variables in this study therefore did not suffer from the problem of multicollinearity and were fit for regression analysis.

Table 4.15: Collinearity Statistics

Variable	**Collinearity Statistics**	
	Tolerance	**Variance Inflation Factors (VIF)**
Situation analysis practices		
Stakeholder analysis	0.295	3.388
Needs assessment	0.551	1.814
Project formulation practices		
Food security	0.322	3.101
Political goodwill	0.796	1.256
Project ownership	0.502	1.992
Implementation planning practices		
Appropriate budgeting	0.425	2.354
Assignment of responsibilities	0.502	1.994
Monitoring and evaluation planning		
Tracking progress	0.498	2.008
Timeliness and use of data	0.322	3.108
Attitudes towards mariculture		
Attitudes towards benefits of mariculture	0.231	4.322
Attitudes towards costs of mariculture	0.859	1.165

Dependent Variable: Project implementation score

4.5 Project Implementation

The study sought to determine the effects of project design practices on implementation of poverty alleviation mariculture projects in Kenya. The dependent variable in this study was project implementation. There were three measures of project implementation namely level of implementation, degree of success and degree to which the project has addressed poverty. The study covered all the three measures of project implementation. These measures were explored through descriptive analysis and factor analysis. In the conceptual framework, it was postulated that project implementation is influenced by the project design practices namely situation analysis practices, project formulation practices, implementation planning practices, and monitoring and evaluation planning. In addition, attitudes towards mariculture enterprises is considered moderating variable.

4.5.1 Descriptive statistics for project implementation

Project implementation was assessed by three measures namely level of implementation, degree of success and degree to which the project has achieved the intended objective – addressing poverty. These three measures were explored through 14 opinion statements. The descriptive results are presented in a scale of 1 to 5 (where 1 = strongly disagree and 5 = strongly agree) in Table 4.16.

The findings indicated that poverty alleviation mariculture projects provided alternative livelihood to the coastal communities with mean scores of 3.67 – 3.77 which are equivalent to agree (Table 4.16). Livelihoods has been defined by Chambers and

Conway (1992) to mean the capabilities, assets (stores, resources, claims and access) and activities required for a means of living.

The findings revealed that the poverty alleviation mariculture projects provided employment opportunities to the coastal communities with mean scores ranging between 3.58 and 3.72 which are equivalent to agree (Table 4.16). This is consistent with the observation by Edwards (2000) that aquaculture including mariculture has contributed towards poverty reduction in poor societies in some areas of the world where it is a traditional practice, for example China, Indonesia and Vietnam. It also supports the findings of Wakibia et al. (2011) that seaweed mariculture in the south coast of Kenya provided employment for 100-400 farmers. The findings of Mirera and Ngugi (2009) revealed that the introduction of mariculture in the coast of Kenya has provided economic opportunities to poor rural coastal communities to access an additional or alternative source of livelihood.

The findings also indicated that the poverty alleviation mariculture projects generated products that made most respondents agree that they were satisfied with mean scores ranging between 3.50 and 3.54. Satisfaction was used as an indicator of degree of success. The finding contradicted the observation by Mirera et al. (2014) that negative attitudes from community members were experienced when mud-crab farming was first introduced. The negative attitudes resulted in conspiracies that led to theft of farmed mud crabs, which in some cases was planned and executed from within the group members, especially when they were ready for harvesting.

Table 4.16: Descriptive statistics for project implementation of poverty alleviation mariculture projects in the coast of Kenya

Opinion statement	N	Min	Max	Mean	SD
1. The mariculture allows beneficiaries to have employment	180	1	5	3.71	1.18
2. The mariculture enables beneficiaries to gain self-employment	179	1	5	3.72	1.19
3. The mariculture greatly assist beneficiaries to have employment opportunities	179	1	5	3.58	1.28
4. The mariculture increases the level of satisfaction by beneficiaries	179	1	5	3.54	1.39
5. The mariculture enables beneficiaries to have increased satisfaction	181	1	5	3.50	1.35
6. The products from mariculture makes the beneficiaries happy	179	1	5	3.74	1.30
7. The mariculture provides alternative livelihood for beneficiaries	181	1	5	3.77	1.11
8. The mariculture enables the beneficiaries to diversify their livelihood sources	180	1	5	3.67	1.19
9. The mariculture increases livelihood opportunities for the beneficiaries	179	1	5	3.68	1.14
10. The mariculture allows the beneficiaries to have access to adequate food for their household	181	1	5	3.33	1.28
11. The mariculture enables the beneficiaries to meet protein needs for their household	181	1	5	3.25	1.28
12. The mariculture provides access to food for the beneficiaries	179	1	5	3.48	1.22
13. The mariculture enables beneficiaries to have sufficient food to meet their dietary needs	181	1	5	3.12	1.31
14. The mariculture ensures access to sufficient food for the beneficiaries dietary needs	181	1	5	3.08	1.27

Key: N = sample size, ranking **s**cale for the mean: 1.0-1.7 (strongly disagree), 1.8-2.5 (disagree), 2.6-3.3 (neutral), 3.4-4.1 (agree), 4.2-5 (strongly agree), min. = minimum, max. = maximum, SD = Standard Deviation.

4.5.2 Factor Analysis of Mariculture Project Implementation

Factor analysis was performed to summarize the data set and regroup variables in to a limited set of factors based on shared variance (Yong & Pearce, 2013) in order to interpret the relationships and patterns. Factor analysis was conducted on the three measures of project implementation namely level of implementation, satisfaction and outcome effectiveness. It was conducted using principal components as the main factor extraction technique. Before conducting the principal component analysis, the data was assessed to establish its suitability for factor analysis. The principal component analysis involved using the eigenvalue rule, screeplot and parallel analysis to determine the number of components to retain (Pallant, 2007; Tabachnick & Fidell, 2007). Screeplot involves plotting each of the eigenvalues of the factors and inspecting the plot to find a point at which the shape of the curve changes direction and becomes horizontal. Factors above the elbow or break are retained since these factors contribute the most to the explanation of the variance in the data set (Pallant, 2007). Parallel analysis involves comparing the size of the eigenvalues with those obtained from a randomly generated data set of the same size, and those eigenvalues that exceed the corresponding values from the random data set are retained. The factors were rotated to obtain the pattern of loadings for interpretation. Results of suitability analysis, factor analysis and oblique rotation are presented in the sections below.

4.5.3 Sample Adequacy Results for Project Implementation

The suitability of data for factor analysis was tested for each variable in the model using Kaiser-Meyer-Oklin Measure for Sampling Adequacy (KMO Index) and Bartlett's Test of Sphericity. The KMO Index ranges between 0 and 1 with an index of 0.6 and above being considered suitable for factor analysis (Kaiser 1970, 1974; Tabachnick & Fidell, 2007). The result of Kaiser-Meyer-Oklin Measure is presented in Table 4.17. The Bartlett's Test of Sphericity on the other hand tests the significance of the data. In this test, a significance level of $p < 0.05$ is required for factor analysis to be considered suitable. The result of Bartlett's Test is presented in Table 4.17.

Table 4.17: Kaiser-Meyer-Oklin and Bartlett's Test of Sphericity for Mariculture Project Implementation

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.882
Bartlett's Test of Sphericity	Approx. Chi-Square	1380.756
	df	36
	Sig.	.000

The results from this study indicate that the Kaiser-Meyer-Oklin Index is 0.882 (Table 4.17) which was above the recommended minimum value of 0.5 (Ali et al., 2016; Rusuli et al., 2013) and 0.6 (Kaiser 1970, 1974; Tabachnick & Fidell, 2007), hence factor analysis was suitable. Bartlett's Test of Sphericity (Bartlett 1954) was $p = 0.000$ (Table 4.17) which was less than the recommended upper limit of $p = 0.05$ (Rusuli et al., 2013), thereby indicating high statistical significance and justifying the need for factor analysis to be performed. The component correlation matrix also showed that most of the coefficients were above 0.3 thereby confirming the need for factor analysis.

4.5.4 Factor Analysis Results for Project Implementation

The three measures of project implementation were subjected to factor analysis with principal component analysis as the extraction method. The final results are presented in Table 4.18 to Table 4.20. The results of both principal component analysis and parallel analysis (Table 4.18) indicated that only one factor was extracted accounting for 65.9 percent of the variance in project implementation. This component had an eigenvalue that was greater than one (1) hence meeting the eigenvalue rule and had the greatest influence on implementation of mariculture projects. Results of scree test also confirmed that there was only one major component driving implementation of poverty alleviation mariculture projects.

Table 4.18: Total Variance Explained and comparison with criterion values from parallel analysis for Project Implementation of Poverty Alleviation Mariculture in Kenya

A. Total Variance Explained for Project Implementation on Poverty Alleviation Mariculture in Kenya

	Initial Eigenvalues			Extraction Sums of Square Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulati %
1	5.929	65.874	65.874	5.929	65.874	65.874
2	.990	11.002	76.876			
3	.651	7.230	84.107			
4	.407	4.520	88.626			
5	.319	3.547	92.173			
6	.273	3.038	95.211			
7	.209	2.322	97.533			
8	.163	1.814	99.348			
9	.059	.652	100.000			

Extraction Method: Principal Component Analysis.

B. Comparison of initial eigenvalues from principal components analysis and criterion values from parallel analysis

Component number	Actual eigenvalue from principal component analysis	Criterion value from parallel analysis	Decision
1	5.929	1.356	Accept
2	.990	1.231	Reject
3	.651	1.147	Reject
4	.407	1.064	Reject
5	.319	0.992	Reject
6	.273	0.905	Reject
7	.209	0.849	Reject
8	.163	0.776	Reject
9	.059	0.681	Reject

A confirmatory factor analysis was performed on the dependent variable using direct oblimin rotation due to the existence of strong correlations. The results of the direct oblimin rotation are presented in Table 4.19. The final solution has confirmed the results of PCA, a scree test and parallel analysis. Only one component remained in the final extraction hence the solution could not be rotated and the reduced component matrix was adopted (Table 4.20).

The main loadings in the single component were from items on employment, satisfaction and food security, all of which measured the degree to which the poverty alleviation mariculture projects had addressed the objective of poverty alleviation. The three initial sub-concepts on employment, satisfaction and food security have been combined to form outcome effectiveness. The single component was therefore named outcome effectiveness which refers to how much a project meets its objectives. The results demonstrate that outcome effectiveness which entailed provision of employment to beneficiaries, increased satistaction by stakeholders and provision of livelihoods and food security forms the main measure of implementation of poverty alleviation mariculture projects along the coast of Kenya.

The findings were in agreement with results of a study by Ika et al. (2012) which empirically investigated critical success factors for World Bank projects and concluded that project success entails efficiency and effectiveness. The communalities which gives information about how much of the variance in each item is explained, shows high values of greater than 0.3, thus indicating that all the variables fitted well under effectiveness.

Table 4.19: Reduced Component Matrix for Principal Component Analysis solution of project implementation items

Opinion Statement	Effectiveness	Communalities
1. The mariculture allows beneficiaries to have employment	.754	.569
2. The mariculture enables beneficiaries to gain self employment	.844	.712
3. The mariculture greatly assists beneficiaries to have employment opportunities	.778	.606
4. The mariculture increases the level of satisfaction by beneficiaries	.871	.759
5. The mariculture enables beneficiaries to have increased satisfaction	.886	.784
6. The products from mariculture make the beneficiaries happy	.823	.677
7. The mariculture enables the beneficiaries to diversify their livelihood sources	.747	.558
8. The mariculture improves access to food for the beneficiaries	.809	.654
9. The mariculture enables beneficiaries to have sufficient food to meet their dietary needs	.781	.610

The mean and reliability of the scales constructed on the basis of the single factor of project implementation, was checked using univariate descriptives under factor analysis. The results are presented on a scale of 1.0 to 5.0 in Table 4.20. Cronbach's alpha was used to test the reliability of the proposed scales. The findings indicated that project implementation converged on one factor scale, outcome effectiveness, with a Cronbach's alpha of 0.935, which was above the recommended lower limit of 0.70 (DeVellis, 2003), hence the study was reliable.

Table 4.20: Analysis of the Mean and Reliability of the Single Factor of Project Implementation

Definition	**Mean**	**SD**	**Cronbach's Alpha**	**N of Items**
Effectiveness	3.56	1.271	.935	9

Key: Ranking **s**cale for the mean: 1.0-1.7 (strongly disagree), 1.8-2.5 (disagree), 2.6-3.3 (neutral), 3.4-4.1 (agree), 4.2-5.0 (strongly agree), SD=Standard Deviation.

It was observed that there was an increase in effectiveness which includes increased employment, increased satisfaction and increased livelihoods and food security as indicated by a mean score of 3.56 which lies on the agree on the ranking scale. The increased satisfaction by stakeholders of the poverty alleviation mariculture projects in the Coast of Kenya supports the finding by Hurtado-Ponce et al. (1996) that seaweed mariculture in Panagatan Cays of Philippines was perceived by seaweed planters as a better source of livelihood than fishing which is only done for home consumption. The income derived from seaweed mariculture showed an increased purchasing power of both basic needs and recreational needs hence providing increased satisfaction to the beneficiaries.

It was also noted that the poverty alleviation mariculture projects in the coast of Kenya were contributing towards increasing employment including self emplyoyment to the beneficiaries with the three opinion statements on employment returing positive responses. This is consistent with the findings Luxton and Luxton (1999) that seaweed mariculture in Tabuaeran in the Central Pacific has been particularly attractive to the people resettled from the Gilbert Islands by the Government. Here, seaweed mariculture overtook copra which initially was the only source of income. Consequently, seaweed mariculture has made the cash-economy of Tabuaeran considerably larger than most of the settler's home islands in the Gilbert group.

It was further noted that even though some major mariculture projects have collapsed and others have stagnated for many years, some of the projects have picked up and are already contributing towards improving food and nutrition security which is an important aspect of poverty alleviation in the coast of Kenya. This is consistent with the findings of Hurtado & Agbayani (2002), Hurtado-Ponce et al. (1996) and Luxton & Luxton (1999) that seaweed mariculture has enabled the beneficiaries in the Philippines and Central Pacific to meet their basic needs such as food, shelter and clothing.

4.6 Effect of Situation Analysis Practices on Implementation of Poverty Alleviation Mariculture Projects in the Coast of Kenya

This study sought to examine the effect of situation analysis practices on implementation of poverty alleviation mariculture projects. To achieve this objective, situation analysis practices were assessed through three main measures namely stakeholder analysis, problem analysis and needs assessment. Stakeholder analysis included issues of benefits that accrue to project beneficiaries, interest, power, influence and gender. Among these issues, the benefit that stakeholders expect from a project is the most important and was therefore used as a proxy for stakeholder analysis in this study. Problem analysis included identification of the core problem of the target group and digging in to the root causes and effects of the problem.

Needs assessment covered identification and examination of gaps, assessment of community's past experience with similar projects, and identification of assets and resources of a community. Identification and examination of gaps and assessment of community's past experience with similar projects was looked at in terms of lessons learnt which is the most important aspect. Twelve constructs that underlie the three measures were subjected to factor analysis. Overall, the effect of situation analysis on project implementation was analyzed through descriptive statistics, factor analysis, correlation analysis and regression analysis.

4.6.1 Descriptive statistics for situation analysis

Table 4.21 shows the statistical results for the situation analysis based on 12 opinion statements. The descriptive results are presented in a scale of 1 to 5 (where 1.0 - 1.7 = strongly disagree and 4.2 – 5.0 = strongly agree).

The respondents agreed that the mariculture projects empowered beneficiaries by enabling them to acquire skills through training and experience, and therefore enabling them to create ability to run and sustain mariculture projects and alleviate poverty as shown by mean scores of 3.77 to 4.05 that clustered around agree in the ranking scale. There was agreement that poverty alleviation mariculture projects generated income to beneficiaries thus addressing their expectations which is in the form of benefits from mariculture projects and confirming that stakeholder analysis was done for the mariculture projects with mean scores of 3.68 to 3.92 that that fall on the agree ranking scale. This finding was consistent with the observation by Mirera et al. (2014), Primavera et al. (2000, 2010), Primavera (2006) and Mirera (2009) that alternative livelihoods such as small scale mud crab mariculture are able to aid in sustaining coastal communities' income and food security. Further, the respondents agreed that mariculture projects reduced poverty among the beneficiaries through livelihoods diversification and enhanced income with three mean scores that ranged between 3.82 and 3.86 and therefore clustering around the agree scale. This finding was supported by Worm and Branch (2012), Primavera (2006), and Primavera et al. (2010) that coastal communities consider mariculture as a viable alternative livelihood option to fishing households due to declining catch and sizes of fish caught from their traditional fishing grounds.

Table 4.21: Descriptive statistics for situation analysis practices

Opinion statement	N	Min	Max	Mean	SD
1. Mariculture clearly allows the beneficiaries to earn income	182	1	5	3.92	1.21
2. Mariculture promotes income generation for the beneficiaries	182	1	5	3.85	1.18
3. Mariculture greatly assists the beneficiaries to earn income	182	1	5	3.68	1.27
4. Mariculture relates to the problem of poverty	182	1	5	3.86	1.04
5. Mariculture enhances livelihoods and income that alleviates poverty among beneficiaries	182	1	5	3.82	1.17
6. Mariculture reduces poverty among the beneficiaries through livelihoods diversification and enhanced income	182	1	5	3.82	1.12
7. The project enables the beneficiaries to develop ability to run mariculture	182	1	5	4.05	1.03
8. The project enhances the ability of beneficiaries to sustain mariculture	182	1	5	3.88	1.12
9. The project greatly increases the ability of beneficiaries to manage mariculture	182	1	5	3.77	1.18
10. The project has promoted mariculture than the previous ones	180	1	5	3.75	1.16
11. The mariculture promotes the use of lessons learnt than past projects	181	1	5	3.81	1.14
12. The mariculture enables beneficiaries to use lessons learnt than previous projects	181	1	5	3.75	1.12

Key: N = sample size, ranking **s**cale for the mean: 1.0-1.7 (strongly disagree), 1.8-2.5 (disagree), 2.6-3.3 (neutral), 3.4-4.1 (agree), 4.2-5.0 (strongly agree), min. = minimum, max. = maximum, SD =. Standard Deviation

4.6.2 Factor Analysis of Situation Analysis

Factor analysis was undertaken on three measures of situation analysis namely stakeholder analysis, problem analysis and needs assessment in order to identify the main measures that drive the variable. Factor analysis was conducted using principal component analysis as the main factor extraction technique. Suitability of data for factor analysis was assessed before performing the principal component analysis. The principal component analysis was conducted using eigenvalue rule, screeplot and parallel analysis to determine the number of components to retain for rotation. The retained components were rotated to obtain the pattern of loadings that could be easily interpreted. Results of suitability analysis as well as factor analysis including oblique rotation are presented in the sections below.

4.6.3 Suitability of Data Set for Factor Analysis on Situation Analysis

The Kaiser-Meyer-Oklin Measure of Sampling Adequacy on situation analysis practices was 0.825 which was above the recommended minimum of 0.6 (Kaiser 1970, 1974; Tabachnick and Fidell, 2007). The Bartlett's Test of Sphericity was $p = 0.000$ which met the requirement of $p < 0.05$ (Rusuli et al., 2013) (Table 4.22). These results supported the need for factor analysis.

Table 4.22: Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity for Situation Analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.825
Bartlett's Test of Sphericity	Approx. Chi-Square	1361.706
	df	28
	Sig.	.000

4.6.4 Factor Analysis Results for Situation Analysis

Factor analysis was performed on situation analysis practices using principal components as the main factor extraction technique. All measures of situation analysis practices were subjected to factor analysis and the results are presented in Tables 4.23 to 4.27. The results of both principal component analysis and parallel analysis in Table 4.23 revealed that only the first two components had initial eigenvalues greater than one (1), cumulatively explaining 69.3 percent of the variance and had the greatest influence on situation analysis practices. Factor one (1) explained 54 percent while factor two (2) explained 15 percent of the variance respectively and should be retained for rotation based on Kaiser's criterion. The results of a scree test also showed that only the first two components were meaningful and should be retained for rotation.

Table 4.23: Total variance explained and comparison of initial eigenvalues with criterion values from parallel analysis of Situation Analysis

A. Situation Analysis Practices Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.515	54.288	54.288	6.515	54.288	54.288
2	1.802	15.013	69.301	1.802	15.013	69.301
3	.907	7.555	76.856			
4	.887	7.396	84.252			
5	.554	4.621	88.872			
6	.321	2.672	91.544			
7	.281	2.344	93.888			
8	.221	1.841	95.728			
9	.194	1.615	97.344			
10	.159	1.321	98.665			
11	.098	.817	99.482			
12	.062	.518	100.000			

B. Parallel analysis

Component	Actual eigenvalue from principal component analysis	Criterion value from parallel analysis	Decision
1	6.515	1.4546	Accept
2	1.802	1.3273	Accept
3	0.907	1.2336	Reject
4	0.887	1.1530	Reject
5	0.554	1.0777	Reject
6	0.321	1.0113	Reject
7	0.281	0.9485	Reject
8	0.221	0.8867	Reject
9	0.194	0.8311	Reject
10	0.159	0.7588	Reject
11	0.098	0.6999	Reject
12	0.062	0.6174	Reject

A direct oblimin rotation was performed and the rotated solution revealed strong loadings on the two components with almost all variables loading substantially on only one component. The pattern matrix (Table 4.24) shows the factor loadings of each of the retained variables under situation analysis practices. The main loadings in component 1 were all income earning and poverty alleviation items. Component one (1) was therefore named income earning. Income earning and poverty alleviation are critical aspects of stakeholder analysis and problem analysis that are conducted under situation analysis to inform project formulation. The main loadings in component two (2) were items on needs assessment which included assessment of community's experience through the use of lessons learnt. Component two (2) was named needs assessment. Needs assessment is a sub-concept under situation analysis practices. The results therefore showed that stakeholder analysis and needs assessment are important sub-concepts under situation analysis practices. From the foregoing, the importance of stakeholder analysis and needs assessment at the design stage of poverty alleviation mariculture projects cannot be over-emphasized. The communalities showed high values of greater than 0.3, hence indicating that all the variables fitted well under stakeholder analysis and needs assessment.

Table 4.24: Pattern matrix for principal component analysis solution with oblimin rotation of two factor solution of situation analysis items

Opinion statement	Pattern Coefficients		Commu -nalities
	Stakeholder analysis component	Needs assessment component	
1. Mariculture clearly allows beneficiaries to earn income	**.855**	.004	.733
2. Mariculture promotes income generation for the beneficiaries	**.838**	.031	.725
3. Mariculture greatly assists the beneficiaries to earn income	**.894**	.005	.804
4. Mariculture enhances livelihoods and income that alleviates poverty among beneficiaries	**.891**	.000	.793
5. Mariculture reduces poverty among beneficiaries through livelihoods diversification and enhanced income	**.924**	-.031	.830
6. The project has promoted mariculture than the previous ones	.143	**.840**	.827
7. The mariculture promotes use of lessons learnt than past projects	-.049	**.980**	.922
8. The mariculture enables beneficiaries to use lessons learnt than previous projects	-.051	**.975**	.911

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

The structure matrix that provides information about the correlation between variables and the two factors (stakeholder analysis and needs assessment) is presented in Table 4.25. The component correlation matrix which reveals the strength of the relationship between stakeholder analysis and needs assessment is presented in Table 4.26.

Table 4.25: Structure matrix for principal component analysis solution with oblimin rotation of two factor solution of situation analysis items

Opinion statement	Structure Coefficients	
	Stakeholder analysis component	**Needs assessment component**
1. Mariculture clearly allows beneficiaries to earn income	**.856**	.361
2. Mariculture promotes income generation for the beneficiaries	**.851**	.381
3. Mariculture greatly assists the beneficiaries to earn income	**.897**	.379
4. Mariculture enhances livelihoods and income that alleviates poverty among beneficiaries	**.891**	.372
5. Mariculture reduces poverty among beneficiaries through livelihoods diversification and enhanced income	**.911**	.354
6. The project has promoted mariculture than the previous ones	.494	**.900**
7. The mariculture promotes use of lessons learnt than past projects	.360	**.959**
8. The mariculture enables beneficiaries to use lessons learnt than previous projects	.356	**.953**

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

Table 4.26: Component Correlation Matrix of Situation Analysis items

Component	1 – Income earning	2 – Lessons learnt
1 – Income earning	1.000	.418
2 – Lessons learnt	.418	1.000

The structure matrix shows the existence of positive correlations between the variables and the two factors, stakeholder analysis and needs assessment. The component correlation matrix revealed the existence of a moderate positive correlation between stakeholder analysis and needs assessment (r = 0.418). It is therefore evident from these results that stakeholder analysis which is captured by income earning and needs assessment which is captured by lessons learnt, had the strongest influence on situation analysis.

A descriptive analysis of the two factors of situation analysis practices that were identified through the direct oblimin rotation was undertaken by estimating the mean and testing the reliability of the scales of each factor and the results are presented in Table 4.27.

Table 4.27: Analysis of the Mean and Reliability of the factors of Situation Analysis Practices

Definition	Mean	SD	Cronbach's Alpha	N of Items
Stakeholder expectations in terms of benefits of the mariculture projects	3.819	1.19	.927	5
Use of past experience in form of lessons learnt from similar projects	3.772	1.14	.931	3

Key: ranking **s**cale for the mean: 1.0-1.7 (strongly disagree), 1.8-2.5 (disagree), 2.6-3.3 (neutral), 3.4-4.1 (agree), 4.2-5 (strongly agree), SD=Standard Deviation.

Cronbach's alpha was used to test the reliability of the proposed scales. The findings indicated that primary targets of the mariculture project had a Cronbach's alpha of 0.927

and past experience in form of lessons learnt from similar projects had a Cronbach's alpha of 0.931. Based on Cronbach's alpha for both primary targets of the mariculture project and past experience in form of lessons learnt from similar projects, and the recommended lower limit of Cronbach's alpha of 0.70 (DeVellis, 2003; Pallant, 2007), the study was reliable.

It was observed that stakeholder expectations in terms of benefits from mariculture projects was the most important issue in stakeholder analysis as indicated by a mean score of 3.86, which is equivalent to agree on the ranking scale. The mariculture projects had increased income earnings of beneficiaries, enhanced livelihoods and income among beneficiaries, and reduced poverty among beneficiaries through livelihood diversification and enhanced income. This is consistent with the findings of Hurtado & Agbayani (2002) and Hurtado-Ponce et al. (1996) that seaweed mariculture in the Philippines improved the standard of living of the beneficiaries through higher cash income. Similarly, seaweed mariculture replaced copra as the main source of income for over 70 percent of all households in Tabuaeran of Line Islands in Central Pacific (Luxton & Luxton, 1999). The findings also support the observation by Bene et al. (2015) that small scale commercial aquaculture including mariculture has greater opportunity to contribute to family income and address poverty issues.

It was also noted that mariculture had promoted the use of past experience in form of lessons learnt from similar projects and had enabled beneficiaries to use these lessons learnt than previous projects as shown by a mean score of 3.772, which is equivalent to agree on the ranking scale. This points to the importance of conducting an assessment of community's past experience with similar projects during the design of mariculture projects in the coast of Kenya. The respondents therefore agreed that there was a positive effect of needs assessment on implementation of poverty alleviation mariculture projects in the coast of Kenya. Promoting the use of past experience in form of lessons learnt from similar projects in the coast of Kenya is consistent with the observation by AFD, EU and GIZ (2017) that it is essential to build upon the existing local situation and learn from both successful and unsuccessful experiences. Hishamunda et al. (2009) also found that expansion of aquaculture including mariculture in Southeast Asia has been uneven between different countries with successes and failures that provide invaluable lessons for which countries within and outside the region can learn.

4.6.5 Regression Analysis of Situation Analysis and Project Implementation

A multiple regression analysis was performed using the computed factor scores to determine whether situation analysis practices (measured by stakeholder analysis and needs assessment) had any significant effect on the implementation of poverty alleviation mariculture projects, as measured by effectiveness, in the coast of Kenya and test the null hypothesis that situation analysis practices do not affect the implementation of poverty alleviation mariculture projects in the coast of Kenya.

4.6.5.1 Diagnostic Analysis

Diagnostic analyses were done to ensure that the assumptions of normality, linearity and homoscedasticity were not violated. The points of the Normal Probability Plot (P-P) of the Regression Standardized Residual occurred in a straight diagonal line from the bottom left to the right thereby confirming normality of data. The scatterplot also showed that most of the scores were concentrated in the centre within the recommended range of 3.3 and -3.3 without outliers (Tabachnick & Fidell, 2007). This further affirmed that the data was normally distributed.

Regression results (Table 4.28) indicated that the estimated tolerance value was 0.826 which was above the lower limit of 0.10 hence confirming that there was no possibility of multicollinearity in the analysis. In addition, the computed Variance Inflation Factor (VIF) was 1.211 which was below the upper limit of 10. This also confirmed that multicollinearity was not likely to be a problem. Consequently, all independent variables were retained in the regression analysis.

4.6.5.2 Regression Analysis Results of Situation Analysis and Mariculture Project Implementation

The regression results (Table 4.28) showed that there was a significant positive relationship between stakeholder analysis and project implementation with level of significance being p = 0.000. Stakeholder analysis is a sub-variable of situation analysis practices hence it can be deduced from the regression results that there was a significant positive relationship between situation analysis practices as measured by stakeholder analysis and implementation of poverty alleviation mariculture projects as measured by effectiveness. The regression model is summarized by equation 4.1.

$$Y = 0.09 + 0.733X_1 + e \quad \text{...} 4.1$$

Where,

Y – Implementation of poverty alleviation mariculture projects

X_1 – Stakeholder analysis

e – Error term

Table 4.28: Regression Results of Situation Analysis and Implementation of Poverty Alleviation Mariculture Projects

	B	SE	β	t	p	Tolerance	VIF
Constant	0.009	0.053	-	0.165	0.869	-	-
Stakeholder analysis	0.733	0.058	0.726	12.585	0.000	0.826	1.211
Needs assessment	0.012	0.058	0.012	0.208	0.835	0.826	1.211

R Square	.535
Adjusted R Square	.530
ANOVA	$F_{(2, 169)} = 97.247$; Sig. =.000

Dependent Variable: Effectiveness

It is evident from the regression results that stakeholder analysis was an important factor that should be appropriately carried out during situation analysis for implementation of poverty alleviation mariculture projects to be successful. Considering that project design is a participatory process that requires participation of stakeholders, it is essential to conduct stakeholder analysis so that key stakeholders are involved in the design and subsequent stages of the poverty alleviation mariculture projects in the coast of Kenya. This finding is consistent with the observation by ARCIS (2006) that structured project design is a comprehensive process that requires involvement of stakeholders and consideration of their needs, interests, resources and capacities. It also supports the observation by Golder (2005) that stakeholder analysis is a crucial component of situation analysis and should be undertaken at the outset of a project.

The fact that stakeholder analysis was a significant factor influencing project implementation ($\beta = 0.726$; $t = 12.59$; $p = 0.000$) implies that there were more perceived benefits from mariculture in terms of income earnings. It also means that stakeholders had high expectations in terms of benefits from poverty alleviation mariculture projects and this should be seriously taken into consideration during the project design phase. This confirmed that mariculture and the broader aquaculture development are increasingly being recognized as a source of food and income to rural households (Mirera et al., 2014; Ahmed & Lorica, 2002; and Ndanga et al., 2013). The finding is also consistent with the findings of Katranidis et al. (2003) that mariculture projects which were established in Cephallonia and Ithaki islands in Greece, generated jobs for local communities and land rents for the villages in coastal areas near fish cages, and were accepted in Ithaki Island where mariculture is a form of development which is suitable for the remote and predominantly rural island.

The R Square was 0.535 implying that our model (which includes stakeholder analysis) explained 53.5 percent of the variation in implementation of poverty alleviation mariculture projects. The Analysis of variance (ANOVA) results ($F_{(2,169)} = 97.247$, $p = 0.000$) revealed the existence of a significant relationship between situation analysis practices as measured by stakeholder analysis, and implementation of poverty alleviation mariculture projects as measured by outcome effectiveness. When the p-value is less than 0.05, it shows that the coefficients in the model were not equal to zero implying a good fit. The results showed that $p = 0.000$ hence showing a good fit. This implied that the situation analysis practices particularly stakeholder analysis had an effect on implementation of poverty alleviation mariculture projects.

4.7 Effect of Project Formulation on Implementation of Poverty Alleviation Mariculture Projects in the Coast of Kenya

This study sought to establish the effect of project formulation practices on implementation of mariculture projects. To achieve this objective, the study analyzed respondents’ responses on how project formulation practices affected project implementation. This involved assessing five measures of project formulation practices namely inclusion of stakeholders, setting of objectives and outcomes, formulating outputs and activities, identifying indicators of progress, and stating key assumptions. Inclusion of stakeholders is concerned with participatory engagement of all parties to promote project ownership, decision making and teamwork. Setting of objectives and outcomes deals with analysis of the local context and household livelihood changes. Formulating outputs and activities involves analysis of resources and time used to deliver livelihoods, nutrition and food security. Identifying indicators of progress involves measuring income generation and level of satisfaction. Stating key assumptions is concerned with factors beyond the control of the project (such as political goodwill, political stability, and security) that may affect achievement of outputs and external factors necessary to sustain overall goals, immediate objectives and outputs.

4.7.1 Descriptive statistics for project formulation

The study sought to establish the effect of project formulation on implementation of mariculture projects. Project formulation were assessed by five measures namely inclusion of stakeholders, setting of objectives and outcomes, formulating outputs and activities, identification of indicators of progress, and stating key assumptions. The five measures were explored through 23 opinion statements. Table 4.29 shows the descriptive statistics for the project formulation and the descriptive results are presented in a scale of 1 to 5 (where 1-1.7 = strongly disagree and 4.2-5.0 = strongly agree).

From the results there was agreement that formulation of the mariculture project objectives was based on understanding of the local context. This means that the analysis of the local context which is normally carried out under situation analysis informs the formulation of mariculture project objectives as shown by a mean score of 4.26, which is equivalent to strongly agree on the ranking scale. It was observed that there was participatory engagement of all parties in mariculture projects to enable beneficiaries to own the projects and ensure that there is informed decision making and team-work as indicated by mean scores that ranged between 4.09 and 4.22, which are equivalent to strongly agree on the ranking scale.

It was also observed from the results that the mariculture allows the risk which includes factors beyond the control of the project such as security or theft that may affect achievement of outputs to be well identified as indicated by a mean score of 4.16, which is equivalent to agree on the ranking scale. The objective of mariculture is to address the problem of poverty among the beneficiaries as indicated by a mean score of 3.92, which is equivalent to agree on the ranking scale. This finding is consistent with the observation by Mirera et al., (2014) that the self-help groups viewed mariculture as a source of employment and food security, and a means for poverty alleviation. Poverty alleviation is realized through livelihood diversification and income generation. The mariculture ensures efficiency in the use of resources for production as shown by a mean score of 3.91, which is equivalent to agree on the ranking scale. Outputs must be achieved with the resources provided and within the time-frame specified.

Table 4.29: Descriptive Statistics of Project Formulation

Opinion statement	N	Min	Max	Mean	SD
1. The project promotes ownership of mariculture by beneficiaries	182	1	5	4.14	.935
2. The project ensures beneficiaries are involved in making decisions in mariculture	182	1	5	4.09	1.044
3. The mariculture enables beneficiaries to own the project	181	1	5	4.22	.884
4. The mariculture project objectives are based on understanding of the local context	182	2	5	4.26	.791
5. The objectives of the mariculture address the problem of poverty among the beneficiaries	182	1	5	3.92	1.097
6. The mariculture objectives are informed by the results of situation analysis	182	1	5	3.95	.912
7. The mariculture project uses the least costly resources to deliver the desired outputs (livelihoods, nutrition, food security)	182	1	5	3.61	1.220
8. Mariculture promotes use of least costly inputs in production	182	1	5	3.63	1.162
9. Mariculture ensures efficiency in the use of resources for production	180	2	5	3.91	.870
10. The mariculture provides nutrition to the beneficiaries within the specified time-frame	182	1	5	3.37	1.284
11. The mariculture provides food security to the beneficiaries within the specified time-frame	181	1	5	3.24	1.315
12. The mariculture project has a system for recording income	182	1	5	3.74	1.228
13. The mariculture project ensures regular discussion of progress in income generation	182	1	5	3.85	1.216
14. The mariculture ensures regular analysis of trends in income generated by the project	182	1	5	3.56	1.214
15. The mariculture provides food security that increases the level of satisfaction by beneficiaries	182	1	5	3.20	1.299
16. The mariculture provides nutrition that suits the priorities of the beneficiaries	179	1	5	3.17	1.276
17. Mariculture project provides nutrition that attracts beneficiaries	180	1	5	3.35	1.331

18. The mariculture enjoys the support of the local political leaders	182	1	5	2.97	1.462
19. The mariculture has the political goodwill	181	1	5	3.10	1.411
20. The mariculture promotes political support for the beneficiaries	182	1	5	2.78	1.238
21. The risk that mariculture project faces were well identified	181	1	5	3.28	1.367
22. The mariculture allows the risk to be well identified	182	1	5	4.16	.864
23. The mariculture has a mechanism of mitigating identified risks	182	1	5	3.47	1.233

Key: N = sample size, ranking **s**cale for the mean: 1.0-1.7 (strongly disagree), 1.8-2.5 (disagree), 2.6-3.3 (neutral), 3.4-4.1 (agree), 4.2-5.0 (strongly agree), min. = minimum, max. = maximum, SD = Standard Deviation

4.7.2 Suitability of the Data Set for Factor Analysis on project formulation

Suitability of the data set for factor analysis was evaluated by subjecting 23 items of project formulation practices to principal components analysis using Kaiser-Meyer-Oklin Measure of Sampling Adequacy, Bartlett's Test of Sphericity and component correlation matrix. The results presented in Table 4.30 confirmed that Kaiser-Meyer-Olkin Index was 0.858 which was above the recommended minimum of 0.6 and the Bartlett's Test of Sphericity showed high significance with p = 0.000 which was less than 0.05 hence supporting the need for factor analysis to be performed. The component correlation matrix also showed that most of the coefficients were above 0.3 thereby justifying the need for factor analysis.

Table 4.30: Kaiser-Meyer-Olkin and Bartlett's Test for Project Formulation

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.858
Bartlett's Test of Sphericity	Approx. Chi-Square	2601.304
	df	253
	Sig.	.000

4.7.3 Factor Analysis Results of Project Formulation

Factor analysis was undertaken using principal component analysis on project formulation practices where 23 constructs were subjected to a variance test. Results of the principal component analysis and parallel analysis did not agree hence a confirmatory direct oblimin rotation was performed because of the existence of strong correlations. The rotated solution revealed the presence of complex structure, with the components showing a number of strong loadings but some variables had significant loadings on more than one component hence they were dropped. Consequently, a three factor model was fixed with results presented in Table 4.33.

The three component solution (Table 4.31) resulted in a reduced component matrix with 10 constructs and explained a total of 80 percent of the variance, with component 1 explaining 40 percent, component 2 explaining 23 percent and component 3 explaining 17 percent of the variance. These three factors (components 1-3) each had their eigenvalues greater than 1, had the greatest influence on project formulation practices and explained about 80 percent of the variance.

Table 4.31: Total Variance Explained for Project Formulation

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**
1	4.048	40.476	40.476	4.048	40.476	40.476	3.580
2	2.262	22.621	63.097	2.262	22.621	63.097	2.654
3	1.695	16.949	80.045	1.695	16.949	80.045	2.668
4	.466	4.659	84.704				
5	.417	4.170	88.874				
6	.334	3.341	92.215				
7	.246	2.458	94.673				
8	.232	2.317	96.990				
9	.168	1.680	98.670				
10	.133	1.330	100.000				

Extraction Method: Principal Component Analysis.
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

To aid interpretation of these three components, another oblimin rotation was performed. The rotated solution revealed the presence of simple structure with, the three components showing strong loadings and each variable loading substantially on only one component. Results of the oblimin rotation are presented in Table 4.32.

Table 4.32: Pattern for principal component analysis solution with oblimin rotation of three factor solution of project formulation items

Opinion Statement	Pattern Coefficients			Commu-nalities
	Food security	Political goodwill	Project ownership	
1. The project promotes ownership of mariculture by beneficiaries	-.088	.067	**.934**	.838
2. The mariculture enables beneficiaries to own the project	.020	.003	**.894**	.811
3. The mariculture project objectives are based on understanding of the local context	.091	-.074	**.799**	.688
4. The mariculture ensures regular analysis of trends in income generated by the project	**.836**	-.015	-.059	.665
5. The mariculture provides food security that increases the level of satisfaction by beneficiaries	**.899**	.028	.030	.838
6. The mariculture provides nutrition that suits the priorities of the beneficiaries	**.901**	.067	.037	865
7. The project provides nutrition that attracts beneficiaries to mariculture	**.913**	-.042	.029	.834
8. The mariculture enjoys the support of the local political leaders	-.002	**.924**	.012	.854
9. The mariculture has the political goodwill	-.068	**.934**	.011	.850
10. The mariculture promotes political support for the beneficiaries	.100	**.847**	-.024	.762

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

From the pattern matrix coefficients (Table 4.32), the main loadings in component 1 consist of items on nutrition and food security. Component 1 was therefore named food security. Food security is in the form of having access to sufficient food to meet dietary needs for a productive and healthy life. Analysis of changes in access to sufficient food is critical to addressing poverty. Nutrition and food security were used as proxies for identification of indicators of progress which is one of the important practices under formulation of projects. The main loadings in component 2 consist of items on political goodwill and can therefore be named political goodwill. Political goodwill is an important factor under stating key assumptions which is one of the critical aspects of project formulation practices. The main loadings in component 3 consist of items on project ownership and decision making and can therefore be named project ownership. Project ownership is an important factor in inclusion of stakeholders under project formulation practices. The communalities showed high values of greater than 0.3, thus indicating that all the variables fitted well under food security, political goodwill and project ownership.

The structure matrix which provides information about the correlation between variables and the three factors, food security, political goodwill and project ownership, is presented in Table 4.33. The component correlation matrix which reveals the strength of the relationship between food security, political goodwill and project ownership is presented in Table 4.34.

Table 4.33: Structure matrix for principal component analysis solution with oblimin rotation of three factor solution of project formulation items

Opinion Statement	Structure Coefficients		
	Food security component	**Political goodwill component**	**Project ownership component**
1. The project promotes ownership of mariculture by beneficiaries	.219	.108	**.910**
2. The mariculture enables beneficiaries to own the project	.300	.066	**.900**
3. The mariculture project objectives are based on understanding of the local context	.324	-.001	**.823**
4. The mariculture ensures regular analysis of trends in income generated by the project	**.814**	.170	.201
5. The mariculture provides food security that increases the level of satisfaction by beneficiaries	**.915**	.233	.313
6. The mariculture provides nutrition that suits the priorities of the beneficiaries	**.927**	.273	.323
7. The project provides nutrition that attracts beneficiaries to mariculture	**.912**	.166	.312
8. The mariculture enjoys the support of the local political leaders	.211	**.924**	.072
9. The mariculture has the political goodwill	.146	**.920**	.051
10. The mariculture promotes political support for the beneficiaries	.284	**.868**	.063

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

Table 4.34: Component Correlation Matrix of project formulation items

Component	1 - Food security	2 – Political goodwill	3 – Project ownership
1 - Food security	1.000	.226	.313
2 – Political goodwill	.226	1.000	.066
3 – Project ownership	.313	.066	1.000

The structure matrix indicated that there was a positive correlation between the retained variables and the three factors namely food security, political goodwill and project ownership. The component correlation matrix also revealed the existence of a medium positive correlation among food security, political goodwill and project ownership (r = 0.313).

A descriptive analysis of the three factors of project formulation practices (food security and nutrition achieved with the resources provided, political goodwill and participatory engagement of all parties for project ownership) that were identified in the pattern matrix (Table 4.32) was undertaken by estimating the mean and testing the reliability of the scales of each factor. The results are presented in Table 4.35.

Cronbach's alpha was used to test the reliability of the proposed scales. The findings indicated that food security and nutrition achieved with the resources provided had a Cronbach's alpha of 0.916, factors beyond the control of the project that were captured by political goodwill had a Cronbach's alpha of 0.891 and promotion of project ownership through participatory engagement of all parties had a Cronbach's alpha of

0.853. Based on Cronbach's alpha for the three scales and the recommended lower limit of Cronbach's alpha of 0.70 (DeVellis, 2003; Pallant, 2007), the study was reliable.

Table 4.35: Analysis of the Mean and Reliability of the factors of Project Formulation

Definition	**Mean**	**SD**	**Cronbach's Alpha**	**N of Items**
Food security and nutrition achieved with the resources provided	3.32	1.282	.916	4
Political goodwill	2.95	1.373	.891	3
Promotion of project ownership through participatory engagement of all parties	4.22	.861	.853	3

Key: Ranking scale for the mean: 1.0-1.7 (strongly disagree), 1.8-2.5 (disagree), 2.6-3.3 (neutral), 3.4-4.1 (agree), 4.2-5.0 (strongly agree), SD=Standard Deviation.

Based on the scales that were constructed for these three factors, it was observed that mariculture projects ensured project ownership, decision making and team-work through participatory engagement of all parties as indicated by a mean score of 4.22, which is equivalent to strongly agree on the ranking scale. The projects promoted ownership by beneficiaries and ensured the mariculture project objectives are based on understanding of the local context. This is consistent with the argument by Institute for Environmental Conflict Resolution (2011) that for stakeholder engagement to effectively create two-way communication and collaboration in solving problems, the roles and responsibilities of stakeholders, and engagement process and milestones need to be identified and clearly communicated to all parties.

The results further suggest that the respondents were neutral with a mean score of 3.32 regarding the observation that mariculture enabled the beneficiaries to achieve food security and nutrition with the resources provided. It was however expected that the mariculture should provide nutrition and food security that increases the level of satisfaction, and should ensure regular analysis of trends in income generated by the project. In the Mediterranean, the importance of mariculture and the related freshwater aquaculture in the provision of job opportunities and contribution to food security has been recognized (Parliamentary Assembly of the Mediterranean (PAM) and the International Ocean Institute (IOI), 2014).

Factors beyond the control of the project such as mariculture projects enjoying the support of the local political leaders, having the political goodwill, and promoting political support for the beneficiaries also landed on neutral ranking scale with a mean score of 2.95. This is contrary to the observation by Hishamunda et al. (2009) that in Vietnam it was appreciated that mariculture is attractive to policy makers because it absorbs the poor.

4.7.4 Regression Analysis of Project Formulation and Project Implementation

Standard multiple regression analysis was conducted to establish whether project formulation practices had a significant effect on implementation of poverty alleviation mariculture projects and to test the null hypothesis that project formulation practices do not influence the implementation of poverty alleviation mariculture projects in the coast of Kenya.

4.7.4.1 Diagnostic Analysis

Regression analysis was performed using the computed factor scores to determine the ability of project formulation practices as measured by identification of indicators of progress, stating key assumptions and inclusion of stakeholders to explain implementation of mariculture projects. In the factor analysis above, identification of indicators of progress was captured by food security, stating key assumptions were captured by political goodwill while inclusion of stakeholders was measured by ownership. Preliminary analyses were carried out to ensure compliance with the assumptions of normality, linearity and homoscedasticity. A Normal Probabilty Plot (P-P) that was generated showed that the Regression Standardized Residual occurred in a straight diagonal line from the bottom left to the right hence indicating that the data was normally distributed.

The scatterplot was also generated and the output showed that most of the scores were concentrated in the centre within the recommended range of 3.3 and -3.3 without outliers as recommended by Tabachnick and Fidell (2007). The three independent sub-variables (food security - identification of indicators of progress, political goodwill and project ownership) were statistically correlated with the dependent variable (project implementation as measured by outcome effectiveness) thus paving the way for multiple regression analysis to be undertaken.

From the results of regression analysis for project implementation and project formulation practices which are presented in Table 4.36, the estimated tolerance values ranged between 0.859 and 0.948 which were above 0.10 and therefore confirmed that there was no possibility of multicollinearity in the analysis. Further, the computed Variance Inflation Factor (VIF) ranged between 1.055 and 1.165 which were below 10 (Pallant, 2007) thereby proving the absence of multicollinearity and allowing the three independent sub-variables to be retained in the multiple regression analysis.

4.7.4.2 Regression Results of Project Formulation and Project Implementation

Regression results (Table 4.36) showed that project formulation as measured by food security, political goodwill and project ownership were positively related to project implementation as measured by effectiveness. There was a significant positive relationship between food security and effectiveness ($\beta = 0.665$; $t = 12.713$; $p = 0.000$). Since food security was used to visualize identification of indicators of progress, the regression results confirm that there was a significant positive relationship between identification of indicators of progress and effectiveness which was the only factor in implementation of poverty alleviation mariculture projects. This means that the poverty alleviation mariculture projects provide food security in the form of giving the coastal communities access to fish and additional income that can be used to buy other food. This is consistent with the observation by Edwards (2000) that aquaculture including mariculture contributes to the livelihoods of the poor through improved food supply, employment and income. It also supports the findings of Hishamunda et al. (2009) that in Southeast Asia, mariculture makes significant contribution to food security, rural livelihoods and foreign exchange of different countries in the region. It increases the availability of food fish for the local population and enables the poor to access food by providing them with income in terms of wages/salaries and farm revenues.

The regression results also showed that there was a significant positive relationship between project ownership and project effectiveness ($\beta = 0.197$; $t = 3.857$; $p = 0.000$). Project ownership was achieved through inclusion of stakeholders in project design, thus implying that there was more participatory engagement of all parties in poverty alleviation mariculture projects to enhance ownership and commitment. It is important for stakeholders to own the poverty alleviation mariculture projects and participate in the projects' decision making processes for implementation to be successful. This finding is consistent with the result of Couillard et al. (2009) that lack of stakeholder involvement often compromises the validity of project design.

Table 4.36: Regression Results of Project Implementation (Effectiveness) and Project Formulation

	B	SE	β	t	p	Tolerance	VIF
Constant	-8.8E-05	0.049	-	-0.002	0.999	-	-
Food security	0.676	0.053	0.665	12.713	0.000	0.859	1.165
Political goodwill	0.114	0.050	0.113	2.277	0.024	0.948	1.055
Project ownership	0.199	0.052	0.197	3.857	0.000	0.901	1.109

R Square	.613
Adjusted R Square	.606
ANOVA	F (3, 165) =87.039; Sig.=.000

Dependent Variable: Effectiveness

Further, there was a significant positive relationship between political goodwill and effectiveness ($\beta = 0.113$; $t = 2.277$; $p = 0.024$). This means that the poverty alleviation mariculture projects were gaining political goodwill in the Coast of Kenya. The increased political goodwill could be attributed to the fact that these projects are providing income and employment to the local communities through organized community groups that are known by the political class. Political goodwill is one of the factors beyond the control of the project that may affect achievement of project objectives, which are usually captured under key assumptions. It also implies that inclusion of factors beyond the control of a project under key assumptions is an important practice that should always be embraced in project formulation. This is consistent with the findings of Hishamunda et al. (2009) that mariculture provides valuable employment in Southeast Asia, and is particularly promoted by policy-makers in Vietnam because it provides rural employment, thereby diversifying rural economies and discouraging rural-urban migration.

The multiple regression model is summarized by equation 4.2.

$Y = 0.000088 + 0.676X_1 +0.114\ X_2 + 0.199X_3 + e$……………………… 4.2

Where,

Y – Implementation of poverty alleviation mariculture projects

X_1 – Food security (identification of indicators of progress)

X_2 – Political goodwill (stating key assumptions)

X_3 – Project ownership (inclusion of stakeholders)

e = Error term

The R square was 0.613 implying that our model (including identification of indicators of progress - food security, political goodwill and project ownership) explained 61.3% of the variation in implementation of the poverty alleviation mariculture projects in the Coast of Kenya as measured by effectivess. Analysis of variance (ANOVA) results revealed the existence of a significant relationship between Project Formulation Practices (as measured by identification of indicators of progress - food security, political goodwill and project ownership) and implementation of poverty alleviation mariculture project as measured by effectiveness with $F_{(3,\ 165)} = 87.039$, $p = 0.000$. The model reached statistical significance with p = 0.000 meaning that p-value is less than 0.05. This implies that project formulation practices had an effect on implementation of poverty alleviation mariculture projects in the coast of Kenya.

4.8 Effect of Implementation Planning on Implementation of Poverty Alleviation Mariculture Projects

The study sought to determine the effect of implementation planning on implementation of mariculture projects. To achieve this objective, implementation planning practices were evaluated through four measures namely preparation of operation plan, setting out who is responsible for each activity, developing a calendar showing when each activity will be completed, and developing a resource plan that sets out resource requirements. To determine the effect of implementation planning practices on implementation of mariculture projects, descriptive analysis was undertaken followed by factor analysis, correlation analysis and multiple regression analysis. Before undertaking these analyses, suitability of the data set for each type of analysis was assessed.

4.8.1 Descriptive Results of Implementation Planning

Implementation planning were assessed by four measures namely preparation of operation plan, setting out who is responsible for each activity (assignment of responsibilities), developing a calendar showing when each activity will be completed, and developing a resource plan (appropriate budgeting) that sets out resource requirements. These four measures were explored through 11 opinion statements.

Results are presented in a scale of 1 to 5 (where 1 = strongly disagree and 5 = strongly agree) in Table 4.37.

Based on the results, the respondents agreed that the mariculture projects had clearly defined activities which are implemented during project implementation as shown by a mean score of 4.01, which is equivalent to agree on the ranking scale. It was also observed that the mariculture projects have embraced planning of actual work to ensure that the work effort is directed towards realization of the objectives of the projects as indicated by a mean score of 4.09 which is equivalent to the agree ranking scale. This confirms the argument by CARE (2007) that a well prepared annual work plan provides a clear plan of action that links resources, activities and responsibilities to results, and builds a foundation for decision-making.

Table 4.37: Descriptive Statistics for implementation planning practices

	N	Min.	Max.	Mean	Std. Dev.
1. Defining clear activities for income generation	182	1	5	4.01	.931
2. Promoting implementation of defined activities	182	1	5	3.87	1.021
3. Effective planning of work	181	1	5	4.09	.825
4. Appropriate assigning of activities to people	182	2	5	4.15	.799
5. Assignment of tasks to members	182	1	5	3.87	1.041
6. Promoted setting of timeframes	182	1	5	3.74	1.079
7. Adherance to target dates	182	1	5	4.16	.809
8. Realistic scheduling of time	182	1	5	3.96	.888
9. Appropriate budgeting	182	1	5	3.44	1.246
10. Promoting budgeting	181	1	5	3.23	1.257
11. Realistic scheduling of resources	181	1	5	3.60	1.124

Key: N = sample size, scale 1.0-1.7 (strongly disagree), scale 1.8-2.5 (disagree), scale 2.6-3.3 (neutral), 3.4-4.1 (agree), scale 4.2-5.0 (strongly agree), min. = minimum, max. = maximum.

It was observed that the mariculture projects followed proper assignment of activities to people so that every member of a poverty alleviation mariculture group had a clear role to play during implementation of the mariculture projects as indicated by a mean score of 4.15, which is equivalent to agree on the ranking scale. This is consistent with the position of CARE (2007) that a good work plan should identify who does what, why, when, how, where and with what resources. It was noted that realistic scheduling of time and adherence to set dates were important for implementation of mariculture projects since with the exception of seaweed farming, fish and other marine organisms that are farmed have to be regularly fed. The dates that are set for fish feeds to be collected from the suppliers cannot be missed because failure may lead to death of fish or stunted growth that would result into loss of income to the community based mariculture groups as indicated by mean scores of 3.96 – 4.16, which are equivalent to agree on the ranking scale. In addition, once fish reach table size, it should be disposed of at the right time to avoid losing money in unnecessary feeding. From these results, it is evident that most respondents agreed that defining clear activities, effective planning of work effort, assignment of activities, realistic scheduling of time and resources and adherence to the set dates have an impact on implementation of mariculture projects.

4.8.2 Factor Analysis of Implementation Planning

Factor analysis was conducted on the four measures of implementation planning namely preparation of operation plan, setting out who is responsible for each activity, developing a calendar showing when each activity will be completed, and developing a resource plan that sets out resource requirements. It was conducted using principal components as the main factor extraction technique to reduce the data table, reduce the number of variables by combining highly correlated variables and retaining uncorrelated variables to avoid multicollinearity and check the integrity of the key variables. Before performing the principal components analysis, the data was assessed to establish its suitability for factor analysis. The principal components analysis involved using Kaiser's criterion, screeplot and parallel analysis to determine the number of components to retain as recommended by Pallant (2007) and Tabachnick and Fidell (2007). The factors were rotated to obtain the pattern of loadings which is easy to interpret.

4.8.2.1 Suitability of Data Set for Factor Analysis on implementation planning

Responses to the 12 items that fall under implementation planning in the questionnaire were subjected to principal components analysis. The suitability of data for factor analysis was evaluated using the Kaiser-Meyer-Oklin index and Bartlett's Test of Sphericity before principal component analysis was conducted. Results of the Kaiser-Meyer-Oklin Measure of Sampling Adequacy and Bartlett's Test of Sphericity are presented in Table 4.40. These results supported the need for factor analysis to be performed since the KMO Index was 0.800 which is greater than the 0.6 which is the recommended minimum, and Bartlett's Test of Sphericity was 0.000 which meets the requirement of $p < 0.05$. Furthermore, most coefficients from the component correlation matrix were above 0.3 hence also confirming the need for factor analysis.

Table 4.38: Kaiser-Meyer-Olkin and Bartlett's Test for implementation planning

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.800
Bartlett's Test of Sphericity	Approx. Chi-Square	1323.154
	df	66
	Sig.	.000

4.8.2.2 Results of Factor Analysis on implementation planning

Principal component analysis was performed. The results of the original principal component analysis indicated that the first three components had eigenvalues greater than 1 and cumulatively explained 68% of the variance in implementation planning. However, a scree test that was performed during the principal component analysis revealed that only the first one component was meaningful with a clear break occurring after the first component. Parallel Analysis was also performed and the results showed that only 1 component had eigenvalues above the corresponding criterion values for a randomly generated data matrix. The output of a scree test and the results of parallel analysis have therefore converged on the need to retain 1 component but since 1 component cannot be rotated, the first three components that were retained through the eigenvalue rule were subjected to an oblique rotation.

After the first rotation and removing the items that had cross-loadings on more than one component, a two factor solution was arrived at and results are presented in Table 4.41. These results showed that the first two components had eigenvalues greater than 1 and cumulatively explained 74% of the variance in implementation planning. These two components were retained for further rotation based on the eigenvalue rule.

Table 4.39: Total Variance Explained for Implementation Planning

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.218	53.639	53.639	3.218	53.639	53.639
2	1.236	20.605	74.245	1.236	20.605	74.245
3	.766	12.767	87.011			
4	.344	5.741	92.752			
5	.249	4.157	96.909			
6	.185	3.091	100.000			

Extraction Method: Principal Component Analysis.

A direct oblimin rotation was performed because of the existence of strong correlations and the rotated solution revealed the presence of complex structure, with some variables loading strongly on more than one factor. After dropping the variables that loaded strongly on more than one factor, two factors remained with a simple solution that had variables loading substantially on only one component (Table 4.40). From the solution in Table 4.40, component 1 was named appropriate budgeting because all the items that loaded strongly on it could be categorized under appropriate budgeting as the main theme. Appropriate budgeting was therefore an important factor in implementation planning. Appropriate budgeting includes developing a resource plan with a clear analysis of resource requirements for mariculture. Component 2 was named assignment of responsibilities because it mainly has items that relate to assignment of responsibilities.

Table 4.40: Pattern matrix for principal component analysis solution with oblimin rotation of two factor solution of items under implementation planning

Opinion Statement	Pattern Coefficients		Commu-nalities
	Appropriate budgeting	Assignment of responsibilities	
1. The mariculture ensures activities are appropriately assigned to people	.030	**.884**	.805
2. The mariculture promotes assignment of tasks to individual members of the project	-.069	**.853**	.684
3. Mariculture has promoted setting of timeframes than previous ones	.075	**.713**	.558
4. The project ensures that appropriate budget is prepared for mariculture	**.973**	-.137	.855
5. The mariculture has promoted budgeting than previous ones	**.856**	.069	.786
6. The mariculture ensures there is a realistic scheduling of resources for implementation	**.801**	.153	.767

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

The structure matrix which provides information about the correlation between the variables and the two factors (appropriate budgeting and assignment of responsibilities) is presented in Table 4.41. The component correlation matrix which shows the strength of the relationship between appropriate budgeting and assignment of responsibilities is presented in Table 4.42).

Table 4.41: Structure matrix for principal component analysis solution with oblimin rotation of two factor solution of items under implementation planning

Opinion Statement	Structure Coefficients	
	Appropriate budgeting	Assignment of responsibilities
1. The mariculture ensures activities are appropriately assigned to people	.398	**.897**
2. The mariculture promotes assignment of tasks to individual members of the project	.286	**.825**
3. Mariculture has promoted setting of timeframes than previous ones	**.** .372	**.744**
4. The project ensures that appropriate budget is prepared for mariculture	**.916**	.267
5. The mariculture has promoted budgeting than previous ones	**.884**	.424
6. The mariculture ensures there is a realistic scheduling of resources for implementation	**.865**	.486

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization

Table 4.42: Component Correlation Matrix of implementation planning

Component	1 - Appropriate budgeting	2 - Assignment of responsibilities
1 - Appropriate budgeting	1.000	.416
2 – Assignment of responsibilities	.416	1.000

The structure matrix coefficients in Table 4.43 indicated that there was a positive correlation between the retained variables and the two factors (appropriate budgeting and assignment of responsibilities). The component correlation matrix also showed that there was a moderate positive correlation ($r = 0.416$) between appropriate budgeting and assignment of responsibilities.

A descriptive analysis of the two factors of implementation planning (appropriate budgeting and assignment of responsibilities) that were identified in the pattern matrix (Table 4.40) was undertaken by estimating the mean and testing the reliability of the scales of each factor. The results are presented in Table 4.43. Cronbach's alpha was used to test the reliability of the proposed scales. The findings indicated that resource requirements for mariculture had a Cronbach's alpha of 0.867 and assignment of responsibilities had a Cronbach's alpha of 0.745. Based on Cronbach's alpha for the two scales and the recommended lower limit of 0.70 (DeVellis, 2003; Pallant, 2007), the study was reliable.

Table 4.43: Analysis of the Mean and Reliability of the Factors of Implementation Planning

Definition	Mean	SD	Cronbach's Alpha	N of Items
Resource requirements for mariculture	3.42	1.212	.867	3
Assignment of responsibilities	3.92	.973	.745	3

Key: Ranking **s**cale for the mean: 1.0-1.7 (strongly disagree), 8-2.5 (disagree), 2.6-3.3 (neutral), 3.4-4.1 (agree), 4.2-5.0 (strongly agree), SD=Standard Deviation.

The scales constructed on the basis of the two factors had mean scores of 3.42 and 3.92, which are equivalent to agree on the ranking scale for both resource requirements for mariculture and assignment of responsibilities. It was observed that developing a resource plan which analyzes resource requirements for a mariculture project is an essential element of implementation planning as indicated by a mean score of 3.42, which is equivalent to agree on the ranking scale. This involves ensuring that appropriate budget is prepared and the scheduling of resources for mariculture project implementation is done in a realistic manner. This is consistent with development of clear cost estimates and financial plan for mariculture and freshwater aquaculture as practiced in Indonesia by Asian Development Bank (2003).

It was also noted that assignment of responsibilities which involves effective planning of the actual work effort for implementation, ensuring that activities are appropriately assigned to people, and assignment of tasks to individual members of the project was considered a crucial aspect of project implementation planning as indicated by a mean score of 3.92, which is equivalent to agree on the ranking scale.

4.8.3 Regression Analysis of implementation planning and project implementation

Standard multiple regression analysis was performed using the computed factor scores to determine the ability of implementation planning practices namely appropriate budgeting and assignment of responsibilities to explain changes in project implementation as measured by effectiveness. It was also undertaken to test the null hypothesis that project implementation planning does not have significant influence on project implementation.

The assumptions of large sample size, multicollinearity and singularity, normality, linearity and homoscedasticity were considered. The Normal Probability Plot (P-P) indicated that the data was normally distributed. The scatter plot showed that there were no outliers. The estimated tolerance value was above 0.10 confirming that there was no multicollinearity in the analysis. This was further confirmed by the Variance Inflation Factor (VIF) which was far below 10 (Table 4.44) therefore confirming the absence of multicollinearity. The two independent variables (assignment of responsibilities and appropriate budgeting) were statistically correlated with the dependent variable (project implementation as measured by effectiveness) hence multiple regression analysis was desirable.

4.8.3.1 Regression Results of implementation planning and project implementation

Regression results in Table 4.44 showed that implementation planning; appropriate budgeting and assignment of responsibilities, were positively related to project implementation as measured by effectiveness.

Table 4.44: Regression Results of Project Implementation and Implementation Planning

	B	SE	β	t	p	Tolerance	VIF
Constant	0.003	0.058		0.052	0.958	-	-
Appropriate budgeting	0.610	0.063	0.605	9.630	0.000	0.826	1.210
Assignment of responsibilities	0.133	0.064	0.131	2.088	0.038	0.826	1.210

R Square	.449
Adjusted R Square	.443
ANOVA	$F_{(2, 169)} = 68.903$; Sig.=.000

Dependent Variable: Effectiveness

Based on the results in Table 4.46, the regression model is summarized by equation 4.3.

$Y = 0.003 + 0.610X_1 + 0.133\ X_2 + e$ ....…………………4.3

Where,

Y – Implementation of poverty alleviation mariculture projects

X_1 – Appropriate budgeting

X_2 – Assignment of responsibilities

e – Error term

From the multiple regression results, there was a statistically significant positive relationship between appropriate budgeting and outcome effectiveness with $\beta = 0.605$; $t = 9.630$; $p = 0.000$. Appropriate budgeting involves developing a resource plan for implementation of poverty alleviation mariculture projects. The results also showed that there was a statistically significant positive relationship between assignment of responsibilities and effectiveness with $\beta = 0.131$; $t = 2.088$; $p = 0.038$. Assignment of responsibilities involves setting out who is responsible for each activity during project implementation. Since appropriate budgeting and assignment of responsibilities are the main measures of implementation planning practices and outcome effectiveness is the main measure of implementation of poverty alleviation mariculture projects, the regression results imply that there was a statistically significant positive relationship between implementation planning practices and implementation of poverty alleviation mariculture projects along the Coast of Kenya. These findings support the observation by Caldwell (2002) that implementation planning demonstrates project feasibility in terms of responsibilities, scheduling of time and resources and is the basis for monitoring project operations.

The R Square was estimated to reveal how much of the variance in the dependent variable (implementation of poverty alleviation mariculture projects) is explained by the model. The R square was 0.449 implying that our model (which includes appropriate budgeting and assignment of responsibilities) explains 44.9 percent of the variation in mariculture project implementation as measured by outcome effectiveness. Similarly, ANOVA was undertaken to assess the statistical significance of the regression results. The ANOVA results showed the existence of a significant relationship between Implementation Planning Practices (as measured by appropriate budgeting and assignment of responsibilities) and implementation of poverty alleviation mariculture projects as measured by effectiveness with $F_{(2, 169)} = 68.903$, $p = 0.000$. The model reached statistical significance with $p = 0.000$ meaning that $p < 0.05$. This means that implementation planning had an effect on implementation of poverty alleviation mariculture projects in the coast of Kenya.

4.9 Influence of Monitoring and Evaluation Planning on Implementation of Poverty Alleviation Mariculture Projects

The study sought to evaluate the influence of monitoring and evaluation planning on implementation of mariculture projects. To realize this objective, five measures were assessed namely implementation monitoring, impact monitoring, periodic reporting to the main stakeholders, self-evaluation by members of the project team, mid-term external evaluation, end of project external evaluation. The influence of monitoring and evaluation planning on implementation of mariculture projects has been analyzed using descriptive analysis, factor analysis, correlation analysis and regression analysis. Before undertaking factor analysis, suitability of the data set for each type of analysis was evaluated.

4.9.1 Descriptive statistics for monitoring and evaluation planning

The study evaluated the influence of monitoring and evaluation planning on implementation of mariculture projects through descriptive statistics. Descriptive results in Table 4.45 showed the respondents' degree of agreement on how monitoring and evaluation planning influenced implementation of mariculture projects. The descriptive results are presented in a scale of 1 to 5 (where 1.0-1.7 = strongly disagree and 4.2-5.0 = strongly agree).

From the results, most of the respondents agreed that implementation of poverty alleviation mariculture projects was related to how relevant the mariculture was to the beneficiaries with a mean score of 4.20, which is equivalent to strongly agree on the ranking scale, followed by timely implementation of mariculture project activities with a mean score of 4.08, which is equivalent to agree on the ranking scale. It was also related to tracking of time lines in the implementation of mariculture projects with a mean score of 3.96 which is equivalent to agree, provision of feedback by stakeholders with a mean of 3.96 which is equivalent to agree, provision of progress reports to stakeholders in time with a mean of 3.81 which is equivalent to agree, how mariculture projects addressed poverty among beneficiaries with a mean of 3.78 which is equivalent to agree, how mariculture promoted livelihood diversification and income generation with a mean of 3.72 which is equivalent to agree, how the mariculture projects ensured effective use of data and information for decision making with a mean of 3.69 which is equivalent to agree, and how the project team ensured appropriate and transparent utilization of resources to achieve the desired output with a mean of 3.65 which is equivalent to agree.

Table 4.45: Descriptive Statistics for Monitoring and Evaluation Planning

Opinion statement	N	Min	Max	Mean	SD
1. The project team ensures transparent and appropriate financial accounting for the mariculture project	182	1	5	3.58	1.355
2. The project team ensures appropriate utilization of resources to achieve the desired output	182	1	5	3.65	1.155
3. The project team controls the use of resources in order to realize livelihood enhancement	182	1	5	3.61	1.140
4. The mariculture provides for timely implementation of activities	181	1	5	4.08	.778
5. The mariculture allows tracking of time lines in the implementation of the project	181	2	5	3.96	.826
6. The mariculture clearly provides for tracking the use of resources to achieve food security for the beneficiaries	181	1	5	2.99	1.308
7. The maricuture allows for tracking of changes in food security	181	1	5	3.00	1.333
8. The mariculture promotes tracking of livelihood diversification for beneficiaries	182	1	5	3.10	1.272
9. The mariculture allows tracking of progress in the diversification of livelihoods for beneficiaries to reduce poverty	182	1	5	3.16	1.305
10. The mariculture greatly assist beneficiaries to track progress in diversification of livelihoods	180	1	5	3.09	1.326
11. The mariculture allows tracking of changes in the income of beneficiaries	180	1	5	3.12	1.344
12. The mariculture promotes tracking of income generation for beneficiaries	180	1	5	3.09	1.327
13. The mariculture tracks the income earned by beneficiaries	181	1	5	3.12	1.335
14. The mariculture ensures timely reporting to stakeholders	181	1	5	3.81	1.105
15. The mariculture has promoted provision of feedback by stakeholders	181	1	5	3.96	.974

Opinion statement	N	Min	Max	Mean	SD
16. The mariculture ensures effective use of data and information for decision making	181	1	5	3.69	1.113
17. The mariculture has promoted the use of data and information for decision making	181	1	5	3.59	1.033
18. The project ensures that mariculture is relevant to beneficiaries	181	1	5	4.20	.899
19. The mariculture addresses poverty among beneficiaries thus remaining relevant	180	1	5	3.78	1.249
20. The mariculture has remained relevant by promoting livelihood diversification and income generation	181	1	5	3.72	1.221
21. The mariculture has developed a system of assessing livelihood diversification and income levels for beneficiaries	181	1	5	3.19	1.261
22. The maricuture has allowed the use of a system for evaluating livelihood diversification and income generation	180	1	5	3.13	1.212

Key: N = sample size, scale 1.0-1.7 (strongly disagree) scale 1.8-2.5(disagree), scale 2.6-3.3 (neutral), 3.4-4.1 (agree), scale 4.2-5.0 (strongly agree), min. = minimum, max. = maximum, SD = standard deviation.

4.9.2 Factor Analysis of Monitoring and Evaluation Planning

The five measures of monitoring and evaluation planning namely implementation monitoring, impact monitoring, periodic reporting to the main stakeholders, self-evaluation by members of the project team, mid-term external evaluation, and end of project external evaluation were subjected to factor analysis. The factor analysis was performed using principal component analysis as the main factor extraction technique to reduce the data table, summarize the data and generate patterns to facilitate interpretation. The data was first assessed to establish its suitability for factor analysis before conducting the principal component analysis. The principal component analysis involved using eigenvalue rule, screeplot and parallel analysis to determine the number of components to retain. Oblique rotation was finally performed to obtain the pattern of loadings for interpretation.

4.9.2.1 Suitability of Data Set for Factor Analysis on monitoring and evaluation planning

Principal factor analysis was performed on 22 questionnaire items under monitoring and evaluation planning using the principal component analysis. The suitability for factor analysis was established by the Kaiser-Meyer-Oklin index and Bartlett's Test of Sphericity (Table 4.48) as well as the component correlation matrix which showed that most coefficients were above 0.3 thus confirming the need for factor analysis. The Kaiser-Meyer-Oklin index was 0.891 which falls within the suitable range of between 0.6 and 1 hence confirming the need for factor analysis. The Bartlett's Test of Sphericity also confirmed the need for factor analysis because in this test the significance should be at $p < 0.05$ for factor analysis to be considered suitable and the results in Table 4.48 show that $p = 0.000$ which was below the recommended maximum of 0.05.

Table 4.46: Kaiser-Meyer-Olkin and Bartlett's Test for monitoring and evaluation planning

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.891
Bartlett's Test of Sphericity	Approx. Chi-Square	1936.086
	df	66
	Sig.	.000

4.9.2.2 Factor Analysis Results for Monitoring and Evaluation Planning

The original principal components analysis revealed that the first five components had eigenvalues greater than 1 and explained a total of 65% of the variance. Based on the eigenvalue rule, these five components should be retained for rotation. However, a screeplot that was generated alongside the principal components analysis showed that only the first two components were meaningful with a clear break occurring after the second component. This means that only the first two components should be retained for rotation. After removing the variables that loaded strongly on more than one component, the total variance explained increased from 65% to 83.6% (Table 4.47).

Table 4.47: Total Variance Explained for Monitoring and Evaluation Planning

	Initial Eigenvalues			**Extraction Sums of Squared Loadings**		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	3.869	55.273	55.273	3.869	55.273	55.273
2	1.985	28.362	83.636	1.985	28.362	83.636
3	.392	5.599	89.234			
4	.323	4.609	93.843			
5	.181	2.583	96.427			
6	.135	1.934	98.361			
7	.115	1.639	100.000			

Extraction Method: Principal Component Analysis.

Extraction of the two factors resulted in a reduced component matrix. The two component solution explained a total of 83.6% of the variance, with component 1 contributing 55.27% and component 2 contributing 28.36%. Results of Parallel Analysis (Table 4.48) have also confirmed that only 2 components had eigenvalues that were above the corresponding criterion values for a randomly generated data matrix of the same size. Subsequently, only the first two components were retained for rotation.

Table 4.49: Comparison of initial eigenvalues from principal components analysis on monitoring and evaluation planning and criterion values from parallel analysis

Component number	Actual eigenvalue from principal component analysis	Criterion value from parallel analysis	Decision
1	13.436	1.6887	Accept
2	3.899	1.5557	Accept
3-22	1.421	1.4697	Reject

An oblimin rotation was conducted and the rotated solution revealed the presence of simple structure with the two components showing strong loadings (Table 4.49). All variables loaded substantially on only one component. From the rotated solution, component 1 was named tracking progress because the items that loaded strongly on it cluster around this theme. The items in component 2 fall under the theme of timeliness and use of data and was therefore named timeliness and use of data and information. The results of this analysis support the use of tracking progress as well as timeliness as separate sub-concepts in monitoring and evaluation planning.

The communalities which give information about how much of the variance in each item is explained had high values greater than 0.3 hence indicating that all items fitted well under the two factors namely tracking progress and timeliness.

Table 4.49: Pattern matrix for oblimin rotation of two factor solution of monitoring and evaluation planning

Opinion Statement	Pattern Coefficients		Communalities
	Tracking progress	Timeliness	
1. The project team ensures that mariculture activities are implemented in time	.025	**.906**	.834
2. The mariculture provides for timely implementation of activities	-.034	**.953**	.891
3. The mariculture allows tracking of time lines in the implementation of the project	.013	**.861**	.748
4. The mariculture ensures that changes in food security are tracked	**.903**	.023	.827
5. The mariculture clearly provides for tracking the use of resources to achieve food security for the beneficiaries	**.915**	.062	.873
6. The mariculture greatly assist beneficiaries to track progress in diversification of livelihoods	**.943**	-.064	.860
7. The mariculture promotes tracking of income generation for beneficiaries	**.909**	-.010	.822

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

The structure matrix coefficients which provide information about the correlation between the variables and the two factors (tracking progress and timeliness) are presented in Table 4.50. The component correlation matrix which shows the strength of the relationship between tracking progress and timeliness is presented in Table 4.51.

Table 4.50: Structure matrix for principal component analysis solution with oblimin rotation of two factor solution of monitoring and evaluation planning items

	Structure Coefficients	
	Tracking progress	**Timeliness**
1. The project team ensures that mariculture activities are implemented in time	.282	**.913**
2. The mariculture provides for timely implementation of activities	.236	**.943**
3. The mariculture allows tracking of time lines in the implementation of the project	.257	**.865**
4. The mariculture ensures that changes in food security are tracked	**.909**	.279
5. The mariculture clearly provides for tracking the use of resources to achieve food security for the beneficiaries	**.932**	.322
6. The mariculture greatly assist beneficiaries to track progress in diversification of livelihoods	**.925**	.204
7. The mariculture promotes tracking of income generation for beneficiaries	**.907**	.248

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

Table 4.51: Component Correlation Matrix of Monitoring and Evaluation Planning items

Component	1 - Tracking progress	2 – Timeliness
1 - Tracking progress	1.000	.284
2 – Timeliness	.284	1.000

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

The structure matrix coefficients indicate that there was a positive correlation between the retained variables and the two factors (tracking progress and timeliness). The component correlation matrix shows that there was a weak positive correlation ($r = 0.284$) between tracking progress and timeliness.

A descriptive analysis of the two factors of monitoring and evaluation planning (tracking progress and timeliness) that were identified in the pattern matrix (Table 4.49) was undertaken by estimating the mean and testing the reliability of the scales of each factor. The results are presented in Table 4.52.

Table 4.52: Analysis of the Mean and Reliability of the Factors of Monitoring and Evaluation Planning

Definition	Mean	SD	Cronbach's Alpha	N of Items
Tracking progress towards the realization of project outputs	3.02	1.23	.934	4
Timeliness in implementation of activities	4.01	1.02	.891	3

Key: Ranking scale for the mean: 1.0-1.7 (strongly disagree), 8-2.5 (disagree), 2.6-3.3 (neutral), 3.4-4.1 (agree), 4.2-5 (strongly agree), SD=Standard Deviation.

Cronbach's alpha was used to test the reliability of the proposed scales. The findings in table 4.52 indicated that tracking progress in the realization of project outputs had a Cronbach's alpha of 0.934 and Timeliness in implementation of activities had a Cronbach's alpha of 0.891. Based on Cronbach's alpha for the two scales and the recommended lower limit of 0.70 (DeVellis, 2003; Pallant, 2007), the study was reliable.

It was observed that tracking progress towards the realization of project outputs included tracking progress in diversification of livelihoods and tracking of changes in the income of beneficiaries, changes in food security and the use of resources with a factor mean of 3.02, which is equivalent to neutral on the ranking scale. It was also noted that timeliness in implementation of activities is a crucial factor in monitoring and evaluation planning for poverty alleviation mariculture projects as demonstrated by a factor mean of 4.01, which is equivalent to agree on the ranking scale. Timeliness in implementation of activities includes timely implementation of activities, tracking of timelines in the implementation of mariculture projects, timely reporting of progress to stakeholders. Timeliness in implementation of activities helps the project team obtain data and information for decision-making and ensuring that mariculture is relevant to the beneficiaries and the larger community.

4.9.3 Regression Analysis Results

Standard multiple regression analysis was performed using the computed factor scores to determine the ability of monitoring and evaluation planning – implementation monitoring (captured by timeliness) and impact monitoring (captured by tracking progress) to explain variances in mariculture project implementation. Normal Probability Plot (P-P) indicated that the data was normally distributed. The estimated tolerance value was above 0.10 confirming absence of multicollinearity in the analysis. This was further confirmed by the Variance Inflation Factor (VIF) which was below 10 (Table 4.53) showing that multicollinearity was not a problem in the analysis. The two independent variables (timeliness and tracking progress) were statistically correlated with the dependent variable (outcome effectiveness which represents project implementation) (Table 4.63) hence multiple regression analysis was desirable.

Multiple regression results (Table 4.53) showed that timeliness and tracking progress were positively related to project implementation (as measured by outcome effectiveness)..

Table 4.53: Regression Results of Monitoring and Evaluation Planning and Project Implementation

	B	SE	β	t	p	Tolerance	VIF
Constant	0.003	0.042		0.063	0.950	-	-
Tracking progress	0.496	0.045	0.491	10.993	0.000	0.859	1.165
Timeliness	0.544	0.045	0.538	12.058	0.000	0.859	1.165

R Square	0.730
Adjusted R Square	0.726
ANOVA	$F_{(2, 158)} = 213.061$; Sig.=.000

Dependent Variable: Effectiveness

Timeliness had a significant positive relationship with implementation of poverty alleviation mariculture projects measured by effectiveness. This means that there were improvements in tracking of project operations, outputs in the form of livelihood enhancement and use of resources to achieve nutrition and food security from the poverty alleviation mariculture projects. In addition, it implies that the operations of poverty alleviation mariculture projects should continuously be monitored and progress be reported to stakeholders regularly to support decision making. The finding is in tandem with the observation by Perrin (2012) that timeliness involves tracking of project operations with respect to use of resources, working within the planned time frames and realization of target outputs.

Similarly, there was a significant positive relationship between tracking progress and implementation of poverty alleviation mariculture projects (as measured by outcome effectiveness). This means that there were improvements in tracking of progress towards realization of the immediate objectives and outcomes of poverty alleviation mariculture projects and tracking of changes in the income of beneficiaries. Since the implementation of poverty alleviation mariculture projects has faced challenges, this finding suggests that efficient monitoring and evaluation systems should be carefully integrated during the design phase to increase success of these projects. This finding is consistent with the observation by Swaans et al. (2013) that it is important to monitor and evaluate changes along the impact pathway.

The multiple regression model is summarized by equation 4.4.

$Y = 0.003 + 0.496X_1 + 0.544\, X_2 + e$ ....……………………………4.4

Where,

Y – Effectiveness (Implementation of poverty alleviation mariculture projects)

X_1 – Tracking progress

X_2 – Timeliness

e = Error term

The R Square was estimated to establish how much of the variation in implementation of poverty alleviation mariculture projects (the dependent variable) was explained by the model. The results showed that $R^2 = 0.730$ implying that our model (which includes tracking progress and timeliness) explained 73 percent of the variation in implementation of poverty alleviation mariculture projects as measured by outcome effectiveness. Further, the statistical significance of the model was assessed through analysis of variance (ANOVA). The ANOVA results indicated that a significant relationship exists between monitoring and evaluation planning (as measured by tracking progress and timeliness) and implementation of poverty alleviation mariculture projects (as measured by effectiveness) with $F_{(2, 158)} = 213.061$, $p = 0.000$. The model reached statistical significance with $p = 0.000$ which is less than 0.0005, implying that monitoring and evaluation planning had an effect on implementation of poverty alleviation mariculture projects. To achieve timeliness, the monitoring and evaluation planning should help to establish an efficient monitoring and evaluation system with pragmatic targets for the poverty alleviation mariculture projects in the Coast of Kenya, to avoid the temptation of collecting alot of data which may not be processed, analyzed and used as observed by Akroyed (1999).

4.10 Effect of Attitudes Towards Mariculture Enterprises on the Implementation of Mariculture Initiatives

The study sought to examine the moderating effect of attitudes of coastal communities towards mariculture enterprises on the implementation of mariculture projects in the coast of Kenya. To achieve this objective, attitudes towards mariculture enterprises were assessed through two measures namely attitudes towards benefits of mariculture enterprises and attitudes towards costs of mariculture. To examine the moderating effect of attitudes of coastal communities towards mariculture enterprises on the implementation of mariculture projects in the coast of Kenya, the study embraced descriptive analysis, factor analysis, correlation analysis and regression analysis. These analyses were preceded by assessment of suitability of the data set for each type of analysis.

4.10.1 Descriptive Analysis on Attitudes Towards Mariculture

Attitudes towards mariculture enterprises were assessed by two measures namely attitudes towards benefits of mariculture and attitudes towards cost of mariculture. The two measures were studied through 9 opinion statements that were presented to the respondents in a scale of 1 to 5 (where 1 = strongly disagree and 5 = strongly agree). Descriptive analysis was performed to examine the key features of attitudes towards mariculture projects and the descriptive results are presented in Table 4.54.

Table 4.54: Descriptive statistics for attitudes towards mariculture

	N	Min	Max	Mean	Std. Dev.
1. The mariculture enjoys broad support from beneficiaries due to its income generation	181	1	5	3.55	1.310
2. The mariculture creates support by beneficiaries through income generation	181	1	5	3.64	1.274
3. The project generates income that enables beneficiaries to support mariculture	181	1	5	3.52	1.348
4. The cost of implementing mariculture limits its adoption by beneficiaries	180	1	5	3.09	1.326
5. The expected cost of mariculture production influences the number of beneficiaries	180	1	5	3.24	1.257
6. The project cost limits the support for mariculture by beneficiaries	180	1	5	3.09	1.287
7. More women have adopted mariculture as source of income than men	181	1	5	3.94	1.242
8. The local values promote mariculture as a source of income	181	1	5	3.72	1.184
9. The mariculture provides income to women	180	1	5	3.84	1.250

Key: N = (sample size), scale 1.0-1.7 = strongly disagree, scale 1.8-2.5 = disagree, scale 2.6-3.3 = neutral, 3.4-4.1 = agree, scale 4.2-5= strongly agree, min. = minimum, max. = maximum.

From the results in Table 4.54, it was evident that the respondents agreed that the mariculture projects had been adopted as a source of livelihood by more women than men as indicated by a mean score which is equivalent to agree. The dominance of women in community-based poverty alleviation mariculture projects in the coast of Kenya is similar to the situation in Zanzibar and Madagascar where seaweed mariculture and sea cucumber mariculture have benefitted more women than men as reported by UNEP Nairobi Convention and WIOMSA (2015). The respondents also observed that mariculture provides income to women and is supported by local values as shown by mean scores which is equivalent to agree.

It was further observed that the mariculture projects enjoy broad support from the beneficiaries due to income generation as indicated by mean scores which is equivalent to agree. This is consistent with the observation by Brummett and Williams (2000) that small-scale aquaculture including mariculture is globally being seen to be important for the livelihood, welfare and food security of some of the poorest communities in developing countries. It also confirmed the observation that aquaculture including mariculture is increasingly being viewed as a source of food and income for households (Mirera et al., 2014). In addition, different authors including Ahmed and Lorica (2002), Shelley (2008), Mirera and Ngugi (2009) and Ndanga et al. (2013) have also argued that aquaculture including mariculture makes important contributions to the income and food security of rural households. Studies by Primavera (2006), Primavera (2010), Worm and Branch (2012), and Mirera et al. (2013) established that communities consider mariculture a viable alternative livelihood option to fishing households due to declining income from traditional fishing. Consequently, the expected benefits from mariculture projects has created a positive attitude from communities and provided motivation for more people to get involved in mariculture.

The results in Table 4.54 further show that most respondents were not sure whether the cost of implementing mariculture projects limited its adoption by beneficiaries as shown by mean score which is equivalent to agree. This could be attributed to the fact that most poverty alleviation mariculture projects have been implemented using donor funds and therefore the beneficiaries have not been compelled to contribute funds for their implementation. Where such projects are implemented with members' contributions, group members often make minimal contributions with the bulk of their contributions coming in the form of labour provided in the mariculture farms.

4.10.2 Factor Analysis on Attitudes Towards Mariculture

Factor analysis was conducted on the two measures of attitudes towards mariculture namely attitudes towards benefits of mariculture and attitudes towards costs of mariculture. Principal component analysis was used as the main factor extraction technique to reduce the data and summarize the data for interpretation. The data was assessed before factor analysis to establish its suitability for factor analysis to be undertaken. The principal components analysis was carried out using Kaiser's criterion or eigenvalue rule, screeplot and parallel analysis to determine the number of components to retain and the retained components were subjected to oblique rotations to obtain the pattern of loadings that could be easily interpreted.

4.10.2.1 Sample Adequacy Results for Factor Analysis on Attitudes Towards Mariculture Enterprises

The Kaiser-Meyer-Oklin Measure of Sampling Adequacy and Bartlett's Test of Sphericity were used to test the suitability of the data set on attitudes towards mariculture enterprises on the implementation of mariculture projects. Nine (9) items that address attitudes in the questionnaire were subjected to principal components analysis. Results of Kaiser-Meyer-Oklin Measure of Sampling Adequacy (KMO Index) and Bartlett's Test of Sphericity are presented in Table 4.55. These results indicate that the KMO Index is 0.817 which is above the recommended minimum value of 0.6 hence confirming the suitability of the data set for factor analysis. The Bartlett's Test of Sphericity has a value of $p = 0.000$ which meets the requirement of $p < 0.05$ thus also confirming the suitability of the data set for factor analysis.

Table 4.55: Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity for Attitudes Towards Mariculture Enterprises

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.822
Bartlett's Test of Sphericity	Approx. Chi-Square	913.868
	df	28
	Sig.	.000

4.10.2.2 Factor Analysis Results for Attitude Towards Mariculture Enterprises

The principal component analysis was used as the main factor extraction method in this study. The results in Table 4.56 reveal that the first two components had eigenvalues greater than 1 and cumulatively explained 68% of the variance. Based on the eigenvalue rule, these two components had the strongest influence on attitudes towards mariculture enterprises and should be retained for rotation. The results of a scree test also confirmed that the first two components were meaningful with a clear break occurring after the second component. The communalities matrix however, revealed that one item had a loading that was less than 0.4 and was therefore dropped before a rotation was performed on the remaining items. Dropping the item resulted in an increase of the cumulative variance explained by the first two components from 68% to 76%.

Table 4.56: Total Variance Explained for Attitudes Towards Mariculture enterprises

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	3.666	45.828	45.828	3.666	45.828	45.828
2	2.386	29.820	75.648	2.386	29.820	75.648
3	.664	8.295	83.943			
4	.372	4.648	88.591			
5	.309	3.868	92.459			
6	.264	3.300	95.759			
7	.190	2.371	98.130			
8	.150	1.870	100.000			

Results of Parallel Analysis (Table 4.57) also confirmed that only 2 components had eigenvalues that were above the corresponding criterion values for a randomly generated data matrix of the same size (9 variables x 182 respondents and 100 replications). The first two components were therefore retained for rotation.

Table 4.57: Comparison of Initial Eigenvalues from Principal Component Analysis on Attitudes Towards Mariculture Enterprises and Criterion Values from Parallel Analysis

Component number	Actual eigenvalue from principal component analysis	Criterion value from parallel analysis	Decision
1	3.667	1.3556	Accept
2	2.424	1.2306	Accept
3	.973	1.1467	Reject
4	.662	1.0640	Reject
5	.368	0.9920	Reject
6	.309	0.9054	Reject
7	.260	0.8488	Reject
8	.188	0.7759	Reject
9	.149	0.6809	Reject

A direct oblimin rotation was performed because of the existence of strong correlations and the rotated solution revealed the presence of simple structure, with the two components showing strong loadings and all variables loading substantially on only one component. Rotation results are presented in Table 4.58 to Table 4.61. Results in the pattern matrix (Table 4.50) indicate that the main loadings in component 1 consist of items on attitudes towards benefits derived from mariculture. Component 1 was therefore named attitudes towards the benefits of mariculture. Benefits are in the form of income generation. Attitude towards the benefits of mariculture is therefore an important factor to consider under attitudes towards mariculture. It further shows that the main loadings in component 2 consist of items on costs involved in implementation of mariculture and was therefore named attitudes towards costs of mariculture. The communalities had high values of greater than 0.3 hence indicating that items in each factor fitted well with each.

Table 4.58: Pattern matrix for Principal Component Analysis of two factor solution of Attitudes Towards Mariculture

Opinion Statement	**Pattern Coefficients**		**Commu -nalities**
	Attitudes towards benefits	**Attitudes towards costs**	
Mariculture creates support by beneficiaries through income generation	**.923**	-.025	.853
The project generates income that enables beneficiaries to support mariculture	**.908**	.040	.824
The mariculture enjoys broad support from beneficiaries due to its income generation	**.898**	.028	.805
The cost of implementing mariculture limits its adoption by beneficiaries	-.048	**.908**	.830
The expected cost of mariculture production influences the number of beneficiaries	.040	**.892**	.795
The project cost limits the support for mariculture by beneficiaries	005	**.875**	.765
The local values promote mariculture as a source of income	**.649**	.022	.421
The mariculture provides income to women	**.864**	-.075	.757

The structure matrix that shows the correlation between the variables and the two factors, attitude towards the benefits of mariculture enterprises and attitudes towards costs of mariculture enterprises, is presented in Table 4.59. The component correlation matrix that explains the strength of the relationship between attitude towards the benefits and attitudes towards costs of mariculture enterprises is presented in Table 4.60.

The structure matrix revealed the existence of a positive correlation between the retained variables and the two factors, attitude towards the benefits and attitudes towards costs of mariculture enterprises. The component correlation matrix showed that there was a low negative correlation between attitude towards the benefits and attitudes towards costs of mariculture enterprises (r=-0.035). The results support the use of attitude towards the benefits of mariculture and attitude towards costs of mariculture as separate sub-concepts in attitudes towards mariculture as conceptualized in the model.

Table 4.59: Structure matrix for Principal Component Analysis of two factor solution of attitudes items

Opinion Statement	Structure Coefficients	
	Attitudes towards benefits	**Attitudes towards costs**
Mariculture creates support by beneficiaries through income generation	**.924**	-.057
The project generates income that enables beneficiaries to support mariculture	**.907**	.008
The mariculture enjoys broad support from beneficiaries due to its income generation	**.897**	-.003
The cost of implementing mariculture limits its adoption by beneficiaries	-.079	**.910**
The expected cost of mariculture production influences the number of beneficiaries	.009	**.891**
The project cost limits the support for mariculture by beneficiaries	-.025	**.875**
The local values promote mariculture as a source of income	**.867**	-.105
The mariculture provides income to women	**.648**	.000

Table 4.60: Component Correlation Matrix of two factor solution of attitudes items

Component	1- Attitude towards benefits	2 - Attitude towards costs
1 - Attitude towards benefits	1.000	-.035
2 - Attitude towards costs	-.035	1.000

An analysis of the mean and reliability of the scales of each of the two factors of attitudes towards mariculture enterprises (attitudes towards benefits of mariculture enterprises and attitudes towards costs of mariculture enterprises) that were identified in the pattern matrix (Table 4.58) was undertaken and the results are presented in Table 4.61.

Table 4.61: Analysis of the Mean and Reliability of the factors of Attitudes Towards Mariculture enterprises

Definition	Mean	SD	Cronbach's Alpha	N of Items
Attitudes towards benefits of mariculture	3.66	1.27	.905	5
Attitudes towards costs of mariculture	3.13	1.29	.870	3

Key: Ranking scale for the mean: 1.0-1.7 (strongly disagree), 1.8-2.5 (disagree), 2.6-3.3 (neutral), 3.4-4.1 (agree), 4.2-5 (strongly agree), SD=Standard Deviation.

Cronbach's alpha was used to test the reliability of the proposed scales. The findings indicated that attitudes towards benefits of mariculture had a Cronbach's alpha of 0.905 and attitudes towards costs of mariculture had a Cronbach's alpha of 0.870. Based on Cronbach's alpha for the two scales and the recommended lower limit of 0.70 (DeVellis, 2003; Pallant, 2007), the study was reliable.

From the results (Table 4.61), it is clear that attitude towards benefits of mariculture enterprises is the most important factor under attitudes towards mariculture as indicated by a means score which is equivalent to agree. It was observed that attitudes towards benefits of mariculture were influenced by income generation from mariculture projects. This is consistent with the findings of Odhiambo et al. (2018) that attitudes towards benefits of mariculture greatly influence implementation of poverty alleviation mariculture projects. The study concluded that focus should be put on how to the improve benefits from mariculture to enhance commitment by the beneficiaries and other stakeholders. Any improvement on expected benefits from mariculture projects is likely to have positive attitude towards such projects and therefore support their implementation. Where negative attitudes exist, mariculture projects are often faced with sabotage. For example, Mirera et al. (2014) found that negative attitudes from other community members were experienced when mud crab farming was first introduced, and this led to conspiracies that resulted in theft of farmed crabs a few days after stocking and a few days before harvest. Effective implementation of mariculture projects requires positive attitudes from both beneficiaries and other community members that interact with the project hence the expected benefits must be clear from the onset. The effect of attitudes towards costs of mariculture enterprises however remained neutral.

4.10.3 Regression Analysis Results for Attitudes Towards Mariculture and Mariculture Project Implementation

Before introducing the project design practices in to a regression analysis with the moderating variable and the dependent variable, a standard multiple regression analysis was performed to establish the influence of attitudes towards mariculture enterprises on the implementation of poverty alleviation mariculture projects. Regression results are presented in Table 4.62.

The results show that there was a significant positive relationship between attitudes towards benefits of mariculture and implementation of poverty alleviation mariculture projects with attitudes towards benefits having a beta coefficient of β = 0.868; t = 22.779; p = 0.000.

Table 4.62: Regression Results of Attitudes Towards Mariculture Enterprises and Mariculture Project Implementation

	B	SE	β	t	p	Tolerance	VIF
Constant	0.005	0.038		0.128	0.899	-	-
Attitudes towards benefits	0.873	0.038	0.868	22.779	0.000	0.999	1.001
Attitudes towards costs	-0.027	0.038	-0.027	-0.703	0.483	0.999	1.001
R Square	.756						
Adjusted R Square	.753						
ANOVA	$F_{(2, 168)}$ = 260.540; Sig.=.000						

Attitudes of local communities towards mariculture are determined by the expected benefits from mariculture and the anticipated costs of implementing mariculture enterprises. The regression model is summarized by equation 4.4.

$Y = 0.005 + 0.873X_1 + e$……………………………………………………………….4.4

Where,

Y – Implementation of poverty alleviation mariculture projects

X_1 – Attitudes towards benefits of mariculture

e = Error term

Coefficient of determination, R Square, was estimated to reveal how much of the variance in the dependent variable (mariculture project implementation) is explained by the model. The estimated $R^2 = 0.756$ (Table 4.64) means that our model (which includes attitudes towards benefits of mariculture and attitudes towards costs of mariculture) explained 75.6 percent of the variance in mariculture project implementation. An ANOVA was undertaken to evaluate the statistical significance of results generated by the model. The ANOVA results (Table 4.62) showed the existence of a significant relationship between attitudes towards mariculture (as measured by attitudes towards benefits of mariculture and attitudes towards costs of mariculture) and mariculture project implementation with $F_{(2, 168)} = 260.540$, $p = 0.000$ which means $p < 0.0005$..

4.11 Combined Effect of Project Design Practices on Implementation of Poverty Alleviation Mariculture Projects

An analysis of the combined effect of all independent variables (project design practices) on project implementation was conducted after analyzing the effect of each independent variable as well as the moderating variable on implementation of poverty alleviation mariculture projects. The analysis involved Pearson correlation analysis and a standard multiple regression analysis.

4.11.1 Correlation Analysis of the Dependent Variable, all Independent Variables and the Moderating Variable

Pearson correlation analysis was conducted to determine strength and direction of the relationships between the dependent variable (implementation of poverty alleviation mariculture projects measured by outcome effectiveness), the moderating variable (attitudes towards mariculture enterprises measured by attitudes towards benefits of mariculture and attitudes towards costs of mariculture) and all independent variables (project design practices namely situation analysis practices (measured by stakeholder analysis and needs assessment), project formulation practices (measured by formulating outputs and activities which was captured by food security, stating key assumptions which was captured by political goodwill and inclusion of stakeholders which was captured by project ownership), implementation planning practices (measured by appropriate budgeting and assignment of responsibilities), and monitoring and evaluation planning (measured by tracking progress and timeliness and use of data). Preliminary analyses were carried out to ensure that assumptions of normality, linearity and homoscedasticity were not violated. Table 4.63 presents the results of Pearson correlation analysis that shows varying relationships between the dependent variable and the different measures of the independent variables as well as the moderating variable.

The Pearson correlation coefficients revealed that there was strong positive relationship between stakeholder analysis and implementation of poverty alleviation mariculture projects (as measured by outcome effectiveness) in the coast of Kenya, $p = 0.000$ (p–value < 0.01). It also revealed that there was medium positive relationship between needs assessment and the poverty alleviation mariculture project implementation (as measured by outcome effectiveness) in the coast of Kenya, $p = 0.000$ (p–value < 0.01). Stakeholder analysis and needs assessment are measures of situation analysis practices and therefore these results have revealed that there is a significant positive relationship between situation analysis practices measures and mariculture project implementation in the coast of Kenya.

The results further showed that there was a strong positive relationship between formulating outputs and activities which was captured by food security and project implementation (as measured by outcome effectiveness), $p = 0.000$ (p – value < 0.01). In addition, there was a medium positive relationship between the inclusion of stakeholders that was captured by project ownership and project implementation measure (as measured by outcome effectiveness) in the coast of Kenya, $p = 0.000$ (p – value < 0.01). Formulating outputs and activities and inclusion of stakeholders are measures of project formulation. This means that there was a significant positive relationship between project formulation practices and implementation of poverty alleviation mariculture projects along the coast of Kenya.

There was a strong positive relationship between appropriate budgeting and project implementation (as measured by outcome effectiveness), $p = 0.000$ (p–value < 0.01). Further, there was a medium positive relationship between assignment of responsibilities and project implementation measure (outcome effectiveness), $p = 0.000$ (p–value < 0.01). Appropriate budgeting and assignment of responsibilities are measures of implementation planning practices. This further means that there was a significant positive relationship between implementation planning practices and implementation of poverty alleviation mariculture projects along the coast of Kenya.

The correlation results also showed that there was a strong positive relationship between monitoring and evaluation planning measures (tracking progress and timeliness and use of data) and project implementation measure (outcome effectiveness), $p = 0.000$ (p–value < 0.05). This means there was a significant positive relationship between monitoring and evaluation planning and mariculture project implementation. This is in line with the finding of Ika et al. (2012) that effective monitoring and evaluation increases the chances of project success. In addition, there was a strong positive relationship between one measure of attitudes towards mariculture enterprises (attitudes towards benefits of mariculture) and project implementation measure (outcome effectiveness), $p = 0.000$ (p – value < 0.05) while there was a negative but weak relationship between one measure of attitudes towards mariculture enterprises (attitudes towards cost of mariculture) and project implementation measure (outcome effectiveness), $p = 0.231$ (p - value > 0.05).

Table 4.63 Correlation Analysis of Mariculture Project Implementation, all Project Design Practices and Attitudes Towards Mariculture

		OE	SA	NA	FS	PG	PO	AB	AR	TP	TUD	ABM	ACM
Outcome Effectiveness (OE)	P. Correlation	1.00											
	Sig. (2-tailed)	.											
	N	174											
Stakeholder Analysis (SA)	P. Correlation	.731	1.00										
	Sig. (2-tailed)	.000	.										
	N	172	180										
Needs Assessment (NA)	P. Correlation	.315	.417	1.00									
	Sig. (2-tailed)	.000	.000	.									
	N	172	180	180									
Food Security (FS)	P. Correlation	.752	.617	.305	1.00								
	Sig. (2-tailed)	.000	.000	.000	.								
	N	169	174	174	176								
Political Goodwill (PG)	P. Correlation	.278	.205	.130	.228	1.00							
	Sig. (2-tailed)	.000	.003	.044	.001	.							
	N	169	174	174	176	176							
Project Ownership (PO)	P. Correlation	.413	.599	.491	.314	.067	1.00						
	Sig. (2-tailed)	.000	.000	.000	.000	.190	.						
	N	169	174	174	176	176	176						
Appropriate Budgeting (AB)	P. Correlation	.660	.547	.445	.688	.155	.429	1.00					
	Sig. (2-tailed)	.000	.000	.000	.000	.020	.000	.					
	N	172	178	178	175	175	175	180					
Assignment of Responsibilities (AR)	P. Correlation	.383	.419	.588	.332	.057	.465	.417	1.00				
	Sig. (2-tailed)	.000	.000	.000	.000	.227	.000	.000	.				
	N	172	178	178	175	175	175	180	180				
Tracking Progress (TP)	P. Correlation	.693	.457	.202	.605	.416	.227	.490	.122	1.00			
	Sig. (2-tailed)	.000	.000	.004	.000	.000	.002	.000	.058	.			
	N	161	166	166	162	162	162	166	166	168			
Timelines and Use of Data (TUD)	P. Correlation	.723	.685	.509	.608	.128	.551	.598	.593	.376	1.000		
	Sig. (2-tailed)	.000	.000	.000	.000	.052	.000	.000	.000	.000	.		
	N	161	166	166	162	162	162	166	166	168	168		
Attitudes Towards Benefits of Mariculture (ABM)	P. Correlation	.869	.796	.416	.737	.220	.489	.643	.408	.536	.734	1.000	
	Sig. (2-tailed)	.000	.000	.000	.000	.002	.000	.000	.000	.000	.000	.	
	N	171	175	175	171	171	171	175	175	164	164	177	

Attitudes Towards Costs of Mariculture (ACM)	P. Correlation	-.057	.065	.014	-.049	.051	.194	-.053	.152	-.161	.001	-.034	1.000
	Sig. (2-tailed)	.231	.195	.426	.264	.254	.005	.242	.022	.020	.497	.325	
	N	171	175	175	171	171	171	175	175	164	164	177	177

KEY: E = Effectiveness, P. Correlation = Pearson Correlation, SA = Stakeholder Analysis, NA = Needs Assessment, FS = Food Security, PG = Political Goodwill, PO = Project Ownership, AB = Appropriate Budgeting, AR = Assignment of Responsibilities, TP = Tracking Progress, TUD = Timelines and Use of Data, ABM = Attitudes Towards Benefits of Mariculture, ACM = Attitudes Towards Costs of Mariculture

It can therefore be argued from the results that project design practices (situation analysis practices, project formulation practices, implementation planning practices, monitoring and evaluation planning) and attitudes towards mariculture significantly influence the implementation of poverty alleviation mariculture projects in the coast of Kenya. This is in tandem with the argument by Canadian International Development Agency (2001) and Ika et al. (2012) that strong project design and monitoring would increase the chances of project success.

4.11.2 Regression Analysis of All Project Design Practices and Implementation of Poverty Alleviation Mariculture Projects

A standard multiple regression analysis was performed using the computed factor scores to determine the ability of measures of situation analysis practices, measures of project formulation practices, measures of implementation planning practices, and measures of monitoring and evaluation planning practices to predict implementation of poverty alleviation mariculture projects in the coast of Kenya. The multiple regression analysis was preceded by preliminary analyses to ensure that the assumptions of normality, linearity, homoscedasticity and multicollinearity were not violated. The regression analysis was based on the following model:

$$Y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + e$$

Where:

Y = the dependent variable (mariculture project implementation)

X_1, X_2, X_3, X_4, X_5 and X_6 = independent variables (project design practices)

a = the intercept point on the Y axis for X_1, X_2, X_3, X_4, X_5 and X_6

β_1, β_2, β_3, β_4, β_5 and B_6 = the slope of the regression line for each independent variable, controlling for the other (multiple regression coefficients).

e = Error term

4.11.3 Results from Multiple Regression of Project Design Practices and Mariculture Project Implementation

The multiple regression results are presented in two levels namely results that relate to multicollinearity, normality and outlier tests and the estimated regression coefficients.

4.11.3.1 Results of multicollinearity, normality and outlier tests from regression analysis

The estimated tolerance values were examined and found to range between 0.295 and 0.859 (Table 4.64) which was above 0.10 hence confirming that there was no possibility of multicollinearity in the analysis. In addition, the computed Variance Inflation Factor (VIF) also ranged between 1.256 and 4.322 (Table 4.59) further confirming that multicollinearity was not likely to be a problem hence all independent variables were retained in the multiple regression analysis. The points of the Normal Probabilty Plot (P-P) of the Regression Standardized Residual occurred in a straight diagonal line from the bottom left to the right thereby confirming normality of data. In the scatterplot, most of the scores were concentrated in the centre without outliers since they concentrated within the recommended range of 3.3 and -3.3 as recommended by Tabachnick and Fidell (2007).

All independent variables were statistically correlated with project implementation thereby showing that the data was suitably correlated with the dependent variable hence confirming that multiple regression can be reliably undertaken.

4.11.3.2 Estimated regression coefficients

Results (Table 4.64) showed that tracking progress, timeliness, stakeholder analysis, food security, needs assessment, appropriate budgeting, which are measures of monitoring and evaluation planning, situation analysis practices, project formulation practices and implementation planning practices, are significantly related to implementation of poverty alleviation mariculture projects based on the regression coefficients and significance values (p-values).

From the results, the regression model is summarized by equation 4.5 as follows:

$$Y = 0.006 + 0.271X_1 - 0.121X_2 + 0.152X_3 + 0.114X_4 + 0.330X_5 + 0.323X_6 + e \ldots\ldots 4.5$$

Where,

Y – Implementation of poverty alleviation mariculture projects

X_1 – Stakeholder analysis

X_2 – Needs assessment

X_3 – Food security

X_4 – Appropriate budgeting

X_5 – Tracking progress

X_6 – Timeliness & use of data

e = Error term

It is evident from the results that tracking progress which is the most important factor and timeliness & use of data which is the second most important factor are measures of monitoring and evaluation planning hence revealing that monitoring and evaluation planning makes the strongest and most significant contribution to implementation of poverty alleviation mariculture projects in the coast of Kenya. This further confirms the findings by Ika et al. (2012) that design and monitoring were the most important success factors that significantly contributed to the explanation of project success.

Following in rank are stakeholder analysis and needs assessments which are measures of situation analysis practices. This finding further means that situation analysis practices has the second most strongest and significant effect on implementation of poverty alleviation mariculture projects in the coast of Kenya. Overall, the results confirm that implementation of poverty alleviation mariculture projects is influenced by project design practices; situation analysis practices, project formulation practices, implementation planning practices and monitoring and evaluation planning as conceptualized in the model.

Table 4.64: Multiple Regression Results of the Combined Effect of Project Design Practices on Implementation of Poverty Alleviation Mariculture Projects

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta (β)	t	Sig.	Tolerance	VIF
(Constant)	.006	.036		.154	.878		
Stakeholder analysis	.273	.059	.271	4.649	.000	.382	2.615
Needs assessment	-.122	.049	-.121	-2.510	.013	.559	1.789
Food security	.153	.061	.152	2.505	.013	.353	2.829
Political goodwill	.009	.040	.009	.229	.819	.813	1.231
Project ownership	-.058	.050	-.057	-1.149	.252	.526	1.902
Appropriate budgeting	.115	.055	.114	2.073	.040	.431	2.321
Assignment of responsibilities	.038	.051	.037	.742	.459	.517	1.935
Tracking progress	.333	.050	.330	6.615	.000	.522	1.917
Timeliness & use of data	.327	.061	.323	5.350	.000	.355	2.815

R Square	.804
Adjusted R Square	.793
ANOVA	$F_{(9,160)}$ = 68.968; Sig.=.000

Dependent Variable: Outcome Effectiveness

The R Square was estimated to reveal how much of the variance in mariculture project implementation was explained by the model. Results in Table 4.64 showed that the model had an R^2 of 0.804. The $R^2 = 0.804$ implies that our model (which includes all project design practices) explained 80.4 percent of the variance in mariculture project implementation. The statistical significance of the model was also assessed using analysis of variance (ANOVA). The ANOVA results (Table 4.64) also indicated that a significant relationship exists between project design practices and mariculture project implementation (outcome effectiveness) with $F_{(9,160)} = 68.968$, $p = 0.000$. The model reached statistical significance with $p = 0.000$ which is less than 0.0005.

4.12 Overall Effect of Project Design Practices and Attitudes Towards Mariculture on the Mariculture Project Implementation

The overall effects of all project design practices (independent variables) and attitudes towards mariculture enterprises (the moderating variable) on project implementation (dependent variable) was analyzed through multiple regression analysis which was performed using the computed factor scores. The assumptions of normality, linearity, homoscedasticity and multicollinearity were observed during the analysis. This analysis was carried out to fit the following regression model:

$$Y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + e$$

Where:

Y = the dependent variable

X_1, X_2, X_3 and X_4 = independent variables a = the intercept point on the Y axis for X_1, X_2, X_3 and X_4

β_1, β_2, β_3 and B_4 = the slope of the regression line for each independent variable, controlling for the other (multiple regression coefficients).

e = Error term

The multiple regression results are presented in table 4.65.

4.12. 1 Results of multicollinearity, normality and outlier tests from regression analysis

Multicollinearity was tested by examining the tolerance values and the variance inflation factor (VIF). The estimated tolerance values were found to range between 0.295 and 0.859 (Table 4.65) which was above 0.10 hence confirming that there was no possibility of multicollinearity in the analysis. In addition, the computed Variance Inflation Factor (VIF) also ranged between 1.256 and 4.322 (Table 4.65) further confirming that multicollinearity was not likely to be a problem hence all independent variables were retained in the multiple regression analysis. The points of the Normal Probabilty Plot (P-P) of the Regression Standardized Residual occurred in a straight diagonal line from the bottom left to the right thereby confirming normality of data. In the scatterplot, most of the scores were concentrated in the centre without outliers since they concentrated within the recommended range of 3.3 and -3.3 (Tabachnick & Fidell, 2007). From the correlation analysis (Table 4.63 above), all independent variables were statistically correlated with project implementation thereby showing that the data was suitably correlated with the dependent variable hence confirming that multiple regression could be reliably undertaken.

4.12.2 Estimated regression coefficients

Results (Table 4.63) show that situation analysis practices, monitoring and evaluation planning, and attitudes towards mariculture projects are positively related to effectiveness and success of mariculture project implementation based on the beta coefficient and t-test. While situation analysis and monitoring and evaluation planning are within the control of project designers, attitudes towards mariculture projects which is statistically significant is external. The most important factor was attitudes towards benefits of mariculture enterprises with the highest beta value ($\beta = 0.500$; $t = 7.917$; $p = 0.000$) followed by tracking progress (($\beta = 0.3$; $t = 6.972$; $p = 0.000$) and timeliness & use of data ($\beta = 0.201$; $t = 3.750$; $p = 0.000$) which are measures of monitoring and evaluation planning, and needs assessment ($\beta = -0.132$; $t = -3.216$; $p = 0.002$) which is a measure of situation analysis practices.

From the results, the regression model is summarized by equation 4.6.

$Y = 0.005 - 0.132X_1 + 0.300X_2 + 0.327X_3 + 0.500X_4 + e$ ....…………….4.6

Where,

Y – Implementation of poverty alleviation mariculture projects

X_1 – Needs assessment

X_2 – Tracking progress

X_3 – Timeliness & use of data

X_4 – Attitudes towards benefits of mariculture

e = Error term

Table 4.65: Multiple Regression Results of the Effect Project Design Practices and Attitudes on Implementation of Poverty Alleviation Mariculture Projects

	Unstandardized Coefficients		**Standardized Coefficients**			**Collinearity Statistics**	
Model	**B**	**Std. Error**	**Beta (β)**	**t**	**Sig.**	**Tolerance**	**VIF**
(Constant)	.005	.031		.155	.877		
Stakeholder analysis	.061	.056	.060	1.073	.285	.295	3.388
Needs assessment	-.133	.041	-.132	-3.216	.002	.551	1.814
Food security	.028	.054	.028	.520	.604	.322	3.101
Political goodwill	.003	.034	.003	.100	.920	.796	1.256
Project ownership	-.053	.043	-.052	-1.223	.223	.502	1.992
Appropriate budgeting	.077	.047	.076	1.633	.105	.425	2.354
Assignment of responsibilities	.057	.044	.057	1.317	.190	.502	1.994
Tracking progress	.304	.044	.300	6.972	.000	.498	2.008
Timeliness & use of data	.203	.054	.201	3.750	.000	.322	3.108
Attitudes towards benefits	.503	.064	.500	7.919	.000	.231	4.322
Attitudes towards costs	.014	.033	.014	.412	.681	.859	1.165

R Square	.862
Adjusted R Square	.852
ANOVA	$F_{(11, 149)}$ = 84.816; Sig.=.000

Dependent Variable: Effectiveness

It is evident that attitude towards benefits of mariculture, which is the most important factor is a moderating variable. This means that attitudes towards benefits of mariculture makes the strongest and most significant contribution to implementation of poverty alleviation mariculture projects in the coast of Kenya as a moderating variable. This means that a mariculture project may fail despite proper design if there are negative attitudes from stakeholders and beneficiaries towards expected benefits and may succeed if there are positive attitudes. Following in rank are tracking progress and timeliness and use of data which are measures of monitoring and evaluation planning hence revealing that monitoring and evaluation planning makes the second most significant contribution to implementation of poverty alleviation mariculture projects in the coast of Kenya. The last in rank is needs assessment which is a measure of situation analysis. Needs assessment has emerged to be significant because it is closely tied to stakeholder analysis.

It has been observed from the overall multiple regression analysis that the introduction of the moderating variable, attitudes towards mariculture, in the model has changed the pattern of results that were obtained from the combined project design practices model. Three factors that have been consistently significant namely stakeholder analysis, identification of indicators of progress - food security and appropriate budgeting suddenly disappeared.

The R Square was estimated to reveal how much of the variance in mariculture project implementation was explained by the model. Results in Table 4.65 showed that the model had an R^2 of 0.862. The R square value of 0.862 implies that our model (which includes all project design practices and attitudes towards mariculture) explained 86.2 percent of the variance in mariculture project implementation. The statistical significance of the model was also assessed using analysis of variance (ANOVA). The ANOVA results (table 4.65) indicated that a significant relationship exists between project design practices and mariculture project implementation (outcome effectiveness) with $F_{(11, 149)}$ = 84.816; Sig. = 0.000. The model reached statistical significance with p = 0.000 which is less than 0.0005, implying that project design practices and attitudes towards mariculture enterprises have an effect on the implementation of poverty alleviation mariculture enterprises. These results highlight the importance of project design practices and managing stakeholder attitudes towards mariculture in the implementation of poverty alleviation mariculture projects and spur community development in the coast of Kenya. The significant direct effect of attitudes towards mariculture could be attributed to the expected benefits in the form of income from mariculture projects that have attracted many people. This is consistent with the conclusion from a study by Mirera et al. (2014) that community groups that spearhead mariculture interventions have realized initial benefits from mariculture and have a vision of helping their communities out of poverty through community-based mariculture projects.

4.13 Results of Hypothesis Test

Multiple regression analysis was used to establish the effects of project design practices (independent variables) on implementation of poverty alleviation mariculture projects (dependent variable). The five null hypotheses in this study that were presented in chapter 1 were tested through a multiple regression model. A summary of the test results for null hypotheses is presented in Table 4.66.

Table 4.66 Summary of Research Hypothesis Test Results

	Null Hypothesis	**Decision**
1	Situation analysis practices do not affect implementation of mariculture projects	The null hypothesis rejected and the alternative hypothesis accepted
2	Project formulation practices do not influence implementation of mariculture projects.	The null hypothesis rejected and the alternative hypothesis accepted
3	Project formulation practices do not influence implementation of mariculture projects.	The null hypothesis rejected and the alternative hypothesis accepted
4	Monitoring and evaluation planning practices do not influence implementation of mariculture projects	The null hypothesis rejected and the alternative hypothesis accepted
5	Attitudes do not constrain the implementation of mariculture projects	The null hypothesis rejected and the alternative hypothesis accepted

4.14 Discussion of Key Findings

The overall objective of this study was to assess the effects of adherence to project design practices on implementation of poverty alleviation mariculture projects in Kenya. The study had four independent variables namely situation analysis practices, project formulation practices, implementation planning practices, and monitoring and evaluation planning. In addition, attitude towards mariculture enterprises was considered as a moderating variable.

4.14.1 Situation Analysis

This study sought to examine the effect of situation analysis on implementation of mariculture projects. To test whether situation analysis had a significant effect on implementation of poverty alleviation mariculture projects or not, a regression analysis was performed with two situation analysis factors (stakeholder analysis and needs assessments) as independent variables against mariculture project implementation (effectiveness) as the dependent variable. Stakeholder analysis was analyzed through stakeholder expectations in terms of expected benefits which was visualized by income earnings. Acoording to UNDP (2009), stakeholders are the people who will benefit from a development project or activity or whose interests may be affected by that project or activity. Stakeholder analysis therefore involves identifying stakeholders by expected benefits, interests, importance and influence. This is consistent with the argument by Isakhanyan (2011) that understanding stakeholder expectations is a primary step towards overcoming potential external barriers as stakeholders who anticipate benefits tend to have an innovative, partnership-building attitude and take a supportive position.

The regression results showed that there was a significant positive effect of stakeholder analysis on mariculture project implementation as measured by effectiveness. When the combined effect of all independent variables on the dependent variable was tested, stakeholder analysis and needs assessments which are factors under situation analysis were significantly related with effectiveness. The emergence of the two situation analysis factors to have a significant effect on implementation of poverty alleviation mariculture projects means that situation analysis had a significant effect on implementation of poverty alleviation mariculture projects in the coast of Kenya. The Analysis of variance (ANOVA) revealed the existence of a significant relationship between situation analysis as measured by stakeholder analysis, and mariculture project implementation as measured by effectiveness.

The findings were consistent with the observation by Golder (2005) that stakeholder analysis is a crucial component of situation analysis and should be undertaken at the outset of a project. Stakeholder analysis is used to identify and assess the importance of key people, groups of people, or institutions that may significantly influence the success of or have an interest on an activity or a project (MacArthur, 1997; Obadire et al., 2013). Stakeholder analysis can help identify potential risks, conflicts and constraints that could affect a project or activity being planned. It can also help identify opportunities and partnerships that could be explored and developed, and vulnerable or marginalized groups that are normally left out of project planning process (UNDP, 2009).

The findings were also in agreement with the argument by ARCIS (2006) that structured project design is a comprehensive process that requires involvement of stakeholders and consideration of their needs, interests, resources and capacities. It also supports the studies by Mirera et al. (2014), Primavera et al. (2000, 2010), Primavera (2006) and Mirera (2009) that small scale mud crab mariculture contribute to income earnings and food security of coastal communities. The findings also support the studies by Mirera et al. (2014), Ahmed & Lorica (2002) and Ndanga et al. (2013) that mariculture and the broader aquaculture development are increasingly being recognized as a source of food and income to rural households.

The findings also agree with studies by Hurtado & Agbayani (2002) and Hurtado-Ponce et al. (1996) that seaweed mariculture in the Philippines generated higher cash income to the beneficiaries and replaced copra as the main source of income for over 70 percent of all households in Tabuaeran of Line Islands in Central Pacific (Luxton & Luxton, 1999). The study further supports the argument that in the interest of proper expectation management and to have support for a project, it is essential to address the likely failures and ensure that the expected benefits are realized (Isakhanyan, 2011). The findings also support the observation by MacArthur (1997) that stakeholder analysis is a major element in participatory development discussions and there is need for the intended beneficiaries to be involved in some or all of the processes of planning, implementation and long-term management of the changes brought about by a project intervention.

4.14.2 Project formulation

This study sought to establish the effect of project formulation on implementation of mariculture projects. To realize this objective, a regression analysis was conducted on the factors of project formulation against mariculture project implementation. The results revealed that all the three factors of project formulation namely identification of indicators of progress which was captured by food security, inclusion of stakeholders which was captured by ownership and stating key assumptions which was captured by political goodwill, emerged to have statistically significant relationship with mariculture project implementation as measured by effectiveness. However, a multiple regression analysis of the combined effect of all project design practices against mariculture project implementation revealed that only food security had a statistically significant effect on implementation of poverty alleviation mariculture projects in the coast of Kenya. The other two factors did not have a statistically significant effect. Food security is in the form of giving the coastal communities access to sufficient food to meet their dietary needs.

The findings are consistent with the studies by Mirera et al. (2014) that the self-help groups viewed mariculture as a source of food security, and a means for poverty alleviation. It also supports the studies by Hishamunda et al. (2009) which found that in

Southeast Asia, mariculture makes significant contribution to food security and rural livelihoods. The results further agree with the observation of PAM and IOI (2014) that in the Mediterranean, mariculture and the related freshwater aquaculture contribute significantly to food security. In the Philippines and Central Pacific, seaweed mariculture has enabled the beneficiaries to obtain food, shelter and clothing (Hurtado & Agbayani, 2002; Hurtado-Ponce et al., 1996; Luxton & Luxton, 1999) thus confirming the importance of food security.

4.14.3 Implementation planning

The study sought to determine the effect of implementation planning on implementation of mariculture projects. This was tested by conducting a regression analysis on the two factors of implementation planning against implementation of poverty alleviation mariculture projects. The regression results showed that the two factors of implementation planning (appropriate budgeting and assignment of responsibilities) had a significant relationship with mariculture project implementation. In fact appropriate budgeting and assignment of responsibilities emerged to be significantly related with implementation of poverty alleviation mariculture projects (as measured by effectiveness). However, a multiple regression analysis of all independent variables (project design practices) against mariculture project implementation revealed that only appropriate budgeting had a statistically significant relationship with implementation of poverty alleviation mariculture projects (as measured by effectiveness).

This finding is in agreement with observation by CARE (2007) that a well prepared annual work plan provides a clear plan of action that links resources, activities and responsibilities to results. A good work plan should identify what resources are available for the project before implementation begins. It is also consistent with the observation by Caldwell (2002) that implementation plan demonstrates project feasibility in terms of responsibilities and scheduling of time and resources. The results agree with the position of UNDP (2009) that implementation planning improves focus on priorities and emphasis laid on more efficient use of time, money and other resources by ensuring that the limited resources are focused on priority activities which are likely to bring about the desired change.

4.14.4 Monitoring and evaluation planning

The study sought to evaluate the influence of monitoring and evaluation planning on implementation of mariculture projects. The influence of monitoring and evaluation planning on implementation of mariculture projects was tested using and regression analysis. The results showed that implementation monitoring (which was captured by timeliness) had a significant positive relationship with mariculture project implementation measured by effectiveness. The results further indicated that implementation and impact monitoring (tracking progress) also had a significant and strong positive relationship with project implementation (as measured by effectiveness). These results were confirmed by a multiple regression analysis of all project design practices against implementation of poverty alleviation mariculture projects.

From the results of the multiple regression analysis, it emerged that tracking progress and timeliness which are measures of monitoring and evaluation planning were important factors. This implies that monitoring and evaluation planning makes a significant contribution to implementation of poverty alleviation mariculture projects in the coast of Kenya. This is consistent with the findings of Ika et al. (2012) that design and monitoring were the most important success factors that significantly contributed to the explanation of project success. The finding is also in line with IFRC (2011) which argued that monitoring and evaluation system planning should be based on stakeholder needs and expectations to ensure understanding, ownership and use of monitoring and evaluation information. It is particularly important to ensure that monitoring and evaluation information is credible and accepted by seeking local knowledge when planning monitoring and evaluation functions.

4.14.5 Attitude towards mariculture enterprises

The study sought to examine the moderating effect of attitudes towards mariculture enterprises on the implementation of poverty alleviation mariculture projects in the coast of Kenya. To achieve this objective, a regression analysis was first performed on the two factors of attitudes towards mariculture enterprises (attitudes towards benefits of mariculture and attitudes towards costs of mariculture) against implementation of poverty alleviation mariculture projects. Attitudes of local communities towards mariculture depend on the expected benefits from mariculture and the anticipated costs of implementing mariculture enterprises. The results suggested that attitude towards benefits of mariculture had a significant moderating effect on the relationship between project design practices and implementation of poverty alleviation mariculture projects.

This finding supports a study by Brummett and Williams (2000), Mirera and Ngugi (2009) and Mirera (2011) that mariculture had lagged behind in the coast of Kenya due to negative beliefs and attitudes, and Mirera et al. (2014) that community groups that spearhead mariculture interventions have realized initial benefits from mariculture and have a vision of helping their communities out of poverty through community-based mariculture projects. Attitude towards benefits of mariculture directly affect implementation of poverty alleviation mariculture projects in the coast of Kenya.

4.14.6 Overall effect of project design practices and attitudes towards mariculture on implementation of poverty alleviation mariculture projects

The study sought to assess the effects of adherence to project design practices on implementation of poverty alleviation mariculture projects in Kenya. The multiple regression model used in this study explained most of the variation in mariculture project implementation before the moderating variable, attitude towards mariculture enterprises, was introduced. It showed that a significant relationship exists between all project design practices that were included in the model and implementation of poverty alleviation mariculture projects as measured by effectiveness. The introduction of the moderating variable increased the explanatory power of the model. This implies that the overall model (which includes all project design practices and attitudes towards mariculture) explained most of the variation in implementation of poverty alleviation mariculture projects.

Althoigh most of the existing mariculture projects have stagnated at pilot stage, they have contributed towards poverty alleviation in the coast of Kenya through provision opportunities for self employment and alternative or supplementary livelihood to the beneficiaries. This is similar to the situation in Southeast Asia and Tabuaeran in the Central Pacific where mariculture provides valuable employment (Hishamunda et al. 2009; Luxton & Luxton, 1999), and is therefore being promoted by policy-makers to provide rural employment, diversify rural economies and discourage rural-urban migration.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the key elements of the study, the conclusions drawn from the research findings and recommendations for improving implementation of mariculture projects. The overall objective of this study was to assess the effects of adherence to project design practices on implementation of poverty alleviation mariculture projects in Kenya. To address this objective, the study explored the following: the effect of situation analysis practices on implementation of mariculture projects; effect of project formulation practices on implementation of mariculture projects; effect of implementation planning practices on implementation of mariculture projects; influence of monitoring and evaluation planning on implementation of mariculture projects; and the moderating effect of attitudes towards mariculture enterprises on the implementation of mariculture projects.

5.2 Summary

Many community-based mariculture projects have been implemented along the Kenya coast to address the widespread poverty and livelihood needs with varying degrees of success and failures. Many of these mariculture projects ran into implementation challenges and collapsed or stagnated at the pilot stage for many years despite having financial resources that were set aside for their implementation. Despite the implementation challenges that led to failure of many mariculture projects, the causes of collapse or stagnation of these projects have not been investigated. The purpose of this study was to assess the effects of project design practices on implementation of poverty alleviation mariculture projects along the coast of Kenya. The study intended to fill the information gaps and contribute towards better understanding of poverty alleviation mariculture projects in the coast of Kenya. The information generated from this research will be used to prevent frequent failures of mariculture projects and increase the contribution of mariculture to poverty alleviation, and provision of livelihood and income to the coastal communities. The research information generated would be used by Government Agencies, Non-Governmental Organizations, donor agencies, Community Based Organizations and other stakeholders who are involved in the development of mariculture in the coast of Kenya.

The study found that strong relationships exist between project design practices and implementation of poverty alleviation mariculture project. This was in line with the logical framework which is a model for project design and management as elaborated by Jensen (2010) and Örtengren (2004). The logical framework is based on the logic of cause-effect relationships, encourages creative thinking, promotes participatory engagement between all parties, and ensures that projects are effectively designed and implemented (DFID, 2009; ILO, 2010). Linked to the logical framework is the results based approach which is a management strategy that focuses on performance and the achievement of results and provides a structured and logic model for identifying expected results and the inputs and activities that are required to realize these results (ICRC, 2008; UNDG WGPI, 2010; UNDG, 2011). The capabilities approach is another theory that guided this study because its concepts of freedom and agency are relevant for self-help analysis which underpins the formation of community based mariculture groups in the coast of Kenya. This study found that participatory engagement of all parties is crucial for successful implementation of poverty alleviation mariculture projects. This is in line with participatory development approach which emphasizes participation as the main operational principle that underpins all development activities.

Effect of situation analysis on implementation of poverty alleviation mariculture projects in the coast of Kenya

The study sought to examine the effect of situation analysis on implementation of mariculture projects. The descriptive statistics revealed that the mariculture projects empowered the communities by enabling the beneficiaries to develop ability to run mariculture and alleviate poverty, and allowing beneficiaries to earn income and diversify their livelihoods, thereby addressing the problem of poverty among the coastal communities..

Factor analysis showed that the first two factors explained most of the variance and were therefore most important. The two factors were income earning (which visualized stakeholder analysis) and needs assessment. The emergence of stakeholder analysis as visualized by income earnings shows that mariculture allows beneficiaries to earn income and diversify livelihoods. This is consistent with the findings of Hurtado & Agbayani (2002) and Hurtado-Ponce et al. (1996) that seaweed mariculture in the Philippines improved the standard of living of the beneficiaries through higher cash income. Needs assessment was visualized in terms of the use of past experience in form of lessons learnt from similar projects. This is consistent with the observation by AFD, EU and GIZ (2017) that it is essential to build upon the existing local situation and learn from both successful and unsuccessful experiences.

The Pearson correlation analysis revealed that there was a strong positive correlation between income earning and outcome effectiveness, and a medium positive correlation between needs assessment and outcome effectiveness. A standard multiple regression analysis was performed and the results showed that only stakeholder analysis contributed significantly to the explanation of mariculture project implementation based on the beta coefficient and t-test. It was the most important factor with the highest beta coefficient. R Square showed that the model explained most of the variance in mariculture project implementation. Given that the regression results demonstrated the existence of significant relationship between situation analysis practices (measured by stakeholder analysis) and implementation of poverty alleviation mariculture projects as measured by outcome effectiveness, the null hypothesis that situation analysis practices do not affect implementation of mariculture projects was rejected. It was concluded that situation analysis practices has a significant effect on implementation of poverty alleviation mariculture projects.

Effect of project formulation on implementation of poverty alleviation mariculture projects in the coast of Kenya

The study sought to establish the effect of project formulation practices on implementation of mariculture projects. Descriptive statistics showed that most respondents strongly agreed that formulation of the mariculture project objectives was based on understanding of the local context. In addition, most respondents strongly agreed that there was participatory engagement of all parties in mariculture projects to enable beneficiaries to own the projects and the mariculture allows the risk which includes factors beyond the control of the project such as security or theft that may affect achievement of outputs to be well identified.

Factor analysis was undertaken using principal component analysis on project formulation and a rotation performed using direct oblimin. Results showed a three factor solution with the most important factors being identification of indicators of progress which was visualized as food security, stating key assumptions that was visualized as political goodwill and inclusion of stakeholders that was visualized as ownership. The respondents strongly agreed that mariculture projects ensured participatory engagement of all parties for ownership, decision making and team-work as argued by Institute for Environmental Conflict Resolution (2011). Most of the respondents were neutral regarding the observation that mariculture enabled the beneficiaries to achieve food security and nutrition with the resources provided. It was however expected that the mariculture should provide nutrition and food security that increases the level of satisfaction as is the case in Southeast Asia and the Mediterranean, mariculture makes significant contribution to food security, rural livelihoods and foreign exchange of different countries in the region (Hishamunda et al., 2009; PAM & IOI, 2014). The respondents were also neutral on factors beyond the control of the project such as enjoying the support of the local political leaders, having the political goodwill, and promoting political support for the beneficiaries. This contradicts the finding by Hishamunda et al. (2009) that in Vietnam mariculture is attractive to policy makers because it absorbs the poor.

Pearson correlation revealed that strong positive relationship exists between food security and outcome effectiveness, weak positive correlation between political goodwill and outcome effectiveness and medium positive correlation between project ownership and outcome effectiveness. This was confirmed by standard multiple regression analysis which showed that the most important factor was identification of indicators of progress which was visualized by food security that had the highest standardized beta coefficient. It was followed by stating key assumptions which was visualized by political goodwill and lastly inclusion of stakeholders which was captured by project ownership. Given that the regression results showed clearly that project formulation practices have a significant effect on implementation of poverty alleviation mariculture projects, the null hypothsis that project formulation practices do not influence implementation of mariculture projects was rejected and it was concluded that project formulation practices significantly influence implementation of mariculture projects. The model explained most of the variance in implementation of the poverty alleviation mariculture projects.

Effect of implementation planning on implementation of poverty alleviation mariculture projects in the coast of Kenya

The third objective of the study was to determine the effect of implementation planning practices on implementation of mariculture projects. Implementation planning practices was measured by preparation of operation plan, setting out who is responsible for each activity (assignment of responsibilities), developing a calendar showing when each activity will be completed, and developing a resource plan that sets out resource requirements (appropriate budgeting). Most respondents agreed that out of the four measures, two measures namely setting out who is responsible for each activity (assignment of responsibilities) and developing a resource plan that sets out resource requirements (appropriate budgeting) greatly influence implementation of poverty alleviation mariculture projects.

Factor analysis revealed that a two factor solution was arrived at with the two factors cumulatively explaining 74% of the variance in implementation planning. Factor 1 was named appropriate budgeting which included developing resource requirements for mariculture and factor 2 was named assignment of responsibilities. Most respondents agreed that developing a resource plan which analyzes resource requirements for a mariculture project is an essential element of implementation planning. Most respondents also agreed that assignment of responsibilities which involves effective planning of the actual work effort for implementation and assignment of activities and tasks to individual members of the project was a crucial aspect of project implementation planning.

Pearson correlation revealed that there was a strong positive relationship between appropriate budgeting and outcome effectiveness and a medium positive relationship between assignment of responsibilities and outcome effectiveness. This was confirmed by the results of regression analysis which demonstrated that there was a significant positive relationship between appropriate budgeting and outcome effectiveness, and a significant positive relationship between assignment of responsibilities and outcome effectiveness. Further, the regression analysis showed that appropriate budgeting was the most important factor based on regression coefficients followed by assignment of responsibilities.

Influence of monitoring and evaluation planning on on implementation of poverty alleviation mariculture projects in the coast of Kenya

The study sought to evaluate the influence of monitoring and evaluation planning on implementation of mariculture projects. The descriptive statistics showed there was agreement by most of the respondents that implementation of poverty alleviation mariculture projects was related to how relevant the mariculture was to the beneficiaries. The respondents also agreed that implementation of poverty alleviation mariculture projects was related to timely implementation of mariculture project activities, tracking of time lines in the implementation of mariculture projects, and provision of feedback by stakeholders.

The factor analysis revealed that two factors were significant and explained most of the variance. Factor 1 was named tracking progress and factor 2 was named timeliness and use of data and information. Most respondents agreed that timeliness and use of data and information for decision making is a crucial factor in monitoring and evaluation planning for poverty alleviation mariculture projects. However, most respondents were neutral regarding tracking progress towards the realization of project outputs.

The Pearson correlation analysis revealed that there was a significant and strong positive relationship between tracking progress and outcome effectiveness. It also indicated that there was a significant and strong positive relationship between timeliness and use of data and outcome effectiveness implying that there is a strong positive correlation between self assessment as visualized by timeliness and use of data and implementation of poverty alleviation mariculture projects as visualized by outcome effectiveness. This was confirmed by regression results which showed timeliness and use of data had a significant positive relationship with mariculture project implementation measured by outcome effectiveness, and tracking progress had a significant positive relationship with project implementation (as measured by outcome effectiveness). The most important and significant factor was self assessment (timeliness and use of data) that had the highest beta coefficient followed by implementation and impact monitoring (tacking progress). The R Square demonstrated that the model explained most of the variation in the mariculture project implementation.

Influence of attitudes towards mariculture enterprises on on implementation of poverty alleviation mariculture projects in the coast of Kenya

Attitude towards mariculture enterprises is an important moderating variable on the implementation of poverty alleviation mariculture projects. Factor analysis showed that there were two factors that explained most of the variance in attitudes towards mariculture. Factor 1 was named attitude towards the benefits of mariculture and factor 2 was named attitude towards the cost of mariculture. Most respondents agreed that attitude towards the benefits of mariculture greatly influenced implementation of poverty alleviation mariculture projects. This was consistent with the findings of Odhiambo et al. (2018) that attitudes towards benefits of mariculture greatly influence implementation of poverty alleviation mariculture projects. The respondents were however neutral regarding the effect of attitudes towards costs of mariculture enterprises.

Pearson correlation analysis revealed that there was a strong and positive relationship between attitude towards benefits from mariculture and implementation of poverty alleviation mariculture projects. It also showed that there was a weak negative/inverse relationship between attitude towards costs of mariculture and implementation of poverty alleviation mariculture projects. The multiple regression analysis also revealed that there is a significant and positive relationship between attitude towards benefits of mariculture and implementation of poverty alleviation mariculture projects in the coast of Kenya. Attitude towards benefits of mariculture which is a moderating factor has a direct effect on implementation of poverty alleviation mariculture projects in the coast of Kenya. It makes the strongest and most significant contribution to implementation of mariculture projects in the coast of Kenya. Increased benefits from mariculture projects would lead to increased commitment by beneficiaries to implementation of mariculture projects.

Overall Effect of Project Design Practices and Attitudes towards Mariculture on Mariculture Project Implementation

The overall multiple regression results revealed that tracking progress had a significant positive relationship with implementation of poverty alleviation mariculture projects in the Coast of Kenya. Tracking progress involved impact monitoring. Timeliness also had a significant positive relationship with implementation of poverty alleviation mariculture projects in the Coast of Kenya. Timeliness covered implementation monitoring. Lastly, there was a significant inverse relationship between needs assessment and implementation of mariculture projects that are geared to alleviate poverty along the Coast of Kenya. Timeliness and and tracking progress are the key measures of monitoring and evaluation planning practices hence implying that there was a significant positive relationship between and evaluation planning practices and implementation of poverty alleviation mariculture projects in the Coast of Kenya. Attitude towards benefits of mariculture had significant direct effect on implementation of poverty alleviation mariculture projects in the Coast of Kenya.

5.3 Conclusions

Based on the findings of the study, the following conclusions were drawn:

The demographic characteristics of the mariculture project beneficiaries showed that mariculture projects in the coast of Kenya are dominated by female actors compared male actors. Therefore it was concluded that mariculture projects were more attractive to women as is the case in the rest of the World (Luxton & Luxton, 1999; UNEP Nairobi Convention & WIOMSA, 2015) and had been adopted as a source of livelihood by more women than men.

The study found that most of the mariculture beneficiaries did not have previous experience in mariculture. It was therefore concluded that the lack of previous experience meant that these beneficiaries did not have the necessary skill endowment to enable them participate effectively in mariculture activities at the time they started participating in mariculture projects. The skills gap was addressed by some mariculture projects through provision of training that was relevant to each person's activity in the mariculture projects. Training should therefore be factored in the design of mariculture projects to ensure that people who are involved in mariculture are equipped with the right quality of skills for their project implementation.

Stakeholder analysis and needs assessment were the most important factors under situation analysis practices based on factor analysis. Stakeholder analysis was visualized in terms of income earnings and livelihood diversification by beneficiaries. It was concluded that income earnings influenced participation of local communities who are the primary targets of the mariculture projects. This is consistent with the findings of Hurtado & Agbayani (2002) and Hurtado-Ponce et al. (1996) that seaweed mariculture in the Philippines improved the standard of living of the beneficiaries through higher cash income. Needs assessment was visualized in terms of the use of past experience in form of lessons learnt from similar projects. This is consistent with the observation by AFD, EU and GIZ (2017) that it is essential to build upon the existing local situation and learn from both successful and unsuccessful experiences.

The study also found that there was a strong positive correlation between income earning and outcome effectiveness, and a medium positive correlation between needs assessment and outcome effectiveness. This was confirmed by the regression results which showed that only stakeholder analysis contributed significantly to the explanation of implementation of poverty alleviation mariculture project based on the beta coefficient and t-test. It was therefore concluded that stakeholder analysis as visualized by income earning has a significant effect on implementation of poverty alleviation mariculture projects. This confirmed the model which conceptualized stakeholder analysis as one of the independent variables under situation analysis that influence implementation of poverty alleviation mariculture projects. It also confirmed the theoretical framework on results based approach which emphasizes the importance of clear identification of project beneficiaries and designing interventions to meet their needs as elaborated by UNDG WGPI (2010). Further, since stakeholder analysis is a key measure of situation analysis practices, it was concluded that situation analysis practices have a significant positive effect on implementation of poverty alleviation mariculture projects in the coast of Kenya.

The study found that there was strong positive correlation between food security and outcome effectiveness. It also found that there was a weak positive correlation between political goodwill and outcome effectiveness and medium positive correlation between project ownership and outcome effectiveness. The findings from correlation analysis were confirmed by standard multiple regression analysis which showed that identification of indicators of progress which was visualized by food security had a significant positive relationship with outcome effectiveness. It was therefore concluded that indicators of progress as visualized by food security is an important predictor of implementation of poverty alleviation mariculture projects as visualized by outcome effectiveness. This confirmed the theoretical literature by DFID (2009) on logical framework that requires realistic targets to be identified and milestones which act as an early-warning system to be set to indicate how a project is progressing along the predicted trajectory. It also confirmed the expectation that the mariculture projects would provide food security that increases the level of satisfaction as is the case in Southeast Asia and the Mediterranean (Hishamunda et al., 2009; PAM & IOI, 2014).

The study found that indicators of progress – food security, political goodwill and project ownership cumulatively explained most of the variance in project formulation practices. The respondents strongly agreed that mariculture projects ensured project ownership by stakeholders. The regression analysis also confirmed that project ownership which was realized through inclusion of stakeholders had a significant positive relationship with implementation of poverty alleviation mariculture projects. It was therefore concluded that there was a significant positive effect of inclusion of stakeholders on implementation of poverty alleviation mariculture projects, which has resulted in more participatory engagement of stakeholders in poverty alleviation mariculture projects in the Coast of Kenya and created project ownership and commitment. The participatory engagement of stakeholders in mariculture projects confirmed the theoretical literature on results based approach which highlights inclusiveness as an important results based management principle. The principle of inclusiveness aims to engage stakeholders to discuss, agree and commit themselves to achieving what has been agreed upon (UNDG, 2010).

Further, regression analysis found that there was a significant positive relationship between political goodwill and implementation of poverty alleviation mariculture projects in the Coast of Kenya as measured by outcome effectiveness. It was concluded that the external factors such as political goodwill may affect achievement of the objectives of poverty alleviation mariculture projects and therefore it is essential to capture them under key assumptions and plan for how to mitigate them during project formulation. This confirmed the theoretical framework on results based approach which emphasizes the need for identifying assumptions and mitigating risk that may influence success or failure as elaborated by Asian Development Bank (2013).

Since indicators of progress – food security, project ownership and political goodwill are the key measures of project formulation practices, it was further concluded that project formulation practices significantly influence implementation of poverty alleviation mariculture projects. This confirms the model which conceptualized project formulation practices as an independent variable affecting implementation of poverty alleviation mariculture projects in the Coast of Kenya.

The study found that appropriate budgeting and assignment of responsibilities cumulatively explained most of the variance in implementation planning practices. Both appropriate budgeting which involves developing a resource plan that sets out resource requirements and assignment of responsibilities that involves setting out who is responsible for each activitity were crucial aspects of project implementation planning as conceptualized in the model.

The study further found that there was a strong positive correlation between appropriate budgeting and outcome effectiveness and a medium positive correlation between assignment of responsibilities and outcome effectiveness. This was confirmed by the results of regression analysis which demonstrated that there was a significant positive relationship between appropriate budgeting and outcome effectiveness. It was concluded that appropriate budgeting that sets out resource requirements had a significant positive effect on implementation of poverty alleviation mariculture projects in the Coast of Kenya as conceptualized in the model. Therefore, improvements in budgeting would lead to improvements in implementation of poverty alleviation mariculture projects. Appropriate budgeting involves realistic preparation and scheduling of resources for implementation of poverty alleviation mariculture projects. The regression analysis also confirmed that there was a significant positive relationship between assignment of responsibilities and outcome effectiveness. Based on this finding, it was concluded that assignment of responsibilities is another important predictor of implementation of poverty alleviation mariculture projects in the Coast of Kenya as conceptualized in the model.

Since appropriate budgeting and assignment of responsibilities are measures of implementation planning practices, it was further concluded that there was a significant positive relationship between implementation planning practices and implementation of poverty alleviation mariculture projects in the Coast of Kenya. Therefore, improvements in implementation planning practices would lead to improvements in outcome effectiveness of poverty alleviation mariculture projects and would therefore reduce poverty among coastal communities.

The study found that tracking progress and timeliness were significant and explained most of the variance under monitoring and evaluation planning practices. There was a strong positive correlation between timeliness and implementation of poverty alleviation mariculture projects in the Coast of Kenya as visualized by outcome effectiveness. This was confirmed by regression results which showed that there was a significant positive relationship between timeliness and outcome effectiveness. It was therefore concluded that improvement in timeliness in terms of monitoring implementation activities would lead to improvement in outcome effectiveness. The increased use of data and information generated from monitoring implementation of activities would likely result in optimal decision making and effective implementation of poverty alleviation mariculture projects in the Coast of Kenya.

The study also found that there was a strong and positive correlation between tracking progress and outcome effectiveness. This was further confirmed by regression results which indicated that tracking progress had a significant and positive relationship with outcome effectiveness. Therefore, it was concluded that increased tracking of progress of the mariculture projects in terms of tracking project operations, tracking of outputs in the form of livelihood enhancement, use of resources to achieve nutrition and food security, and tracking of changes in the income of beneficiaries would lead to increased success in implementation of poverty alleviation mariculture projects in the Coast of Kenya which would be manisfested in outcome effectiveness. Since timeliness and tracking progress were the key measures of monitoring and evaluation planning practices, it was concluded that monitoring and evaluation planning practices has a significant effect on implementation of poverty alleviation mariculture projects in the Coast of Kenya.

The study found that attitude towards the benefits of mariculture and attitude towards the cost of mariculture explained most of the variance in attitudes towards mariculture. The correlation analysis showed that there was a strong positive correlation between attitude towards benefits from mariculture and implementation of poverty alleviation mariculture projects in the Coast of Kenya. It also showed that there was a weak inverse correlation between attitude towards costs of mariculture and implementation of poverty alleviation mariculture projects in the Coast of Kenya. The multiple regression analysis confirmed that there was a significant direct moderating effect of attitude towards benefits of mariculture on implementation of poverty alleviation mariculture projects in the coast of Kenya. It was therefore concluded that attitudes towards benefits of mariculture had a direct moderating effect on implementation of poverty alleviation mariculture projectsin the coast of Kenya. Therefore, increased benefits from mariculture projects would lead to increased commitment by beneficiaries to implementation of poverty alleviation mariculture projects in the Coast of Kenya.

From the overall regression model results, the study found that tracking progress and timeliness which were used to visualize monitoring and evaluation planning practices had significant positive relationships with implementation of poverty alleviation mariculture projects in the Coast of Kenya. Needs assessment which is a measure of situation analysis practices had a significant inverse relationship with implementation of mariculture projects. It was therefore concluded that there was a significant positive relationship between tracking progress and timeliness against implementation of poverty alleviation mariculture projects along the Coast of Kenya. Further, there was a significant inverse relationship between implementation of mariculture projects and needs assessment.

Since tracking progress and timeliness were used to monitoring and evaluation planning practices and needs assessment was a measure of situation analysis, it was concluded that there was a significant relationship between project design practices (monitoring and evaluation planning practices, situation analysis practices) and implementation of poverty alleviation mariculture projects in the Coast of Kenya. The collapse and stagnation of most mariculture projects could therefore be attributed to ineffective project design which was occasioned by lack of or inadequate stakeholder analysis, community needs assessment, and implementation and impact monitoring. Further, attitude towards benefits of mariculture had direct moderating effect on implementation of poverty alleviation mariculture projects in the Coast of Kenya.

5.4 Recommendations

Based on the findings of this study and the conclusions that have been drawn, the following recommendations are advanced for the mariculture stakeholders including the

Government agencies, policy makers, development partners and mariculture project implementers:-

It was concluded that stakeholder analysis should be adequately undertaken during the design phase of poverty alleviation mariculture projects. It is therefore recommended that appropriate stakeholder analysis should be undertaken by project designers as part of situation analysis for implementation of any poverty alleviation mariculture project to succeed and for the ultimate goal of such projects to be realized. This requires that appropriate project beneficiaries be engaged from the onset based on the expected benefits from such mariculture projects. The stakeholder analysis should also consider the interests and influence of different parties who should be involved in the mariculture projects at different levels.

It was concluded that there was a significant relationship between indicators of progress as visualized by food security and implementation of poverty alleviation mariculture projects in the Coast of Kenya. It was therefore recommended that indicators of progress should be identified jointly by the mariculture project designers, proponents and stakeholders and used by the project implementation team to monitor income generation and level of satisfaction with implementation of poverty alleviation mariculture projects in the Coast of Kenya.

It was concluded that there was a significant a positive relationship between project ownership and implementation of poverty alleviation mariculture projects in the Coast of Kenya, hence it is recommended that more participatory engagement of stakeholders in poverty alleviation mariculture projects be promoted by the National and County Governments and development partners to create ownership and commitment. The stakeholders should be made to own the mariculture projects and participate in the projects' decision making processes for implementation to be successful.

It was concluded that appropriate budgeting that sets out realistic resource requirements and assignment of responsibilities had significant positive effects on implementation of poverty alleviation mariculture projects in the Coast of Kenya. It is therefore recommended that appropriate budgeting and proper assignment of responsibilities be prioritized for implementation of poverty alleviation mariculture projects to be successful and for the intended objectives to be achieved. This requires that the project design teams ensure there is clear setting out of who is responsible for each activity. It should involve adequate planning of the actual work effort required for project implementation, assigning responsibilities and tasks and prepairing detailed time lines for the project activities.

It was concluded that improvement in timeliness in terms of monitoring implementation activities would lead to improvement in outcome effectiveness. It is therefore recommended that monitoring implementation activities by the mariculture project team be strengthened so that data and information generated is used to correct any anomalies, gauge progress and guide overall decision-making during implementation of poverty alleviation mariculture projects in the Coast of Kenya. The increased monitoring of implementation activities would likely result in optimal decision making and effective implementation of poverty alleviation mariculture projects.

It was concluded that increased tracking of progress of the mariculture projects would lead to increased success in implementation of poverty alleviation mariculture projects in the Coast of Kenya. It was recommended that tracking progress be mainstreamed in all poverty alleviation mariculture projects by the project implementers. Since timeliness and tracking progress were used to visualize monitoring and evaluation planning, it was recommended that monitoring and evaluation systems planning be embedded in the design of all poverty alleviation mariculture projects.

It was concluded that attitudes towards benefits of mariculture had a direct moderating effect on implementation of poverty alleviation mariculture projects and therefore it is recommended that focus should be put on how to improve benefits from poverty alleviation mariculture projects by providing effective training on various aspects of mariculture to address the lack of experience and skill endowments and enable the workers build the necessary capacity.

Policy recommendations

From the overall regression model results, it was concluded that collapse and stagnation of most mariculture projects was due to ineffective project design which was occasioned by lack of or inadequate situation analysis particularly stakeholder analysis and community needs assessment, and monitoring and evaluation planning particularly implementation monitoring and impact monitoring. It is therefore recommended that proper stakeholder analysis, community needs assessment, implementation monitoring and impact monitoring be made mandatory in the design of poverty alleviation mariculture projects. Proponents of poverty alleviation mariculture projects should demonstrate to the Government Agency responsible for development of mariculture that these have actually been complied with before they are given clearance to proceed with implementation.

Areas for further research

The present study did not cover inland freshwater aquaculture and the findings in mariculture may not be same in the inland freshwater aquaculture. Future research should cover both mariculture and freshwater aquaculture to bring out differences that the two branches of aquaculture may reveal with respect to the effects of project design practices on project implementation.

Political goodwill is an essential factor under project formulation as conceptualized in the model. The political goodwill in this study includes factors beyond the control of the project that may affect achievement of outputs and should be captured under key assumptions. The selection of these factors was not exhaustive since this study focused on political goodwill to represent key assumptions. It is recommended that other factors such as security could be introduced to provide more insights on the effects of project design practices on implementation of poverty alleviation mariculture projects.

The present research took a heavily quantitative approach with a little qualitative aspect to confirm some results. Future research could take a more qualitative approach so that knowledge in this area is enhanced by comparing results from a purely qualitative study with the findings of this study.

Finally, when attitude was introduced as a moderating variable in the present study, it had a significant direct effect on project implementation, increased the explanatory power of the overall multiple regression model and reduced the regression coefficients of the independent variables under project formulation practices and implementation planning practices. Future research should be conducted in a different cultural setting to establish whether the same results would be obtained. Despite the few limitations of this study, the findings would address the frequent failures in mariculture projects and spur development by providing information that will improve mariculture project design and implementation. The study would be an important reference for future research on project design practices and implementation.

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APPENDICES

APPENDIX 1: Questionnaire

Introduction: Thank you for taking your time to meet with me today. I am from Kenya Marine and Fisheries Research Institute. I am interested in knowing your participation in mariculture project and any challenges/problems that you may have or be experiencing. I have a check-list here of some of the things I want to know. The interview should take less than one hour. Your responses will be kept confidential and I will ensure that any information which will be included in our report does not identify you as the respondent. Are you willing to participate in this interview?

______________________________   __________________________

Interviewee   Date

I appreciate your cooperation.

Location: ______________________________ Date: _________________________

A: BACKGROUND INFORMATION *(Please tick one)*

1) Gender:

[1] Female   [2] Male

2) What is your age? *(tick as appropriate)*

[1] Under 18   [2] 19-30yrs   [3] 31-40yrs

[4] 41-50yrs   [5] Over 50

3) What grade of formal education do you have?

[1] Class 8 or less [2] Incomplete secondary [3] O-level certificate

[4] A-level certificate [5] Tertiary

4) What is your employment status? [1] Unemployed [2] Employed

5) From where did you get capital for your mariculture project?

[1] Exclusively from members' contribution [2] Partly donor and partly members' contributions [3] Exclusively from donor funding [4] Not aware

6) Do you have any previous experience in mariculture?

[1] Yes [2] No

7) Have you acquired any training in the mariculture?

[1] Yes [2] No

8) If the answer to question 6 is yes, what type of training have you acquired?

[1] Pond management [2] Stocking [3] Other *(specify)*__________

9) Do you have adequate land (space) for mariculture expansion? [1] Yes [2] No

10) If the answer to question 8 is yes, who owns the land?

______________________________ If the answer to question 8 is no, why is there lack of land/space for expansion? ________ _________________________

11) Where do you get seed for stocking your mariculture farm?

[1] From the wild [2] Hatchery; If from the wild, how is it collected and by who? ____

12) How readily available is the seed?

[1] Scarce [2] Available seasonally [3] Readily available all year round

13) Where do you get feed for your mariculture farm (in case of fish and crabs)?

_________ ____

14) How do you handle grievances/conflicts between group members?

[1] No mechanism for handling grievances exist [2] Grievance handling mechanism exists [3] Other (specify) ____________

In the subsequent sections, please select one response against each of the statements

B: SITUATION ANALYSIS

Stakeholder analysis: *Analysis of primary targets of the project in terms of beneficiaries - benefits are in the form of income increases*

1. The mariculture clearly allows the beneficiaries to earn income
   [1] Strongly disagree [2] Disagree [3] Unsure
   [4] Agree [5] Strongly agree
2. The mariculture promotes income generation for the beneficiaries
   [1] Strongly disagree [2] Disagree [3] Unsure
   [4] Agree [5] Strongly agree
3. The mariculture greatly assists the beneficiaries to earn income
   [1] Strongly disagree [2] Disagree [3] Unsure
   [4] Agree [5] Strongly agree

Problem analysis: *Analysis of the root causes of the core problem - poverty*

4. The mariculture relates to the problem of poverty
   [1] Strongly disagree [2] Disagree [3] Unsure
   [4] Agree [5] Strongly agree

5. The mariculture enhances livelihoods and income that alleviate poverty among beneficiaries

   [1] Strongly disagree [2] Disagree [3] Unsure

   [4] Agree [5] Strongly agree

6. The mariculture reduces poverty among the beneficiaries through livelihoods diversification and enhanced income

   [1] Strongly disagree [2] Disagree [3] Unsure

   [4] Agree [5] Strongly agree

Needs assessment: *Capacity needs necessary to run and sustain mariculture – capacity needs are in the form of enhanced ability (skills and knowledge) and assessment of community's past experience with similar projects.*

7. The project enables the beneficiaries to develop ability to run mariculture

   [1] Strongly disagree [2] Disagree [3] Unsure

   [4] Agree [5] Strongly agree

8. The project enhances the ability of beneficiaries to sustain mariculture

   [1] Strongly disagree [2] Disagree [3] Unsure

   [4] Agree [5] Strongly agree

9. The project greatly increases the ability of beneficiaries to manage mariculture

   [1] Strongly disagree [2] Disagree [3] Unsure

   [4] Agree [5] Strongly agree

10. The project has promoted mariculture than the previous ones

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

11. The mariculture promotes the use of lessons learnt than past projects

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

12. The mariculture enables beneficiaries to use lessons learnt than previous projects

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

C: PROJECT FORMULATION PRACTICES

Inclusion of stakeholders*:* *Participatory engagement of all parties for ownership, informed decision making and team-work*

13. The project promotes ownership of mariculture by beneficiaries

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

14. The project ensures beneficiaries are involved in making decisions in mariculture

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

15. The mariculture enables beneficiaries to own the project

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

Setting of objectives and outcomes: *The objective of mariculture is to alleviate poverty among the beneficiaries through livelihood diversification and income generation.*

16. The mariculture project objectives are based on understanding of the local context

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

17. The objectives of mariculture address the problem of poverty among the beneficiaries

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

18. The mariculture objectives are informed by the results of situation analysis

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

Formulating outputs and activities: *Analysis of resources and time used to deliver outputs*

19. The mariculture project uses the least costly resources to deliver the desired outputs (livelihoods, nutrition, food security and income) to beneficiaries

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

20. The mariculture promotes the use of least costly inputs in the production process

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

21. The mariculture ensures efficiency in the use of resources for production

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

22. The mariculture provides nutrition to the beneficiaries within the specified time-frame

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

23. The mariculture provides food security to the beneficiaries within the specified time-frame

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

Identifying indicators of progress: *Performance indicators which describe the way to measure achievement of objectives (measuring generation of income and level of satisfaction)*

24. The mariculture project has developed a system for recording income
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
25. The mariculture project ensures regular discussion of progress in income generation
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
26. The mariculture ensures regular analysis of trends in income generated by the project
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
27. The mariculture provides food security that increases the level of satisfaction by beneficiaries
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
28. The mariculture provides nutrition that suits the priorities of the beneficiaries
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
29. The project provides nutrition that attracts beneficiaries to mariculture
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree

Stating key assumptions: *Analysis of the context in which the project operates; factors beyond the control of the project - political goodwill*

30. The mariculture enjoys the support of the local political leaders

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

31. The mariculture has the political goodwill

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

32. The mariculture promotes political support for the beneficiaries

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

33. The risks that mariculture project faces were well identified

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

34. The mariculture allows the risks to be well identified

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

35. The mariculture has a mechanism for mitigating the identified risks

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

D: IMPLEMENTATION PLANNING PRACTICES

Preparation of operation plan: *Definition of activities that are required to implement a mariculture project*

36. The mariculture has defined clear activities for income generation

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

37. The mariculture promotes implementation of defined activities to generate income for beneficiaries

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

38. The mariculture allows beneficiaries to implement defined activities

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

Setting out who is responsible for each activity: *Assignment of responsibilities*

39. The mariculture ensures effective planning of the actual work effort for income generation

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

40. The mariculture ensures that activities are appropriately assigned to people

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

41. The mariculture promotes assignment of tasks to individual members of the project

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

Developing a calendar showing when each activity will be completed: *Setting a timeframe and target dates*

42. The mariculture has promoted setting of timeframes than previous ones

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

43. The mariculture ensures that the target dates are adhered to

    [1] Strongly disagree [2] Disagree [3] Unsure

    [4] Agree [5] Strongly agree

44. The project ensures that there is realistic scheduling of time and resources for mariculture to generate income

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

Developing a resource plan: *Analysis of resource requirements for mariculture*

45. The project ensures that appropriate budget is prepared for mariculture

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

46. The mariculture has promoted budgeting than previous ones

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

47. The mariculture ensures there is a realistic scheduling of resources for implementation

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

E: MONITORING AND EVALUATION PLANNING

Implementation monitoring: *Analysis of progress in the realization of outputs* **(***use of resources, timeliness)*

48. The project team ensures transparent and appropriate financial accounting for the mariculture project

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

49. The project team ensures appropriate utilization of resources to achieve the desired output

[1] Strongly disagree [2] Disagree [3] Unsure
[4] Agree [5] Strongly agree

50. The project team controls the use of resources in order to realize livelihood enhancement
[1] Strongly disagree [2] Disagree [3] Unsure
[4] Agree [5] Strongly agree
51. The project team ensures that mariculture activities are implemented in time
[1] Strongly disagree [2] Disagree [3] Unsure
[4] Agree [5] Strongly agree
52. The mariculture provides for timely implementation of activities.
[1] Strongly disagree [2] Disagree [3] Unsure
[4] Agree [5] Strongly agree
53. The mariculture allows tracking of time lines in the implementation of the project
[1] Strongly disagree [2] Disagree [3] Unsure
[4] Agree [5] Strongly agree
54. The mariculture ensures that changes in food security for the beneficiaries is tracked
[1] Strongly disagree [2] Disagree [3] Unsure
[4] Agree [5] Strongly agree
55. The mariculture clearly provides for tracking the use of resources to achieve food security for the beneficiaries
[1] Strongly disagree [2] Disagree [3] Unsure
[4] Agree [5] Strongly agree
56. The mariculture allows tracking of changes in food security
[1] Strongly disagree [2] Disagree [3] Unsure
[4] Agree [5] Strongly agree

Impact monitoring: *Tracking immediate objectives and outcomes - Analysis of poverty alleviation (livelihood diversification and income generation)*

57. The mariculture promotes tracking of livelihood diversification for beneficiaries
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
58. The mariculture allows tracking of progress in the diversification of livelihoods for beneficiaries to reduce poverty
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
59. The mariculture greatly assists beneficiaries to track progress in diversification of livelihoods
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
60. The mariculture allows tracking of changes in the income of beneficiaries
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
61. The mariculture promotes tracking of income generation for beneficiaries
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
62. The mariculture tracks the income earned by beneficiaries
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree

Periodic reporting to the main stakeholders: *Timely reporting*

63. The mariculture ensures timely reporting to stakeholders
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree

64. The mariculture allows stakeholders to obtain progress reports in time

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

65. The mariculture has promoted provision of feedback by stakeholders

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

Self-evaluation by members of the project team: *Use of data and information*

66. The mariculture ensures effective use of data and information for decision making

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

67. The mariculture allows data and information to be used for decision making

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

68. The mariculture has promoted the use of data and information for decision making

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

Mid-term external evaluation: *Analysis of the relevance of mariculture projects*

69. The project ensures that mariculture is relevant to the beneficiaries

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

70. The mariculture addresses poverty among beneficiaries thus remaining relevant

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

71. The mariculture has remained relevant by promoting livelihood diversification and income generation

    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree

End of project external evaluation: *Achievement of objectives*

72. The mariculture has developed a system of assessing livelihood diversification and income levels for beneficiaries

    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree

73. The mariculture has allowed the use of a system for evaluating livelihood diversification and income generation

    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree

74. The mariculture has promoted the use of an evaluation system for livelihood diversification and income generation

    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree

F: ATTITUDES TOWARDS MARICULTURE

Attitudes towards the benefits of mariculture: *Analysis of benefits in the form of income changes accruing from mariculture*

1. The mariculture enjoys broad support from beneficiaries due to its income generation

    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree

2. The mariculture creates support by beneficiaries through income generation

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

3. The project generates income that enables beneficiaries to support mariculture

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

Attitudes towards costs involved: *Analysis of costs associated with mariculture*

75. The cost of implementing mariculture limits its adoption by beneficiaries

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

76. The expected cost of mariculture production influences the number of beneficiaries

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

77. The project cost limits the support for mariculture by beneficiaries

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

Attitude towards mariculture in relation to culture: *Analysis of gender influence on attitudes and its effect on maricluture*

78. More women have adopted mariculture as a source of income than men

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

79. The local values promote mariculture as a source of income

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

80. The mariculture provides income to women

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

G: PROJECT IMPLEMENTATION

Level of implementation: *Full implementation of mariculture projects -*

Analysis of project operation in the form of employment opportunities created by the project

81. The mariculture allows beneficiaries to have employment

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

82. The mariculture enables beneficiaries to gain self employment

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

83. The mariculture greatly assists beneficiaries to have employment opportunities

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

Degree of success: *Analysis of level of satisfaction by beneficiaries*

84. The mariculture increases the level of satisfaction by beneficiaries

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

85. The mariculture enables beneficiaries to have increased satisfaction

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

86. The products from mariculture make the beneficiaries happy

[1] Strongly disagree [2] Disagree [3] Unsure
[4] Agree [5] Strongly agree

Degree to which the project has addressed poverty*: Livelihoods, nutrition and food security.*

Analysis of changes in livelihoods

87. The mariculture provides alternative livelihoods to the beneficiaries
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
88. The mariculture enables the beneficiaries to diversify their livelihood sources
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
89. The mariculture increases livelihood opportunities for the beneficiaries
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
90. The mariculture allows the beneficiaries to have access to adequate food for their households
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
91. The mariculture enables the beneficiaries to meet protein needs for their household
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
92. The mariculture improves access to food for the beneficiaries
    [1] Strongly disagree [2] Disagree [3] Unsure
    [4] Agree [5] Strongly agree
93. The mariculture enables beneficiaries to have sufficient food to meet their dietary needs

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

94. The mariculture ensures access to sufficient food for the beneficiaries dietary needs

[1] Strongly disagree [2] Disagree [3] Unsure

[4] Agree [5] Strongly agree

APPENDIX2: Interview Guide

Introduction: Thank you for accepting to be interviewed for our research about the implementation of mariculture projects. My name is ______________________________ and I wish to talk to you about your experiences in the mariculture project. I am interested in knowing your participation in mariculture project and any challenges that you may be experiencing. The interview should take less than 1 hour. I will write some notes during the session, since I may not remember everything that you will say. Your responses will be kept confidential and I will ensure that any information included in our report does not identify you as the respondent. Are you willing to participate in this interview?

____ ____________________________

Interviewee Date

I appreciate your cooperation.

A: Background information

1) Gender
2) Age
3) Level of formal education
4) Occupation

Stakeholder analysis

5) (a) Extent of involvement in mariculture project in the area

   (b) Beneficiaries of mariculture project and how were they identified

6) Any benefits derived from mariculture project

7) Any stakeholder consultations by the project

8) Mariculture and capacity building needs of the local people

9) Any previous experience in mariculture or aquaculture

Formulation of mariculture projects

10) Involvement in preparation of the mariculture project

11) Participation in making decisions in the mariculture project

12) Process of identifying the mariculture project activities

13) Is progress in the mariculture project measured and how?

Planning implementation of the mariculture project

14) Availability of an implementation plan for the mariculture project

15) How the actual work effort for implementation of the mariculture project is planned

16) Assigment of responsibilities responsibilities in the plan (actual work effort required for implementation of mariculture projects)

17) Budget preparation

Monitoring and evaluation plan for the mariculture project

18) Tracking changes in income due to the mariculture project

19) Tracking progress in the diversification of livelihoods

20) Tracking the use of resources in the mariculture project

21) Tracking changes in nutrition and food security

Attitude towards benefits and costs of mariculture

22) Any support for mariculture from stakeholders

    (b) Motivation for participation in the mariculture project

Implementation of maricultureprojects

23) Employment opportunities generated by the mariculture project income, livelihood, nutrition and food security generated by mariculture

24) Extent of satisfaction with the outputs from the mariculture project

Thank you for your time.

APPENDIX 3: Original Total Variance Explained for Project Implementation

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.307	66.481	66.481	9.307	66.481	66.481
2	1.304	9.311	75.793	1.304	9.311	75.793
3	.826	5.898	81.690			
4	.684	4.884	86.575			
5	.339	2.421	88.996			
6	.320	2.287	91.283			
7	.256	1.825	93.108			
8	.214	1.530	94.638			
9	.201	1.437	96.075			
10	.196	1.400	97.476			
11	.112	.803	98.278			
12	.103	.738	99.017			
13	.085	.608	99.625			
14	.053	.375	100.000			

Extraction Method: Principal Component Analysis.

APPENDIX 4: Original Total Variance Explained for Situation Analysis Practices

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.515	54.288	54.288	6.515	54.288	54.288
2	1.802	15.013	69.301	1.802	15.013	69.301
3	.907	7.555	76.856			
4	.887	7.396	84.252			
5	.554	4.621	88.872			
6	.321	2.672	91.544			
7	.281	2.344	93.888			
8	.221	1.841	95.728			
9	.194	1.615	97.344			
10	.159	1.321	98.665			
11	.098	.817	99.482			
12	.062	.518	100.000			

Extraction Method: Principal Component Analysis.

APPENDIX 5: Original Total Variance Explained for Project Formulation Practices

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.186	35.592	35.592	8.186	35.592	35.592
2	2.517	10.943	46.536	2.517	10.943	46.536
3	2.394	10.407	56.943	2.394	10.407	56.943
4	1.643	7.144	64.087	1.643	7.144	64.087
5	1.300	5.651	69.738	1.300	5.651	69.738
6	.913	3.968	73.706			
7	.781	3.395	77.102			
8	.661	2.873	79.975			
9	.636	2.766	82.741			
10	.546	2.375	85.116			
11	.507	2.205	87.322			
12	.455	1.976	89.298			
13	.387	1.684	90.982			
14	.367	1.596	92.578			
15	.273	1.185	93.763			
16	.251	1.093	94.856			
17	.236	1.027	95.883			
18	.202	.879	96.762			
19	.188	.817	97.580			
20	.169	.735	98.315			
21	.152	.659	98.974			
22	.129	.560	99.534			
23	.107	.466	100.000			

Extraction Method: Principal Component Analysis.

APPENDIX 6: Original Total Variance Explained for Implementation Planning Practices

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	5.735	47.793	47.793	5.735	47.793	47.793
2	1.280	10.663	58.456	1.280	10.663	58.456
3	1.137	9.478	67.934	1.137	9.478	67.934
4	.914	7.614	75.548			
5	.838	6.985	82.532			
6	.698	5.816	88.348			
7	.362	3.013	91.361			
8	.302	2.515	93.876			
9	.243	2.023	95.900			
10	.204	1.698	97.597			
11	.173	1.442	99.039			
12	.115	.961	100.000			

Extraction Method: Principal Component Analysis.

APPENDIX 7: Original Total Variance Explained for Monitoring and Evaluation Planning

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.436	49.764	49.764	13.436	49.764	49.764
2	3.899	14.440	64.203	3.899	14.440	64.203
3	1.421	5.264	69.468	1.421	5.264	69.468
4	1.297	4.804	74.271	1.297	4.804	74.271
5	1.070	3.964	78.235	1.070	3.964	78.235
6	.883	3.270	81.505			
7	.722	2.675	84.180			
8	.533	1.975	86.155			
9	.480	1.776	87.931			
10	.419	1.550	89.481			
11	.385	1.426	90.907			
12	.318	1.177	92.085			
13	.306	1.135	93.220			
14	.241	.893	94.113			
15	.218	.809	94.922			
16	.193	.715	95.637			
17	.176	.651	96.288			
18	.150	.557	96.845			
19	.143	.528	97.373			
20	.123	.455	97.828			
21	.112	.413	98.241			
22	.108	.399	98.640			
23	.100	.369	99.008			
24	.079	.294	99.302			
25	.075	.279	99.581			
26	.068	.252	99.833			
27	.045	.167	100.000			

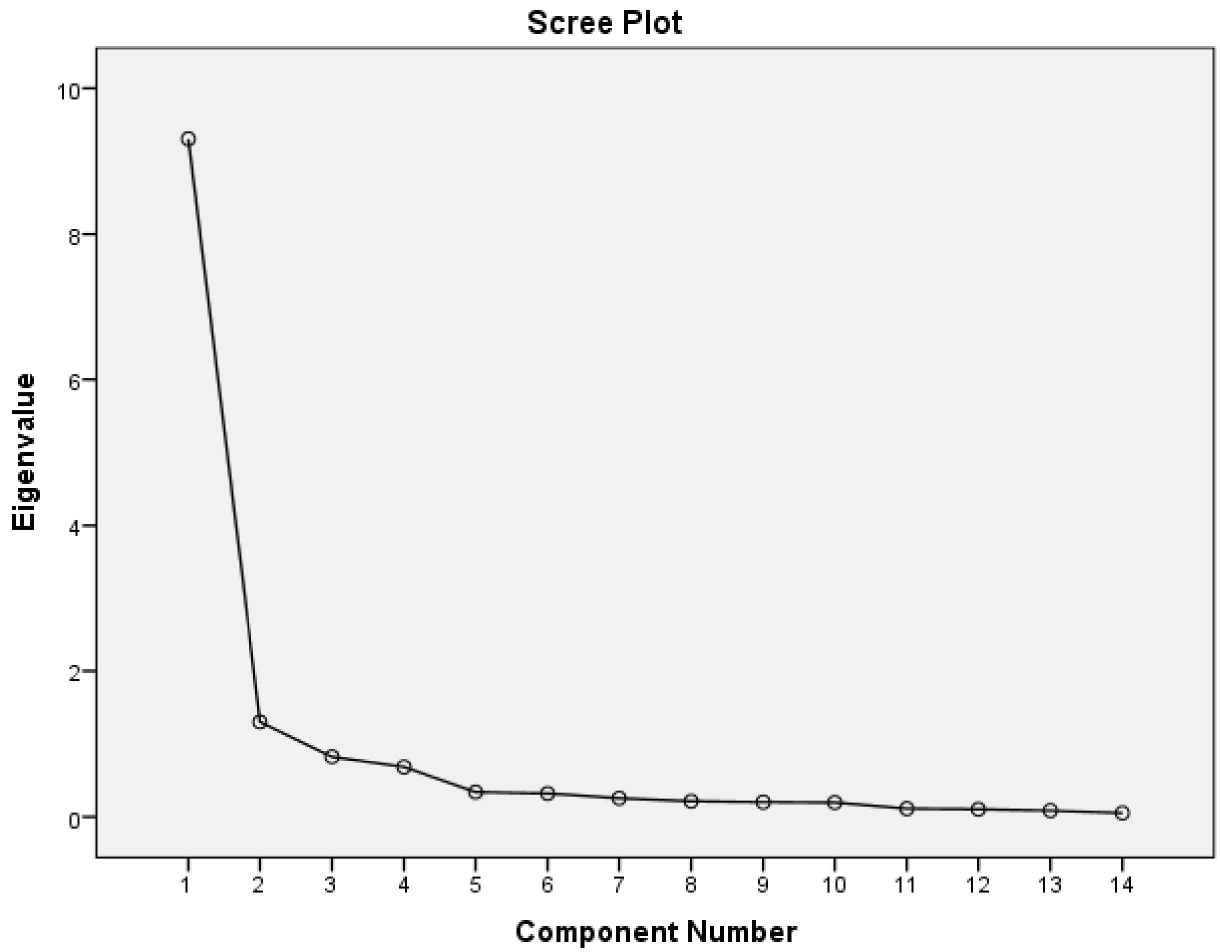
Extraction Method: Principal Component Analysis.

APPENDIX 8: Original Total Variance Explained for Attitudes Towards Mariculture

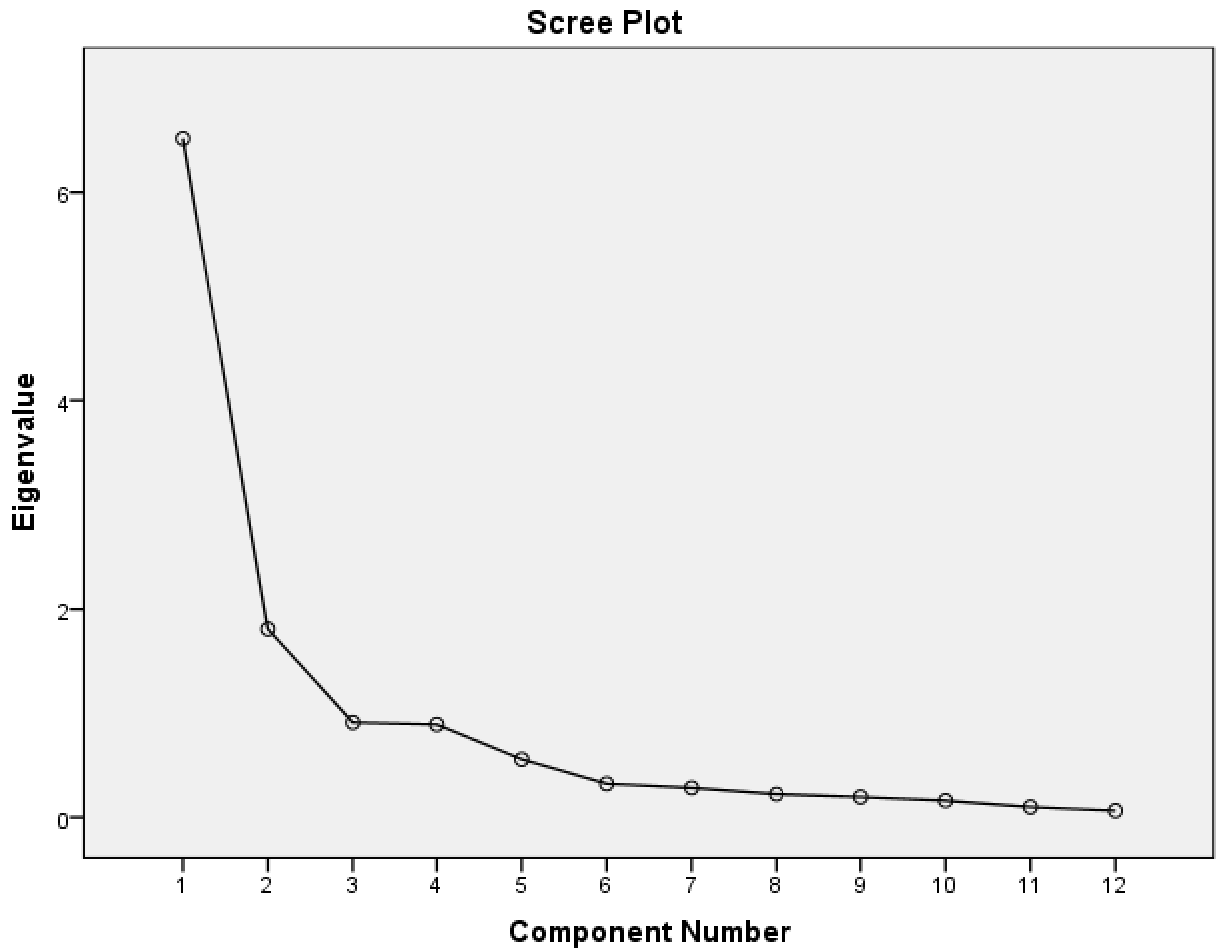
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.667	40.745	40.745	3.667	40.745	40.745
2	2.424	26.930	67.676	2.424	26.930	67.676
3	.973	10.810	78.485			
4	.662	7.357	85.842			
5	.368	4.089	89.931			
6	.309	3.433	93.364			
7	.260	2.886	96.250			
8	.188	2.094	98.344			
9	.149	1.656	100.000			

Extraction Method: Principal Component Analysis.

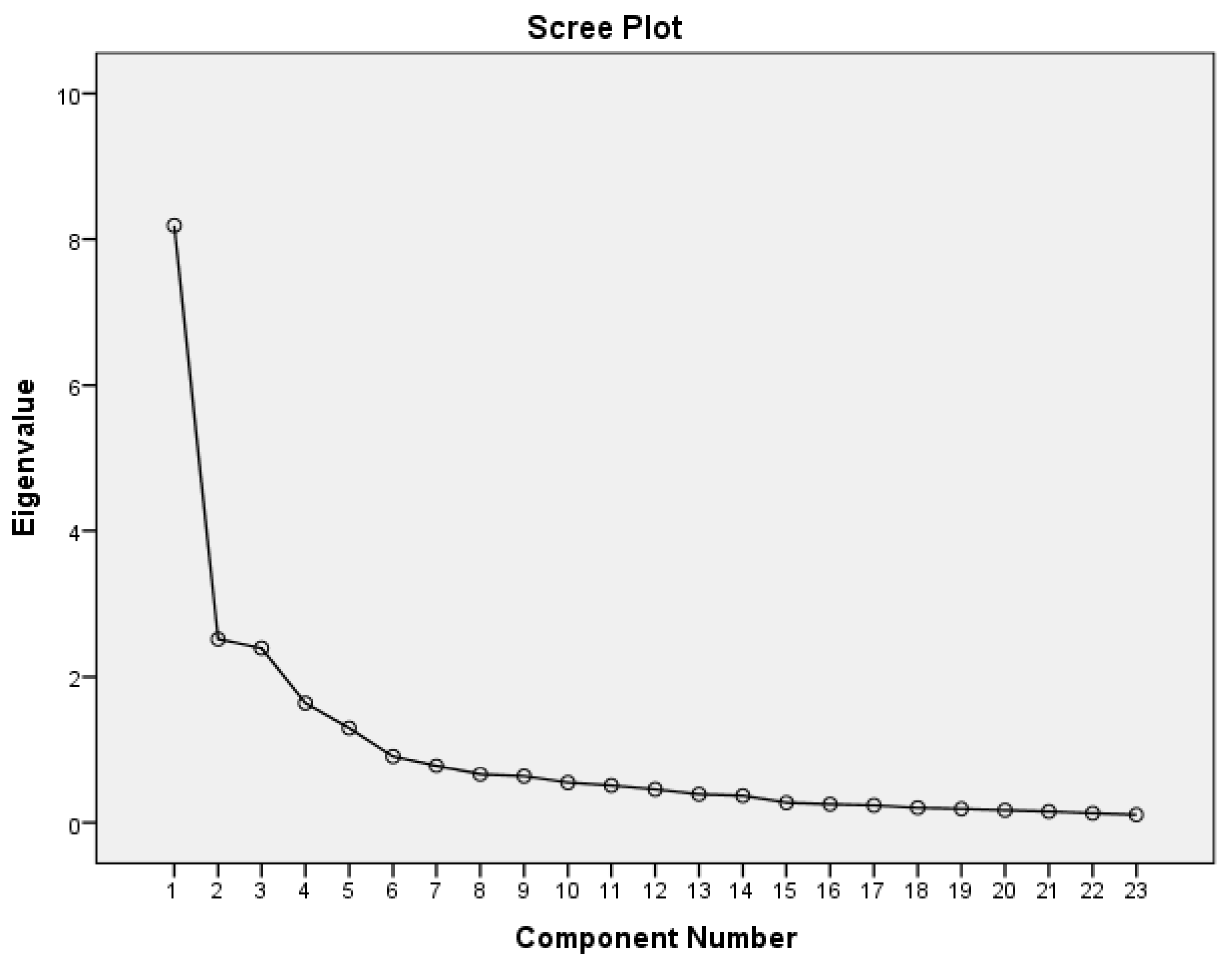
APPENDIX 9: Original Screeplots for Project Implementation



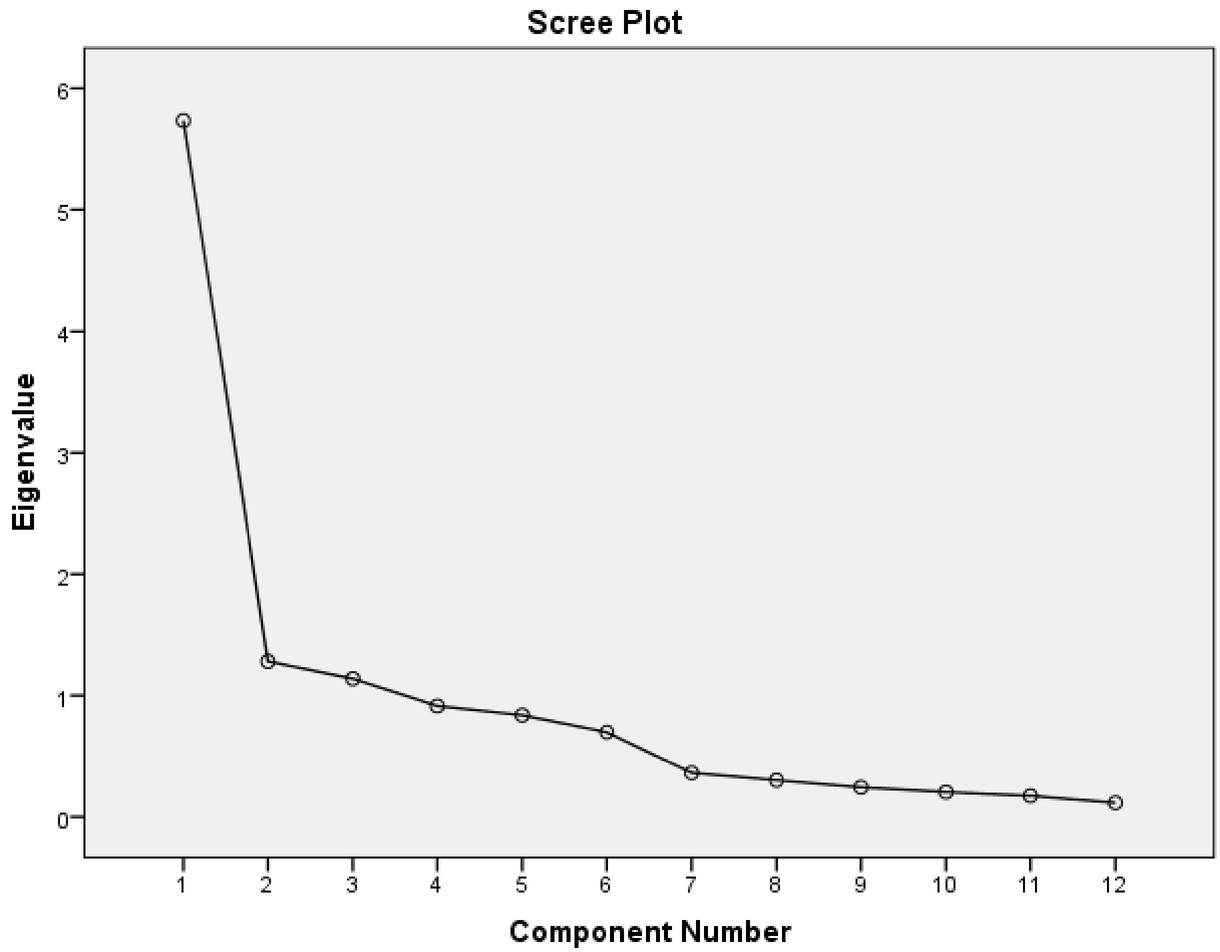
APPENDIX 10: Original Screeplots for Situation Analysis Practices



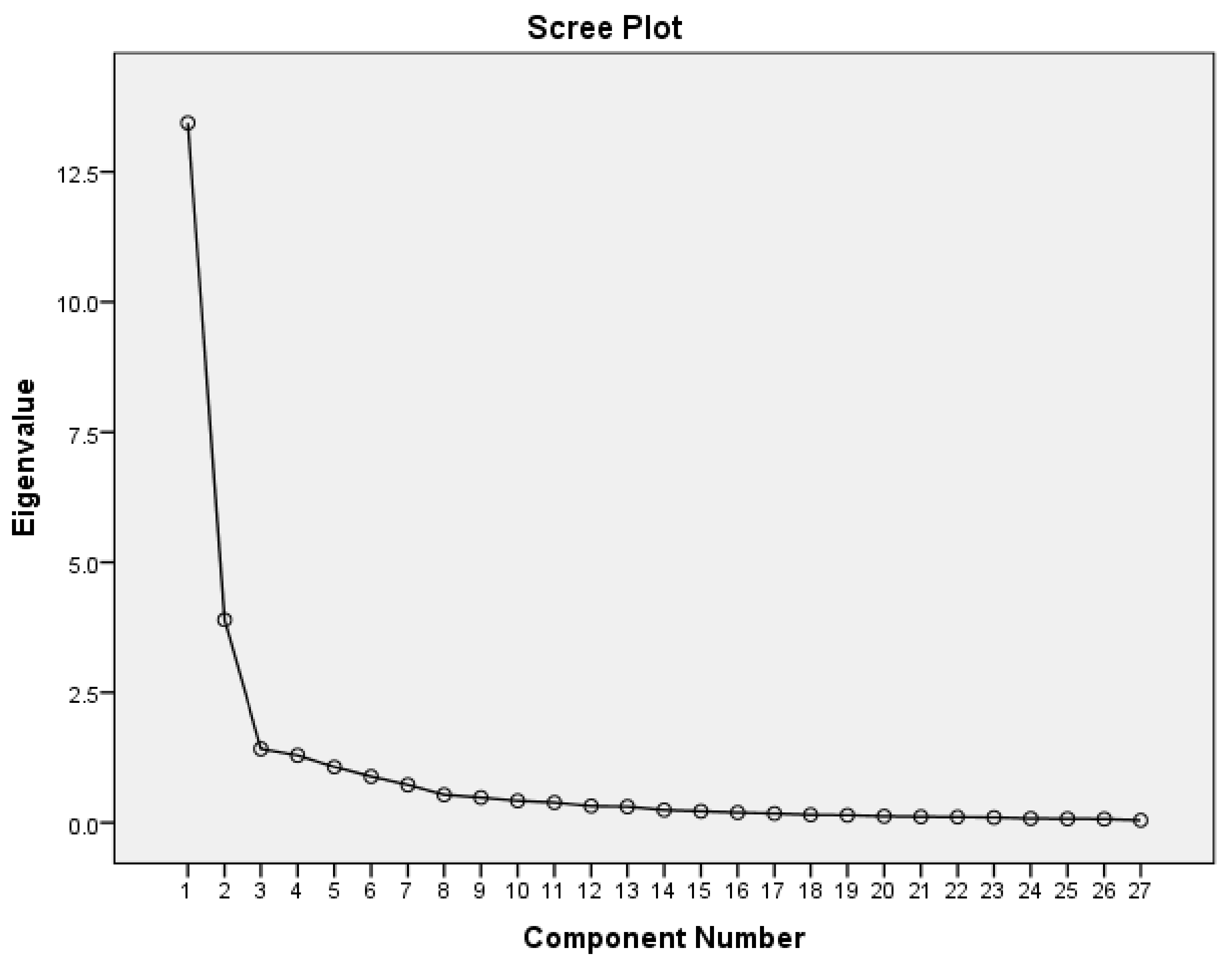
APPENDIX 11: Original Screeplots for Project Formulation Practices



APPENDIX 12: Original Screeplots for Implementation Planning Practices



APPENDIX 13: Original Screeplots for Monitoring and Evaluation Planning



APPENDIX 14: Original Screeplots for Attitudes Towards Mariculture