

Influence of Community Participation on Implementation of Muringa Irrigation Project in Tharaka-Nithi County, Kenya

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Abstract: There has been growing research interest in projects seeking to empower communities to sustainable livelihoods. Of special interest is the role of the local community in the development processes for these projects. The purpose of this study was to examine the influence of community participation on implementation of Muringa Irrigation Project in Tharaka-Nithi County, Kenya. The participatory theory of development and system theory of organization guided this study. Correlational survey design was adopted. The target population was 150 comprising of 141 leaders of farmer-groups and 9 members of the technical management committee of the Muringa Irrigation Project. A sample of 109 was selected using the Krejcie and Morgan table of sample determination. Proportionate stratified random sampling method was used to select 102 leaders of farmer-groups and 7 project management committee members. Questionnaires and key informant interviews were the data collection tools. Pilot study was conducted using a sample 10% of the actual study. Reliability of the questionnaire was 0.8 and was ascertained using Cronbach's coefficient at the acceptable levels of 0.7. Quantitative data was analyzed using descriptive and inferential statistics. Qualitative data was analyzed using content analysis. The relationship between variables were tested using Pearson Product Moment Correlational Coefficient. Regression analysis was used to test the fitness of the model in predicting the dependent variable. Hypothesis was tested using Fisher (F) test at 95% confidence level. The results showed that community participation had significant influence on the implementation of Muringa Irrigation Project for $r = 0.82$. The model accounted for 67.5% variations in the implementation of Muringa irrigation project ($R^2 = 0.675$). It was recommended that project planners and implementers need to encourage selective community participation based on the strength of impacts on achieving sustainable outputs. Government can formulate operational guidelines and frameworks for community participation in order to promote sustainability of future projects.

Keywords: Community participation, community development project, implementation of Muringa Irrigation Project in Tharaka-Nithi County

1. INTRODUCTION

Water as a natural resource is not only essential for life support but is also an economic resource utilized for socioeconomic prosperity of nations. By this recognition, the United Nations General Assembly calls for adequate measures to ensure availability and sustainability of water management so as to safeguard food security (Sachs et al, 2019). The Global Hunger Index (GHI) report (2019) indicates that hunger is one of the greatest cause of malnutrition death in South Asia and Sub-Saharan Africa with hunger indexes of 9.3 and 28.4 respectively (Helvetas, 2019). Availability of water for farming is large influenced by climatic fluctuations and environmental change thus limiting optimum productivity of rural farms (UNESCO, 2019). In response, nations and global development partners are quickly revitalizing their development policies and strategies so as to avoid setbacks related to food insecurity and loss of livelihoods to the communities whose water is an economic resource. One of the emerging approaches towards promoting sustainable water management, agricultural activities and food security in rural areas is through community-based water irrigation projects (Bredenoord, 2016).

Community refers to a collection of people living together in order to achieve shared interests and goals (Williams and Lawson, 2001). Verity (2007) describes community as group of people living in a given geographical area, displaying some sense of belonging and interdependency, sharing mutual aspirations and working collectively as a whole. Development of the communities through implementation of water and irrigation projects has emerged as the most preferred approach towards promotion social-economic development and provision of water resources to the needy and poor (Meenar, 2015). The development of community through irrigation projects entails strengthening the capacity of the local communities in identifying and prioritizing their development and socioeconomic needs and opportunities in order to encourage them to work, support and utilize the projects benefits into generating sustainable positive change in their livelihoods (Kutipan, 2017). Increasingly, community integration in local projects has captured the center-stage of development agenda of most nations and development partners. Owing to the belief that community involvement in rural programmes not only empowers but also improves the livelihood and promotes development, community participation has developed into normed practice (Shukor et al., 2011).

Jung and Choi (2013) asserts that exploitation of Community Participation in project development requires a multilevel approach in terms of community mobilization, resource mobilization, community collaboration and partnership. In this context, local development projects should be anchored on Community Participation. Studies from Asian and Western Countries have demonstrated the usefulness of integrating community capacities into local development projects in terms of enhancement effectiveness and sustainable impacts (Nancy, 2018; Mahanani and Chotib, 2018; Meenar, 2015). In Africa, studies show that community participation contributes to sustainable impacts of community water projects due to improved resource mobilization (Majee et al., 2020; Muniu et al., 2017; Orina et al., 2016; Alasela et al., 2003). In Nigeria, Zimbabwe and Kenya, there is empirical establishment that community engagement leads to highly performing and sustainable impacts (Hermawan and Hutagalung, 2020; Omondi et al., 2020; Sabastian and Nathan, 2017; Jelili et al., 2020; Mashayamombe and Hofisi, 2016). Other studies have demonstrated that community leadership promotes networks, sharing of knowledge across leading to favorable synergies for project responsiveness (Manusawai et al., 2020; Redondo-Sam, 2016; Martiskainen, 2017).

Just like other Sub-Saharan African and Asian countries which have water scarce that affects productivity of agricultural land. Through irrigation projects and sustainable agricultural practices, it can be easy to achieve most of sustainable development goals including ending hunger, achieving food security and improved nutrition and promoting peace in the community (Sachs et al, 2019). However, a large portion of rural populations in developing countries have continued to rely on unproductive traditional technologies and reliance of natural rainfalls leading to poor yields. The resultant effect is food insecurity, poor nutrition, hunger and loss of income from crop sales. In addition, it aggravates the already worse situation in relation to the living conditions of the general population in these regions hence constraining the social economic advancement of the rural economy (Sabastian and Nathan, 2017). In Kenya, public participation in project development is not only a right but a legal requirement (Republic of Kenya, 2010). Administratively, involvement of the public and local community is described as a policy decision making process for determining the levels of service and budget priorities for the projects that meets community needs (Kakumba and Nsingo, 2008). This study sought to examine the influence of community participation on the implementation of Muringa Irrigation Project in Tharaka-Nithi County.

Muringa Irrigation project in Tharaka-Nithi County was a Government of Kenya funded infrastructural agricultural development strategy (2010-2020) under National Irrigation Board (NIB) aimed at increasing productivity of agricultural through tapping and supplying irrigation water to farmland for improved food security and sustenance of livelihoods (Republic of Kenya, 2016). The project was in line with Kenya's Vision 2030 which aimed at transforming the nation into a newly industrializing, middle-income country providing high quality of life to all its citizens in a clean and secure environment (Republic of Kenya, 2008). To achieve this, top priority was to increase area under in irrigation in order to reduce the country's dependence on rain-fed agriculture to farmers in Maara Sub-county in Tharaka-Nithi County (Republic of Kenya, 2013). Kenya Shillings 1.5 Billion was allocated for the Muringa Irrigation Project to benefit 1,400 farm families through irrigation

coverage of 5,000 Hectares of land (Republic of Kenya, 2016). Specific project components were the construction of intake and laying of pipeline for conveyancing and installation of sprinkler water distribution system. The water was to be tapped from Maara River (Republic of Kenya, 2016).

2. STATEMENT OF THE PROBLEM

It is in no doubt that agriculture is the cornerstone for food security and socioeconomic stability of many communities and nations. The Global Hunger Index report (2019) indicates that hunger is one of the greatest cause of malnutrition death in South Asia and Sub-Saharan Africa with hunger indexes of 29.3 and 28.4 respectively (Helvetas, 2019). Upon this realization, the Government of Kenya set aside Kenya Shillings 1.5 Billion for implementation of Muringa Irrigation Project in Tharaka-Nithi County with an aim of providing irrigation water to over 1,400 farmers through irrigation coverage of 5,000 Hectares of land (Republic of Kenya, 2016). The main objective of the Muringa Irrigation Project was to empower local farmers through provision of stable supply of irrigation water and thereby contributing to agricultural productivity and sustenance of livelihoods. However, there is ongoing debate and concerns regarding integration of the community as far as project implementation and sustainability is concerned (Kusmiarto et al., 2020; Moreri et al., 2018; Hall et al., 2016; Buerger and Holzer, 2015; Mansuri and Rao, 2013). Inadequate community involvement is cited as one of the risk factors contributing to delays and failures of community development projects (Kilic and Bacharova, 2012). In addition, there questions the low level of community participation of Tharaka-Nithi Community in local developing planning, budgeting and implementation of development project leading to low level of community contribution to the project needs, low pipe connectivity, breakages of water pipes among other issues. Also, locals of Tharaka-Nithi County have decried poor quality of project outputs due to low citizen involvement leading to poor supervision of the project (Mwangi and Okwengu, 2019). Further, statistics suggest that there is as low as 7.5% level of awareness of development projects among the community of Tharaka-Nithi County (Mwangi and Okwengu, 2019). In response, the county assembly of Tharaka-Nithi County embarked on legislation on public participation bill so as to enforce participation of local community in development projects.

Previous studies have narrowly focused on community involvement from the dimension of creating awareness and information sharing thus negating the multifaceted potentials and capacities of communities (Hermawan and Hutagalung, 2020; Orina et al., 2016). Whereas community involvement in project development contributes to sustainable impacts (Aga et al., 2018; Nancy, 2018; Mahanani and Chotib, 2018; Meenar, 2015), narrow focus on the Community Participation and its construction has limited knowledge on the understanding of broader community dimensions that contribute to project implementation. As a result, managers and planners of community development projects are denied opportunities for learning improving management of community development projects. Also, Community Participation is one area that has been ignored by researchers of community development. In community development, Community Participation denotes multilevel aspects of community integration into local development projects through dimensions of community resource mobilization, community collaboration, community leadership and partnership (Traverso-Yeppez et al., 2012). In this context, local development projects should be anchored on Community Participation.

3. LITERATURE REVIEW

Project implementation is the activation of project activities, resources, efforts, processes, procedures and systems so as to achieve the planned goals within time, cost and quality constraints (PMI, 2013). Usually, the implementation of project is guided by operation manuals and project management plan. During the implementation, there is need for effective and efficient organization, coordination and control of the entire project system so as to increase chances of project success (Culligan et al., 2013). This is most important in community development projects like irrigation projects whose failure can be detrimental to socioeconomic wellbeing of the local community. However, project implementation is a complex process and is often faced by coordination challenges. Sanchez and Robert (2010) view the complexity as a key factor influencing uncertainty because it introduces non-linearity to the consequences, rendering the development of events unpredictable. Thus it is necessary to identify the key aspects of implementation that informs the success of the project. Project implementation can be

measured using different indicators that denote effectiveness, efficiency, responsiveness, relevance and even sustainability of the deliverables (PMI, 2013). However, the decision on the choice of indicators for measuring project implementation is informed by the strategies put in place to counter implementation setbacks so as to assure significant level of stability in the implementation process (Culligan et al., 2013). Thus project managers and teams should carry out the process of prioritizing and balancing opportunities and risks against demand and supply of limited resources. Interpreted, there is need for adequate measures to solve the systematic challenges through prudent approaches and coordination of tools, skills and procedures in the implementation in order to optimize implementation benefits. There is empirical evidence to support that implementation of projects is directly influenced the foundations good planning, strong partnerships and collaboration of project management (Filippov et al., 2012). Lack of interconnectivity between elements in a local development projects and community has resulted into unresponsive deliverables (Grönevall and Danilovic, 2014). Omission of knowledge management concepts such as stakeholders mapping, scope management and risk management which are essential in project implementation is very detrimental to the implementation of projects (PMI, 2013). For example, implementation of essential-service rural- development projects like irrigation project requires integration of local community right from the conception of project idea, selection, implementation and coordination. In an attempt to fill the knowledge gap left by Aubry et al. (2010) conducted a follow up study aimed at identifying the cause and effects of triggers of projects management office. Using web-based questionnaires, the factor and correlation analyses revealed dynamic causes of project office changes that were unique to the context and environmental aspects of projects in relation to the organization and their implementation was quite difficult. The findings signify the important role played by the project environment and community in promoting stable implementation. However, their study did not describe the actual community integration practices and processes with impact on the implementation. Their findings were so broad in relation to specific components of the irrigation development project. In addition, the methodology used weak correlations among independent variables that partly support the results from previous qualitative studies based on case studies that provide a narrow perspective of viewing the contribution of community capacities on project implementation.

There is limited clarity about the meaning of capacity. However, Hounslow, (2002) refers Community Participation as the capability of people to collectively work together so as to sustain desired changes. Kutipan (2017) explores Community Participation as the systematic process of involving the abilities and competences of the community in dealing and solving their needs for better livelihoods. Jung and Choi (2013) describes Community Participation as the capacity of people to mobilize resources in order to meet own needs Further, J. ng and Choi (2013) concludes that Community Participation is both a process of collaborative action for promoting stable policies and projects for addressing structural and systematic inequities in terms of needs (Jung and Choi, 2013). Kutipan (2017) concludes that community capacity as the interaction between persons and organizational in specific community for better state and welfare of the society. Capacity is all about the ability of a community to have higher endurance against threatening and increasing the capability of the community to overcome the impactful challenges. Thus Community Participation entails any activities undertaken by the community whether by its own or with aid of others so as to develop collective commitment, resources and skills. There are greater concerns over the host community towards successful implementation of local development projects. But there is limited knowledge on the contribution of Community Participation on irrigation projects (Meenar, 2015). An exploratory study by Nancy (2018) on the influence of Community Participation on health programme in Indonesia concluded that Community Participation was enhanced by collaboration. In their exploratory studies on the Community Participation building efforts in Thailand and USA, Nancy (2018) and (Meenar, 2015) respectively concluded that development of Community Participation was often faced by challenges relating to resource mobilization and community partnership that of course challenges the sustainability of the programmes. A related study by Mahanani and Chotib (2018) on the effects of collective action, empowerment of community, shared vision to the Community Participation in urban projects for water conservation in Malaysia. The results suggested that Community Participation influenced the way community resolved their local challenges and the sustainability of the resolutions.

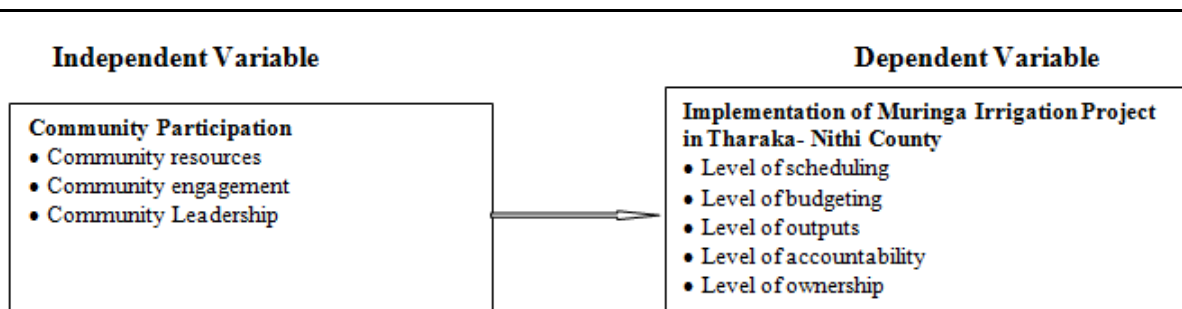
Community Participation has been assessed using different aspects related to attitudes, skills, resources and assets, abilities, opportunities, leadership, technologies, partnerships, participation, coordination and awareness and the results were inconclusive (Khosravi et al., 2015; Bennett et al., 2012; Koutra, 2007). Laverack (2006) explores Community Participation as the process that boosts assets accumulation for community to draw upon in order to develop their livelihoods. Timbuleng (2011) conceptualizes Community Participation in terms of the abilities, attitudes, skills, and resources owned by the community for improving their socioeconomic well-being. However, this study perceives Community Participation as a concept of wider range of community resources, community leadership and community engagement. Community Participation is perceived as a critical part towards effective implementation of a community development project. An evaluation study on the performance of fishery-processing empowerment project in Indonesia revealed that execution and utilization of empowerment programmes can lead to increase in the production capacity of the recipients (Swastawati et al., 2020). Another study by Hidayati et al. (2018) on the impact of women's empowerment through Corporate Social Responsibility programmes in Indonesia found that community involvement strengthened implementation process leading to better results. While projects are endeavors designed to produce set of outcomes within planned and constraining cost and budget (Nagesh and Thomas, 2015), not all programmes live to realize such ends. Manusawai et al. (2020) did a study to determine and analyze the degree of community participation in the community nursery program in Indonesia and the results suggested that involvement of community leaders played an important role in motivating the community to actively age in the community development program. Hermawan and Hutagalung (2020) conducted a related qualitative to establish factors that determine the success of participation in government ran programmes in Indonesia and they concluded that conditions of community participation were driven by factors such as trust, opportunity, ability to participate and willingness to participate. Another study to examine the perceptions and participation in community resources and leadership in South Africa by Majee et al. (2020) concluded that participation in community leadership roles was strongly related to perceptions of how important the provision of key resources at the local level contributes to their future community. However, these studies were limited in their qualitative methodologies. Instead, the current study used comprehensive methodologies that triangulate both qualitative and quantitative strategies to inquiry for enhanced validity.

4. THEORETICAL FRAMEWORK

This study was guided by the participatory theory of development and supported by system theory of organization. participatory theory of development or commonly known as popular participation states that community and societies have got the appropriate capacities to make decisions in solving problems which undermine their socio-economic transformation and prosperity (Doll, 2010). Thus participatory theory of development emphasizes on creating favorable and people centered approaches towards participatory community development (Syokau and Strathdee, 2010). The participatory development coordination of peoples` effort in taking initiatives by themselves and empowering into self-sustenance. Participatory theory of development linked with the predictor variable as it guided in the arguments regarding the influence of community capacities (resources, engagement and leadership) on the implementation of Muringa Irrigation Project in Tharaka-Nithi County. System theory of organization positions that organizations consist of interrelated and interdependent components operating in a coordinated and integrated mode while flexibly adapting to the changing environment so as to achieve a common goal (Ahrne, 1994). System theory of organization stresses on the need to involve and coordinate all the relevant parties in a project endeavor for greater results (PMI, 2013). System theory of organizing was used to argue that successful projects are implemented flexibly while adapting to the dynamic environment.

5. CONCEPTUAL FRAMEWORK

Figure 1 shows the flow of research variables on the influence of Community Participation on implementation of Muringa Irrigation Project in Tharaka-Nithi County.



6. METHODOLOGY

Correlational survey design was used in carrying out the study. The target population was 150 comprising of 141 leaders of farmer-groups and 9 members of the technical management committee of the Muringa Irrigation Project. A sample of 109 was selected using the Krejcie and Morgan table of sample determination. Proportionate stratified random sampling method was used to select 102 leaders of farmer-groups and 7 project management committee members. Questionnaires and key informant interviews were the data collection tools. Pilot study was conducted using a sample 10% of the actual study. Reliability of the questionnaire was 0.8 and was ascertained using Cronbach’s coefficient at the acceptable levels of 0.7. Quantitative data was analyzed using descriptive and inferential statistics. Qualitative data was analyzed using content analysis. The relationship between variables were tested using Pearson Product Moment Correlational Coefficient. Regression analysis was used to test the fitness of the model in predicting the dependent variable. Hypothesis was tested using Fisher (F) test at 95% confidence level.

Model: $Y = \beta_0 + \beta_1 X_1 + \epsilon$, Where: Y= Implementation of Muringa irrigation project, X_1 = Community Participation, β_0 = constant, β_1 = beta coefficient for X_1 , ϵ = error term

The null hypothesis (H_0) stated that there is no significant relationship between community participation and implementation of Muringa irrigation project. The alternate hypothesis (H_A) stated that there is significant relationship between community participation and implementation of Muringa irrigation project

7. RESULTS

The relationship between community participation and implementation of Muringa irrigation project was determined through Pearson’s Correlation Analysis and the resultant statistics are shown in Table 1

Table1. Correlation between community participation and implementation of Muringa irrigation project

		Community Participation
Implementation of Muringa Irrigation project	Pearson Correlation	0.82
	Sig. (2-tailed)	0.00
	n	88

The data in Table 1 shows that community participation had very strong positive relationship with Implementation of Muringa Irrigation project for coefficient of correlation $r = 0.82$ at 95% confidence interval. Thus, the null hypothesis (H_0) was rejected and conclude the alternate hypothesis that there exists significant relationship between community participation and implementation of Muringa irrigation project in Embu County, Kenya. The results from the regression of implementation of Muringa irrigation project and community participation are presented in Table 2.

Table2. Regression of implementation of Muringa irrigation project and community participation

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	00.82 ^a	0.675	0.67	0.15	0.67	179	1	86	0.00
ANOVA									
Mode		Sum of Squares	df	Mean Square	F	Sig.			
1	Regression	3.83	1	3.83	179	0.00 ^b			
	Residual	1.83	86	0.02					
	Total	5.66	87						
Coefficients^a									
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.			
		B	Std. Error	Beta					
1	(Constant	1.64	0.20		8.38	0.00			
	Community participation	0.62	0.05	0.82	13.4	0.00			
a. Dependent Variable: Implementation of Muringa irrigation project									
b. Predictor variables: (Constant), Community participation									

The findings in Table indicates that that community participation had statistically significant relationship with the Implementation of Muringa irrigation project at $F(1,86) = 179$ and for $p=0.00 < 0.05$. Community participation accounted for 67.5% variation of implementation of Muringa irrigation project (for R Square = 0.675). The balance of 32.5% contributed by external factors. Based on the ANOVA data, the model was statistically fit as indicated by $F = 179$ for $p=0.00$. The resolved model is

$$Y = 1.64 + 0.62X_1 + \varepsilon \text{ whereby,}$$

Y= Implementation of Muringa irrigation project

X_1 = Community Participation

β_0 = constant, B_1 = beta coefficient for X_1 , ε = error term

8. DISCUSSIONS

The findings from the inferential statistics showed that community participation has statistically significant influence on implementation of Muringa irrigation project. This finding is supported by Muniu et al. (2017) that community participation had significant influence on resource mobilization and sustainability of community water projects. Further, Omondi et al. (2020) supports that community engagement contributes to performance and sustainability of water projects. Effective community leadership boosts community engagement, education and awareness which enhances community preparedness to resolving own problems thus promoting effective and sustainable implementation of project. Other related empirical findings were done by Nancy (2018), Mahanani and Chotib (2018), Redondo- Sam (2016), Manusawai et al. (2020), Mashayamombe and Hofisi (2016) and Jelili et al., (2020). The findings are theoretically supported by the theory of participatory development in that effective coordination of community effort and empowering them led to successful deliverables. Equally, the finding rhymes with system theory of organization which asserts that responsive project are those which are adaptable to the environment in which stakeholders operate.

9. CONCLUSION AND RECOMMENDATION

The study sought to examine the extent to which the community participation influences implementation of Muringa Irrigation Project in Tharaka-Nithi County. The results from the correlation and regression analysis revealed that community participation has significant influence

and a good predictor of implementation of Muringa Irrigation Project in Tharaka-Nithi County. Thus the conclusion that community participation is a critical factor to consider for successful implementation of project.

Therefore, planners and designers of community development projects should engage the local community by considering their capacities and resources so as to build some sense of ownership for successful implementation of projects. It is important for the government to institute guidelines for public and community involvement in development projects. The guidelines should outline the frameworks for engagement so as to promote equity and fairness in local development projects.

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