



# The effects of situation analysis practices on implementation of poverty alleviation mariculture projects in the coast of Kenya

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*The importance of situation analysis in the project cycle cannot be overstated. This research was carried out in twelve sites where mariculture was practiced in Kilifi, Mombasa and Kwale Counties in the coast of Kenya. The general objective of the research was to assess the effects of situation analysis practices on implementation of mariculture projects in Kenya. The specific objectives were to:- examine the effect of stakeholder analysis on implementation of poverty alleviation mariculture projects, establish the effect of problem analysis on implementation of mariculture projects, and determine the effect of needs assessment on implementation of poverty alleviation mariculture projects. The research was based on quantitative research approach with a cross sectional survey design. Simple random sampling was used to select the number of subjects that represent the target population in the survey. Guided questionnaire administration was adopted to capture responses from members of organized mariculture groups. Factor analysis and regression analysis were conducted on the data collected from the questionnaire survey. Results showed that the poverty alleviation mariculture projects in Kenya are dominated by female actors compared to male actors. Factor analysis revealed that degree of success and degree to which the mariculture projects have addressed their objective of poverty alleviation were the most important measures of project implementation and were named effectiveness. Regression analysis showed that there was a significant positive relationship between stakeholder analysis and effectiveness ( $\beta = 0.726$ ;  $t = 12.59$ ;  $p = 0.000$ ). Being the single most significant factor influencing mariculture project implementation, stakeholder analysis should be undertaken at the situation analysis stage so that it informs project design. It was concluded that improvements in situation analysis practices brought about by improvements in stakeholder analysis would address poverty among coastal fisher communities by improving implementation of poverty alleviation mariculture projects.*

**Keywords:** factor analysis, stakeholder analysis, needs assessment, effectiveness

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## Introduction

Implementation of mariculture projects in the coast of Kenya began three and half decades ago (Troell et al., 2011). These projects were introduced through development, research and conservation programs (Mwaluma, 2002; Mirera, 2011) with the aim of alleviating poverty among the coastal communities, providing alternative livelihoods, employment and income to the fisher communities and easing pressure on the artisanal capture fisheries. The main culture species include milkfish, mullets, mud crabs, seaweeds and prawns (Mirera and Ngugi, 2009). Most mariculture projects have been implemented in the coast of Kenya with donor support and they have involved production systems operated by self-help groups (Mirera and Ngugi, 2009). Unfortunately, most of the projects have collapsed or remained at pilot stage for many years (Munguti et al., 2014). The causes of stagnation of these projects however, have not been established. Some of the projects that collapsed include the shrimp culture at Ngomeni in Kilifi County and the oyster farming at Gazi Bay and Shirazi in Kwale County. The Shrimp farming was initiated in the mid 1980s with funding from FAO (Mirera, 2011; Rönnbäck, et al., 2002; Munguti, et al., 2014) to carry out trials for development of mariculture.

The failure of these projects could probably be associated with failure by the project designers to conduct proper situation analysis. In cases where project design is not informed by proper situation analysis, ineffective project designs emerge. According to Ika et al. (2012), ineffective design and poor monitoring may lead to project failure. Effective project design is conducted through a participatory process to enable the intended project beneficiaries and key stakeholders to own a project from the onset and commit themselves to participate effectively in its implementation. If participation of stakeholders is not embraced at the design phase, it may lead to lack of ownership and ineffective implementation. This point of view is in tandem with the observation by Troell et al. (2011) 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 aimed to assess the effects of situation analysis practices on implementation

of mariculture projects in Kenya. The specific objectives were to: examine the effect of stakeholder analysis on implementation of poverty alleviation mariculture projects, establish the effect of problem analysis on implementation of poverty alleviation mariculture projects, and determine the effect of needs assessment on implementation of poverty alleviation mariculture projects.

## Methodology

A cross sectional survey design was adopted with questions being asked once in the entire period of the research (Mugenda and Mugenda, 2003). 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 members of 12 organized community groups that were involved in mariculture projects (KMFRI-KCDP, 2015). A sample was selected from a population of 331 individuals who are members of the organized community groups that are engaged in mariculture in the three selected Counties. Since this was a finite population, a sample size of 182 individuals was obtained using the formula for determination of sample size for a finite population correction (Naing et al., 2006). Random probability sampling was used to select the number of subjects that represent the target population in the survey. A questionnaire was used as the main research instrument in this study. It was constructed taking into account the objectives of the research as elaborated by Nachmias and Nachmias (2004). 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). Guided questionnaire administration was applied in this study to capture a representative sample of the target population and control for non-verbal behaviour.

The demographic and contextual socioeconomic characteristics were analyzed using descriptive statistics. Implementation of mariculture projects was assessed through level of implementation, degree of success and degree to which a project has addressed poverty. Situation analysis practices were assessed through stakeholder analysis, problem analysis and needs assessment. The effect

**Table 1.** Descriptive statistics of the respondents' demographic and contextual socioeconomic characteristics.

<b>Demographic characteristics</b>	<b>N</b>		
Gender	182	Female: 59%	Male: 41%
Age	182	Mean: 40 years	Minimum: 19 years Maximum: over 50 years
Level of education	182	Primary: 86%	Secondary and above: 14%
Employment status	182	Unemployed: 93%	Employed: 7%
Previous experience in mariculture	182	No experience: 62%	Some past experience: 38%
Training in mariculture	182	No training: 17%	Some training obtained: 83%
<b>Contextual characteristics</b>	<b>Status %</b>	<b>Status %</b>	<b>Status %</b>
Source of seed for mariculture	From the wild: 92%	From hatchery: 8%	
Source of seed for mariculture	From the wild: 92%	From hatchery: 8%	
Provision of security for mariculture	Not effective: 18%	Effective: 78%	No idea: 4%

of situation analysis on project implementation was analyzed through factor analysis and regression analysis. Factor analysis was performed to summarize data set and regroup variables in to a limited set of factors based on shared variance (Yong and Pearce, 2013) in order to interpret the relationships and patterns. It was conducted using principal component analysis, screeplot and parallel analysis to determine the number of components to retain. The retained components were rotated using direct oblmin to obtain the pattern of loadings and interpretation was based on the final rotated factor solutions. Regression analysis was carried out to estimate the effects of situation analysis practices on the mariculture project implementation as elaborated by Tabachnick and Fidell (2007) and Nachmias and Nachmias (2004). Data analyses were performed using the Statistical Package for Social Scientists (SPSS) version 22.0.

## Results and discussion

### Socioeconomic and contextual factors

Results of the demographic and contextual socioeconomic characteristics showed that 59 percent of the respondents were female implying that the poverty alleviation mariculture projects in Kenya were dominated by female actors compared to male actors (Table 1). Majority of the mariculture farmers (74 percent) were aged between 19 – 50 years with the average age of 40 years. This means that poverty alleviation mariculture projects were

run by workers in their active middle age category when they could undertake the hard work in the mariculture farms. The results further showed that about 86 percent of the respondents had attained different levels of primary education. This implies that these projects are run by workers who have low levels of education. The mariculture projects thrived on seed collected from the wild whose sustainability and reliability of supply is not guaranteed. The commercial fish feeds are however generally expensive while the quality of alternative cheap feeds which are locally available is often low. Provision of security is another critical factor for the success of the poverty alleviation mariculture projects. In this regard, about 96 percent of the respondents observed that mariculture projects required security services to curb theft which has been a major problem to the farmers. Provision of security should therefore be considered during the project design stage so that the mariculture projects are not exposed to theft and to avoid conflicts with the other sea users.

### Factor analysis results for project implementation

Three measures of project implementation were subjected to factor analysis with principal component analysis as the extraction method. The analysis revealed that only one factor was extracted accounting for 65.9 percent of the variance in mariculture project implementation. This factor had eigenvalue that was greater than 1 hence meeting the eigenvalue rule. Results of scree test

**Table 2.** Pattern matrix for principal component analysis solution with oblimin rotation of two factor solution of situation analysis items.

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

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

also confirmed that only the first component was meaningful with a clear break occurring after the first component. Results of parallel analysis also revealed that only one component had an eigenvalue that was above the corresponding criterion values for a randomly generated data matrix of the same size (9 variables x 182 respondents and 100 replications) and therefore meaningful.

A confirmatory factor analysis was performed on the dependent variable using direct oblimin rotation and the results (see Appendix 1 in the supplementary file to the online version of this article) showed that only one component remained in the final extraction hence the solution could not be rotated. 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 single component was therefore named effectiveness which refers to how much a project meets its objectives. The results demonstrated that effectiveness 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.

### Factor analysis results for situation analysis practices

Three measures of situation analysis practices namely stakeholder analysis, problem analysis and needs assessment were subjected to factor analysis with principal component analysis as the extraction method. The principal component analysis revealed that only the first two components had initial eigenvalues greater than one, cumulatively explaining 69.3 percent of the variance and had the greatest influence on situation analysis practices. A direct oblimin rotation was performed and the rotated solution in the pattern matrix (Table 2) revealed a simple solution with strong loadings on the two components corresponding to income earning and poverty alleviation items that were used to visualize stakeholder analysis and problem analysis, and use of lessons learnt which visualized needs assessment. The same is confirmed by the structure matrix (Table 3) that shows the existence of positive correlations between the variables and the two factors, stakeholder analysis and needs assessment. The component correlation matrix also revealed the existence of a moderate positive correlation between stakeholder analysis and needs assessment ( $r = 0.418$ ). The results therefore

**Table 3.** 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
Mariculture clearly allows beneficiaries to earn income	<b>.856</b>	.361
Mariculture promotes income generation for the beneficiaries	<b>.851</b>	.381
Mariculture greatly assists the beneficiaries to earn income	<b>.897</b>	.379
Mariculture enhances livelihoods and income that alleviates poverty among beneficiaries	<b>.891</b>	.372
Mariculture reduces poverty among beneficiaries through livelihoods diversification and enhanced income	<b>.911</b>	.354
The project has promoted mariculture than the previous ones	.494	<b>.900</b>
The mariculture promotes use of lessons learnt than past projects	.360	<b>.959</b>
The mariculture enables beneficiaries to use lessons learnt than previous projects	.356	<b>.953</b>

  

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

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

showed that stakeholder analysis and needs assessment are important factors under situation analysis practices.

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. Cronbach's alpha was used to test the reliability of the proposed scales. The findings (see Appendix 2 in the supplementary file to the online version of this article) indicated that stakeholder expectations in terms of benefits of the mariculture projects that captured stakeholder analysis had a Cronbach's alpha of 0.927 and past experience in form of lessons learnt from similar projects that captured needs assessment had a Cronbach's alpha of 0.931. The results were reliable since the Cronbach's alpha for both stakeholder analysis and needs assessment were above the recommended lower limit of Cronbach's alpha of 0.70 (DeVellis, 2003).

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 3.819, which is equivalent to agree on the ranking scale. This

finding was consistent with 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 needs assessment through an assessment of community's past experience with similar projects during the design of 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.

### Regression analysis of situation analysis and project implementation

Regression results (see Appendix 3 in the



supplementary file to the online version of this article) showed that there was a significant positive relationship between stakeholder analysis and project implementation ( $\beta = 0.726$ ;  $t = 12.59$ ;  $p = 0.000$ ). Stakeholder analysis is a sub-variable of situation analysis practices hence the regression results showed that there was a significant positive relationship between situation analysis practices and implementation of poverty alleviation mariculture projects in the coast of Kenya. Stakeholder analysis should therefore be appropriately carried out during situation analysis for implementation of poverty alleviation mariculture projects to be successful. This finding was in agreement 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 a project (MacArthur, 1997; Obadire et al., 2013). It helps to identify potential risks, conflicts and constraints that could affect a project or activity being planned. It also helps to recognize 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 R Square was 0.535 implying that our model explained 53.5 percent of the variation in implementation of poverty alleviation mariculture projects. The Analysis of variance (ANOVA) results ( $F_{(2,169)} = 97.247$ ,  $p = 0.001$ ) also revealed the existence of a significant relationship between situation analysis practices as measured by stakeholder analysis, and implementation of poverty alleviation mariculture projects in the coast of Kenya as measured by outcome effectiveness.

## Conclusions

There was a significant positive relationship between stakeholder analysis and effectiveness. Since stakeholder analysis was a key measure of situation analysis practices while project implementation was measured by effectiveness, it was concluded that situation analysis practices have a significant positive effect on implementation of poverty alleviation mariculture projects in

the coast of Kenya. Further, stakeholder analysis was visualized in terms of income earnings and livelihood diversification by beneficiaries hence income earnings influenced participation of local communities who are the primary targets of the mariculture projects.

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## Supplementary material

Supplemental material for this article can be accessed on the publisher's website.

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