FARMER PARTICIPATION IN PROJECT FORMULATION AND SUSTAINABILITY OF SMALLHOLDER IRRIGATION SCHEMES IN BUSIA COUNTY, KENYA

Mr. Ismael O.Oduor, Professor Charles Rambo, Dr. Raphael O. Nyonje
University of Nairobi, **KENYA**

ABSTRACT

In Kenya sustainability of smallholder irrigation schemes is low and hence the need to examine the extent to which farmer participation in project identification influence sustainability of smallholder irrigation schemes in Busia County, Kenya. If this is determined and addressed then plans to achieve 300,000ha of land under irrigation by 2030 may succeed. The objective of the study was to determine the extend farmer participation in project formulation influence sustainability of smallholder irrigation schemes in Busia County, Kenya. This study is grounded in citizen empowerment theory and guided by pragmatism paradigm. The study adopted descriptive cross sectional survey research design and correlation research design. A sample of 300 was selected using Cochran's formulae from 1,371 farmers spread out in 8 smallholder irrigation schemes and 14 project staff through using the censors approach to arrive at a sample size of 314. Quantitative data was collected using questionnaires and analyzed descriptively and inferentially while qualitative data was gathered using interview guide, observation schedule and documents analysis using patterns features and themes. Descriptive analyses used were arithmetic means and standard deviations and inferential statistics such as Pearson's Product Moment Correlation (r) and regression analysis (R^2) were used. *F*-test was used to test hypotheses that farmer participation in project identification does not have significant influence on sustainability of smallholder irrigation schemes. Analysis showed that r = 0.385, F (1,272) = 46.5, R^2 = 0.1449 at p =0.01 < 0.05, H_{01} was rejected and it was concluded that farmer participation in project identification has influence on sustainability of smallholder irrigation schemes. Analysis also showed that r = 0.327, F (1,272) = 32.53, R^2 = 0.1068 at p = 0.01 < 0.05, H_0 was rejected and it was concluded that farmer participation in project planning has influence on sustainability of smallholder irrigation schemes. It is recommended that extensive community mobilization be undertaken to ensure increased farmer participation in feasibility study to inform selection and authorization of projects. It is recommended that farmers be empowered for enhanced information dissemination for decision making in order to inform their participation in activity scheduling and project approval.

Keywords: Farmer participation, Project formulation, Project identification, Project planning, Sustainability of irrigation schemes.

INTRODUCTION

Before the 1970s, most state and development agencies delivered community projects through top down processes. This approach to development was progressively challenged because it did not address the underlying causes of low sustainability of community projects (Pennington, 2004) since it was initially thought that project beneficiaries, were unable to decide what was appropriate and therefore not allowed to identify their own needs (Mulwa, 2008). This externally imposed and expert-oriented approach to project formulation was common until the late 1980s and early 1990s, when state agencies and development partners

started adopting participatory methodologies as alternative strategies to project formulation (Kurt and Warren 1989; Elaine and Sundeep, 2007) because failure of such projects led to a shift in interest among policy makers and academicians towards beneficiary participation. This shift was (and still is) based on the maxim that community projects are people centered and not process oriented as (Kurt and Warren, 1989) stated that such unsuccessful initiatives were (and still are) as a result of limited beneficiary participation. That is why MWI, (2003) argued that adoption of participatory approaches in project formulation is the basis of farmer participation.

Farmer involvement in project formulation ensures that beneficiaries' needs are incorporated into project design. Based on this understanding, International Water Management Institute, (2004); Afzal and Barbhuiya, (2011) reported an increase in area of land under irrigation in smallholder irrigation schemes in Bangladesh, China, India, Indonesia, Pakistan and Vietnam whose combined total acreage account for over 51 percent of all irrigated land in the whole world. Similarly, in the Latin Americas and the Philippines, National Irrigation Administration Consultancy, (1993); Sam-Amoa and Gowing, (2001); Salas and Wilson, (2004); Svendsen, and Huppert, (2003) reported that farmer participation resulted in better irrigation systems management while (Ghosh and Kumar, 2012) observed that successful transfer of management responsibilities by government agencies to smallholder irrigation farmer groups in the schemes known as Water Users Associations in Ghana led to high crop yields. In Zimbabwe, farmer participation was viewed as an avenue through which challenges that hindered project planning and design were addressed (Chifamba, Nyanga, and Gukurume, 2013). Similarly, policy makers in Ethiopia identified farmer participation as a means through which smallholder irrigation schemes were made sustainable (Wotie and Hanaraj, 2013). Project formulation is therefore a means of solving identified problems and it entails project identification and project planning. This means that farmer participation in project formulation has influence on sustainability of smallholder irrigation schemes.

In Kenya however, although participatory approaches have extensively been used in project formulation since the mid-1980s, sustainability of smallholder irrigation schemes has remained low. For instance out of a total national irrigation potential of 1,341,900ha spread out in 3,600 government of Kenya funded smallholder irrigation schemes, mere 161,840ha or 12% of the irrigation potential was exploited (MWI, 2012). Similarly, County Government of Busia, (2015) reported that in the eight (8) Exchequer funded smallholder irrigation schemes in Busia County, Kenya, only 904ha out of combined total 15,600ha irrigation potential was exploited. Low level of exploitation of irrigation potential notwithstanding, Ministry of National Planning and Development, (2007) cited in its Vision 2030 report that farmer participation is the main strategy through which the national irrigation target of 300,000ha would be achieved. This means that policy makers and project designers anticipate increased area of land under irrigation through among other means, farmer participation in project formulation.

Research objectives

The study aimed to achieve the following research objectives:

i. To establish the level at which farmer participation in project identification influence sustainability of smallholder irrigation schemes in Busia County, Kenya.

ii. To determine how farmer participation in project planning influence sustainability of smallholder irrigation schemes in Busia County, Kenya.

Research Hypotheses

The study tested the following hypotheses:

i. **H_1**: Farmer participation in project identification has a significant influence on sustainability of smallholder irrigation schemes.

ii. **H_1**: Farmer participation in project planning has a significant influence on sustainability of smallholder irrigation schemes.

LITERATURE REVIEW

Theoretical and empirical literature related to the study was reviewed based on the concept of farmer participation in project formulation and sustainability of smallholder irrigation schemes. The concepts formulate mean to demonstrate how solutions to identified problems were derived. Hornby, (2010) visualize the concept *formulate* as an expression of a formula that clearly and precisely explains rules followed in solving an identified problem. In this study, project formulation refers to both project identification and project planning. The study therefore investigated how farmer participation in project identification and planning has influence on sustainability of smallholder irrigation schemes in Busia County Kenya.

Sustainability of smallholder irrigation schemes

The concept *'sustainability'* is defined variously by different organizations. The World Commission on Environment and Sustainable Development, (1987) defined sustainability as development which meets the needs of the present without compromising the ability of future generations to meet their own needs. Nowak, Stein, Randler, Greenfield, Comas, Carr, and Alig, (2010) conceptualized it as a social and environmental practice that protects and enhance human and natural resources needed by future generations to enjoy quality of life equal to or greater than that of the present generation. Rotary International, (2014) similarly defined sustainability as the provision of long-term solutions to community needs that project beneficiaries can maintain long after external funding is over. Based on these conceptual thoughts, irrigation schemes are sustainable when farmers create sense of ownership due to increased area under irrigation (MWI, 2003). In this study, sustainability of smallholder irrigation scheme was depended variable that refers to increases in area under irrigation and sense of project ownership.

Farmer participation in project identification and sustainability of smallholder irrigation schemes

Farmer participation in project identification is their involvement in its conception and subsequent selection from among alternatives and thereafter determination through authorization. Hornby, (2010) defined identification as the recognition that something exists while (New York State Office for Technology, 2003) conceived participation in project identification as a shared acknowledgement of an existing problem that needs to be addressed through an initiative. Munns and Bjeirmi, (1996) on their part envisioned it as the creation of a project idea and beneficiary involvement in its feasibility, selection and authorization. This means that farmer participation in project identification entails their involvement in project feasibility, selection and finally its authorization. In this study farmer participation in project identification was independent variable that refer to their involvement in feasibility study, its selection from among alternatives and thereafter authorization.

Scholars and policy makers agree that farmer participation in project identification influence sustainability of smallholder irrigation schemes. Finsterbusch and Warren, (1989) stated that

farmer participation in project identification allows change to happen instead of influencing it externally. On that basis, Wadajo, Serbeh-Yiadom and Asfaw, (2014) adopted descriptive survey design and cluster sampling technique to randomly select 400 respondents, used questionnaires and interview schedules to determine factors that influence beneficiary participation in community development projects in Oromia Ethiopia. In this study, they showed that 71.5% of farmers who were not involved in feasibility study and project selection and therefore did not have sense of ownership. This finding shows that sense of project ownership has been tested and therefore is a good measure of sustainability. It further means that when farmers participate in feasibility study and project selection, their action creates in them sense of ownership while non involvement, results in the absence of sense of ownership.

Nhundu, Mushunje, Zhou, and Aghdasi, (2015) supported this finding while using cross-sectional survey research design and a sample of 225 smallholder irrigation farmers in Zimbabwe to establish that 78% of respondents involved in feasibility study and project selection expressed sense of ownership compared to 22% who were not involved. Marks, Komives, and Davis, (2014) concurred when they too demonstrated that when project beneficiaries are not involved in project selection, chances are that sustainability of a project is low. These results confirm that farmers' involvement in feasibility study and project selection creates sense of ownership. Nhundu, Mushunje, Zhou, and Aghdasi, (2015) used cross-sectional survey design while (Wadajo,Serbeh-Yiadom and Asfaw, 2014) adopted descriptive survey design and got similar results. However, despite similarity in findings, the literature reviewed did not show the level at which farmer participation in project feasibility study and project selection creates sense of ownership in smallholder irrigation schemes. The unavailability of this knowledge is a gap that the study sought to establish by adopting descriptive cross sectional survey research design and correlation research designs.

Participation in project authorization confirms farmers' preference for the identified project. MoWI, (2003) acknowledged that Memorandum of Understanding between the project manager and irrigation farmers is the evidence of project authorization whereby the Exchequer commits up to 90% of total cost of the project while famers provide at least 10% of the total cost through their labor contribution, locally available construction materials and own cash. Similarly, Denison and Manona, (2007) acknowledged that project authorization is the evidence of farmers commitment. Based on that understanding, Nkambule and Dlamini (2013) used descriptive survey design in Maplotini irrigation scheme in Swaziland to show that farmers who participated in project authorization exhibited sense of ownership while those who did not had no sense of ownership. ADB (2003) also concurred when it established that farmers who participated in project authorization expressed sense of ownership as compared to those who did not participate. This means that sense of project ownership is a sign of commitment that is expressed through project authorization.

Kolavalli and Kerr (2002) however disagreed with these findings when they showed that although farmer participation in project identification is a bottom up approach, the actual process of approval is mainly top down because feasibility study and criteria for project selection is a technical undertaking that reduce farmers' involvement in authorization to a mere rubber stamping exercise that cannot necessarily guarantee any sense of ownership. This means that farmer involvement in project authorization may not necessarily create sense of ownership. Denison and Manona, (2007); Nkambule and Dlamini (2013) used descriptive survey design, and their results were similar. Their finding was however different from what Kolavalli and Kerr (2002) found out while using case study. Despite the differences in

research design used and findings, the extent to which farmer participation in project authorization influence sustainability of smallholder irrigation schemes was not known and therefore remains a knowledge gap. This study adopted descriptive cross sectional survey research design and correlation research designs to establish the extent of this influence.

Farmer participation in project planning and sustainability of smallholder irrigation schemes

Farmer participation in project planning is the kind of planning where farmers' views are incorporated into the planning process. Hornby, (2010) conceived planning as the things one intends to do to achieve set objectives. Based on this understanding, the Government of Serbia, (2011) conceptualized farmer participation in project planning as a process in which they are involved in setting project objectives and thereafter proceed to achieve them while (Woltjer, 2000) defined it as a decision making process involving different stakeholders who jointly agree to achieve set objectives. Innes, (1996); Dietz, (1995) on their part conceptualized farmer participation in project planning as a problem solving initiative that is intended to achieve set of outcomes that are binding to some upon others. In this study farmer participation in project planning was independent variable that refers to involvement of farmers in scheduling project activities and disseminating them for approval.

That participation of farmers in project planning affords them opportunity for involvement in the development of implementation plans and disseminating for approval is quite clear. That is why Ondrik, (2012) referred to this type of planning as a way in which project managers agrees with beneficiaries on how to allocate resources for the project implementation process. On that basis therefore, Wandera, Naku and Afrane (2013) undertook a study on the theoretical knowledge of project planning and implementation in Asotwe and Ejisu projects in Ghana in which they used systematic random sampling technique to select 156 farmers from a sample frame of 3,780, used questionnaires and interview schedules to gather data that was analyzed both qualitatively and quantitatively to show that 19% of respondents involved in project scheduling in Asotwe project had sense of ownership compared to 81% who did not participate. Similarly, at Ejisu project 78% of respondents involved in scheduling of project activities had sense of ownership compared to 22% who were not involved. This means that fewer farmers in Asotwe project were involved in project scheduling as compared to those in Ejisu project, with the implication that the more they get involved in scheduling of activities then the higher is the level of sustainability of smallholder irrigation schemes. Wodajo, Serbeh-Yiadom and Asfaw, (2014) also found similar results.

Koopman, Kweka, Wangwe, and Mboya, (2001), however disagreed with this finding when they used case study to demonstrate that farmer participation in scheduling of project activities did not influence sense of project ownership. Wandera, Naku and Afrane, (2013); Wodajo, Serbeh-Yiadom and Asfaw, (2014) used descriptive survey design and systematic sampling and cluster sampling technique respectively and got similar results while (Koopman, *et al* 2001) adopted case study and found different results. However, despite differences in finding, these studies do not demonstrate the extent to which farmers' participation in project scheduling influence sustainability of smallholder irrigation schemes and therefore the unavailability of this knowledge was a gap that required further investigations. This research adopted descriptive cross sectional survey research design and correlation research designs to determine how farmer participation in project planning influence sustainability of smallholder irrigation schemes in Busia County, Kenya.

Information dissemination during project planning illustrates how scheduled project activities are effectively communicated. Fisher and Urich (1999) used case study to determine influence of information sharing in Bohol-Cebu water project and went on to show that 89% of farmers believed that information dissemination during project planning has influence on sense of ownership while 11% thought otherwise. This finding agrees with the World Bank, (1993) research study in which 92% of respondents agreed that information dissemination has influence on sense of ownership. Lee-Kelly and Sankey, (2008) however disagreed with this result when they showed that information dissemination only reduced decision making time rather than create sense of ownership. While Fisher and Urich (1999) used case studies, Lee-Kelly and Sankey, (2008) and Wotie and Hanaraj (2013) used descriptive survey and causal comparative research designs respectively yet their findings are dissimilar. Despite divergence in research finding, these studies do not show how information dissemination at planning phase influence sense of ownership. The unavailability of this knowledge is a gap that required further investigations. This study used descriptive cross sectional survey research design and correlation research designs to determine how information dissemination influence sustainability of smallholder irrigation schemes.

Project plan is consented to when scheduled activities secure concurrence of all the key stakeholders. MacCallum, (2008) conceptualized farmer participation in project plan approval as a declaration that the plan is accepted and farmer participation can be relied upon. Based on this understanding, Kalkheili, and Zamani, (2008) showed that more land was put under irrigation when the project managers secured farmers' approval prior to project implementation rather than when he didn't. Similarly, Muriungi (2015) while investigating the role of project beneficiaries in participatory Monitoring and Evaluation in Ewaso Ng'iro North Development Authority funded projects in Kenya used descriptive survey design, systematic sampling technique to select a sample of 161 and showed that beneficiary's plan approval created sense of ownership. ADB, (2003) similarly agreed when it established that farmers' involvement in project plan approval has influence on their willingness to pay for irrigation water by 1.5 times more and ultimately increase in area under irrigation. This means that when project managers involve farmers in plan approval, increases their sense of ownership which leads to increase in area under irrigation.

Studies reviewed showed that farmer participation in project plan approval has influence on sense of responsibility which further leads to increase in irrigated land. While ADB (2003) adopted case study, Kalkheili, and Zamani, (2008); Muriungi (2015) used descriptive survey design but got similar results. However, despite this similarity, the extent farmer participation in project plan approval influence indicators of sustainability of smallholder irrigation schemes was not established and therefore knowledge gap that required further investigations. In order to address this gap, this study adopted descriptive cross sectional survey research design and correlation research designs to determine this knowledge.

The study was grounded in citizen empowerment theory propounded by Burns, Hambleton, and Hoggett (1994) that has found extensive use by theoretical and research experts in arguing the inadequacies of the ladder of citizen participation theory in which (Arnstein, 1969) shaped the thinking of academicians and policy-makers on how participation is generally conceived. The philosophical underpinning of this theory is that farmer participation in project formulation elaborates into different typologies of empowerment for which farmer participation in project identification is evidenced through decisions made during feasibility study, selection and project authorization while (MacCallum, 2008) argued that farmer participation in project planning involves project activity scheduling, information

dissemination and project plan a approval. As a basis for empowerment, Vroom (1964) argued in his Expectancy theory that people believe their effort is related their anticipate rewards while (Porter and Lawler, 1968) held the view that such rewards may motivate individuals to improved performance. This means that farmer participation in project identification is based on farmers' future expected benefits generated by the project

That farmer participation in project planning is illustrated through planning theory. Faludi, (1982) however argued that several distinct planning theories broadly categorized as object-centered, control-centered and decision-centered paradigms do exist. MacCallum, (2008) further opined that out of these categories, farmer participation in project planning is best illustrated by decision-centered paradigm which shifts planning responsibilities from the project designers to a framework whereby concurrence is secured between the manager and the beneficiaries during the planning process. That is why Government of Serbia, (2011) argued that commitment in planning is best demonstrated when beneficiaries approve project plans while (Fisher and Urich, 1999) opined that this initiative is effective if it is based on information dissemination. From this argument therefore, Bold, Quisumbing and Gillespie (2013) suggested that empowerment is necessary because it enables farmers to develop intervention pathways through decision making that influence sustainability of smallholder irrigation schemes. This discussion illustrates how farmer participation in project formulation based on citizen empowerment theory forms the basis upon which expectancy theory and planning theory supports sustainability of smallholder irrigation schemes.

METHODOLOGY

The study adopted pragmatism research paradigm because of its flexibility in interrogating multiple realities of the phenomena under study making it easier for the researcher to triangulate data from different sources. The research design adopted was descriptive cross sectional survey research design and correlation research design. Descriptive survey design was suitable for the study because the researcher was interested in describing multiple realities of farmer participation in project identification and farmer participation in project planning by studying a large group of farmers drawn from eight (8) smallholder irrigation schemes spread out across Busia County, Kenya. Correlation research design was suitable for the study because the researcher was interested in establishing the strength and dependence of sustainability of smallholder irrigation schemes on both farmer participation in project identification and also on farmer participation in project planning.

This study had a target population of 1,385 elements made up of two sub-sets namely, the first sub-set of 1,371 farmers drawn from eight (8) smallholder irrigation schemes and the second subset of 14 technical staff drawn from the Department of Irrigation, in Busia County, Kenya. The characteristics of smallholder irrigation farmers included presence of irrigation components such as open earth or concrete lined water canals, PVC or GI pipelines, masonry storage water tanks, hose pipes, risers, overhead sprinklers, open furrows, earth basins, hydrants or any other hydraulic structure in the farmers' fields that is used for abstracting, conveying, distributing and applying irrigation water on crops. The second sub-set of the population under study was the technical staffs of the Department of Irrigation who were assigned to plan design and implement smallholder irrigation projects in Busia County, Kenya. Their characteristics were their professional qualifications which included; Diploma, Bachelors or Master of Science Degree in Agricultural, Hydrology, Civil and Water Engineering or any other related discipline.

Cochran's formula for sample size determination was used to get the desired sample size of the first sub-set. The researcher set the alpha level at 0.05, acceptable error at 0 5%, and the standard deviation at 0.5. Cochran's formula for sample size determination used is outlined here below;

$$n_o = \frac{(Z)^2 * (p)(q)}{(d)^2}$$

Where Z = value for selected alpha = 0.025 in each tail = 1.96,
(p)(q) = estimate of variance = 0.25.
d = acceptable margin of error for the proportion being estimated = 0.05 (i.e. the error the researcher was willing to accept).

Therefore sample size, $n_0 = \frac{(1.96)(1.96)*(0.5)(0.5)}{(0.05)*(0.5)}$

$n_0 = 384$.
This means that for a sub-population of 1,371 smallholder irrigation farmers, the desired sample size was 384. However, Cochran, (1977) recommended that when the sample size exceeds 5% of the population under study (i.e. 1,500⋆0.05=84), the use of Cochran's correctional formula is necessary for calculating the final sample size. Cochran's correctional formula is given as;

$$n_1 = \frac{n_0}{(1+{}^{n_0}/_{population})}$$

Where n_1= corrected sample size,

$$n_1 = \frac{384}{(1 + {}^{384}/_{1371})}$$

$n_1 = 300$
Therefore the desired sample size for the study based on Cochran's correctional formula was 300. The sampling design of farmers in the (8) eight smallholder irrigation schemes from where the desired sample was drawn is as shown in the table 1.

Table 1: Sampling Design

S/no	Name of Irrigation scheme	No. of farmers in each scheme	Proportion of farmers in the study population	No. of farmers from the desired sample size
1.	Mabale Dynamic	148	0.108	32
2.	Maira/Mukemo	270	0.197	59
3.	Neela	206	0.151	45
4.	Ludacho	98	0.071	21
5.	Namalenga	143	0.104	31
6.	Samia Fruit	241	0.176	53
7.	Nandikinya	157	0.115	35
8.	Sisenye	108	0.079	24
Total		**1,371**	**1.000**	**300**

The second subset of 14 elements in the study population was sampled through censors approach. Mugenda and Mugenda, (2003) recommended the use of census approach when the total number of elements is less than 100 and characteristically diverse. The project manager and their teams were diverse in both their technical specialization and area of deployment to justify use of censors approach as a sampling technique.

Stability of the research instrument was undertaken by use of Cronbachs' alpha reliability coefficient in order to measure the interrelatedness of items in the questionnaire. George and Mallery, (2003) further suggested a rule of thumb that Conbrach's alpha reliability coefficient > 0 .9, is excellent, > 0.8 – is good, > 0.7 – is acceptable, > 0.6 – is questionable, > 0.5 – is poor, while < 0.5 – is unacceptable. They further suggested that Conbrach's alpha reliability coefficient of 0.8 and above is reasonable and consistent while a coefficient less than 0.5 is not consistent and therefore unacceptable. To determine Cronbachs' alpha reliability coefficient of the questionnaire, a total of 48 items were used to measure both the predictor and dependent variables in which 2 items produced a reliability coefficient less than 0.6 while the rest gave reliability coefficient above 0.7. The two items were revised prior to the main study and the measurement of the items used in the study produced Cronbach's alpha reliability coefficient in the main study is as shown in table 2.

Table 2: Conbrach's Alpha Reliability Coefficient

Variable	No. of cases	No of items	Reliability Coefficient
Farmer participation in project identification			
Feasibility study	274	4	0.842
Project selection	274	5	0.847
Project authorization	274	5	0.662
Composite for farmer participation in project identification	**274**	**14**	**0.780**
Farmer participation in project planning			
Activity scheduling	274	4	0.748
Information dissemination	274	5	0.872
Project plan approval	274	5	0.721
Composite for farmer participation in project planning	**274**	**14**	**0.783**
Sustainability of smallholder irrigation schemes	**273**	**20**	**0.789**
Composite Cronbach's (α) alpha reliability Coefficient	**274**	**48**	**0.784**

The items in the questionnaire produced composite Cronbach's alpha reliability coefficient of 0.784.This means that items in the research instrument were fairly homogeneous, reflected the same underlying construct(s) and therefore consistent.

Null hypothesis (H_0), that there is no significant influence of farmer participation in project identification on sustainability of smallholder irrigation schemes was tested and null hypothesis (H_0), that there is no significant influence of farmer participation in project planning on sustainability of smallholder irrigation schemes was also tested. Both hypotheses were tested at $\alpha = 0.05$ using *P*-value method and a criterion that null hypothesis not rejected if *P*-value is less than 0.05 or otherwise rejected.

RESULTS

General Information on the respondents

300 questionnaires were issued out for data collection out of which 274 were administered to give a return rate of 91.94%. The return rate was close to 94% that Adeniji, (2011) got while carrying out a study on the significance of participatory management on project execution through direct labour in Adamawa state projects. Nachmias and Nachmias, (2005) recommended that a return rate of over 75% is high enough for statistical generalizations. This means that 91.94% return rate in this study was reliable for statistical generalization on influence of farmer participation in project formulation and sustainability of smallholder

irrigation schemes in Busia County Kenya. The study found that distribution of subjects across different irrigation schemes was proportional to the strength of each scheme in the study population. Similar result was demonstrated by Ndou, (2012) while investigating NGOs and beneficiary participation in agricultural development projects in South Africa in which the sample size was distributed proportionately according to the strengths of each scheme within the study population.

The results indicated that, 148(54%) were females while 126(46%) were males. This means that the distribution of respondents by gender in the irrigation schemes was skewed towards the males. This meant that there were more females than males in the WUAs. The finding agrees with what Chifamba, Nyanga, and Gukurume (2013) in Zimbabwe established when they showed that females constituted 66% while males were 34% of the study population. This implies that sustainability of smallholder irrigation schemes relies more on female involvement. This observation further confirmed by one WUA leader from Mabale Dynamic irrigation scheme, when he stated that,

> *".....the allocation of land for irrigation to women creates incentive for their labour contributions and hence their active participation in WUA activities...."*

The study results indicated that farmers aged below 50 years constituted 188(68.61%) while those above 50years were 86(31.39%) with a mean of age of 42.74 years. This distribution showed that respondents' ages were skewed towards below 50 years. This finding is similar to what Chifamba, Nyanga, and Gukurume (2013) established when they showed that 70% of farmers in Nyanyandzi irrigation schemes in Zimbabwe were below 50 years while those above 51 years were 30%. This means that since irrigation is labour intensive, it mainly relies on participation of elderly whose labour contribution may lead to low sustainability. However this view notwithstanding, interviews revealed that although majority of famers were below 50 years, majority of males were engaged in other alternative forms of income generation as one farmer from Mabale Dynamic Irrigation scheme ably put it,

> *".....we do not entirely rely on irrigation since the majority of the males in each households engages in other off-farm economic activities such as sand harvesting, fishing and boda boda transport businesses, leaving behind their women to mostly take care of irrigation....."*

This partly explains why more women were involvement in irrigation than their male counterparts. This means that the partial involvement of male farmers in project control may not guarantee sustainability of smallholder irrigation schemes.

The study results indicated the distribution of farmers by level of education that 243(88.8%) had at least secondary education while 31(11.2%) had only formal education. This means that those with at least secondary education were more than those with formal education. This finding diagrees with what Chifamba, Nyanga, and Gukurume (2013) found out when they showed that farmers with formal education were 86%while those without formal education were only14%. The level of farmers' education is essential in decision making in irrigation schemes. This was evident when one farmer with secondary education remarked that,

> *".....unless we get involved in monitoring the level of each individual farmer's water use and ensuring equity in its distribution, we may not succeed in ensuring an increase in the area of land this scheme puts under irrigation……."*

This means that farmers' level of education has influence on sustainability of smallholder irrigation schemes.

The study findings showed that the minimum area of land put under irrigation was 0.01 while the maximum acreage was 21acres with a mean of 1.178 and standard deviation of 1.662 acres. The results further showed that 200(73%) respondents irrigated less than 1.0 acres while 74(27%) irrigated more than 1.0 acre. This means that the majority of the farmers cultivated small uneconomical units of land that did not effectively exploit the irrigation potential. This finding disagrees with what Khalkheili and Zamani (2008) established when they showed that farmers in Doroodzan Dam Irrigation Network in Fars Province, Iran cultivated a minimum of 1.25 and a maximum of 37.5 acres with a mean of 8.63 acres and standard deviation of 4.5acres. By comparison, it implies that more land was put under irrigation in Fars Province, Iran than in Busia County, Kenya. This means that in Fars Province Iran, irrigation schemes were more sustainable as compared to schemes in Busia County, Kenya.

Study findings showed that the mean land size put under rain-fed farming was 1.357 acres with a standard deviation of 1.963 acres. By comparison, 167(60.9%) respondents cultivated less than 1.0acre compared to 107(39.1%) who cultivated more than 1.0 acre of land under rain-fed farming. It was further confirmed that farmers put more of land under rain-fed farming at 1.357acres compared to 1.178 acres under irrigation per household. This implies that farmers depend more on rain-fed farming than irrigation. This finding however differs from what Khalkheili and Zamani (2008) found out when they showed that farmers in Doroodzan Dam Irrigation Network cultivated a mean 1.63 acres under rain-fed farming per household compared to 13.2acres under irrigation. This shows that in Fars Province Iran, farmers almost entirely rely on irrigation farmers in Busia County, Kenya rely more on rain-fed farming. This means that by comparison, Doroodzan Dam Irrigation Network was more sustainable as compared to smallholder irrigation schemes in Busia County, Kenya. This observation was explained through interviews when one farmer from Mabale Dynamic irrigation scheme noted that,

"…while ordinarily it costs almost nothing to grow crops with rain water; to the contrary
application of irrigation water costs money through its abstraction, distribution, allocation
and application in the form of operations and maintenance cost which must be paid by water
users before crops irrigated……."

This means that more land was put under rain-fed farming as compared to under irrigation in schemes in Busia County due to costs associated with irrigation therefore it explains why sustainability of smallholder irrigation schemes was low.

The study results showed that respondents' experience in years of practiced irrigation was skewed toward less than 7 years with a mean score of 5.15 years and standard deviation of 4.435 years while the range was between 1-20 years. Document analysis for GIZ/KfW, (2016) feasibility study report recommendation for the proposed Nzoia River Watershed Management project in Kakamega, Bungoma and Siaya Counties showed that Internal Rate of Return for high value irrigated horticultural crops was seven (7) years. This means that irrigation schemes in Busia County Kenya are barely sustainable. These findings differ from what Khalkheili and Zamani (2008) found when they showed that farmers in Doroodzan Dam Irrigation Network, Iran had a mean practiced irrigation experience of 23.2 years and a range of 2 to 70 years. This further confirms that sustainability of smallholder irrigation schemes is associated with years of practiced experience in irrigation. This observation was supported by a WUA member from Maira Mukemo when he stated that,

> *".....the years one spends practicing irrigation is experience which enables one to venture more into irrigation the evidence of which is expansion of area of land put under irrigation per household...."*

This means that the more the years farmers spend practicing irrigation the higher the sustainability of smallholder irrigation scheme.

Sustainability of smallholder irrigation schemes

Indicators of sustainability of smallholder irrigation schemes were; area of land put under irrigation and sense of project ownership. These two sub-variables were tested using 20 items in the research instruments and results of the responses are summarized shown in table 3.

Table 3: Sustainability of smallholder irrigation schemes

Sub-variables	n	SA 5	A 4	N 3	D 2	SD 1	Mean	Std. Dev
Area under irrigation	274	61 (22.26%)	97 (35.40%)	36 (13.14%)	45 (16.35%)	35 (12.85%)	3.37	0.823
Sense of ownership	274	81 (29.42%)	86 (31.46%)	42 (15.33%)	39 (14.22%)	26 (9.56%)	3.57	0.776
Composite mean of sustainability of irrigation schemes	**274**	**71 (25.84%)**	**92 (33.43%)**	**37 (14.24%)**	**42 (15.29%)**	**30.5 (11.21%)**	**3.47**	**0.800**

Items that interrogated area of land under irrigation sought to determine whether irrigation resulted in increase in area of land under cultivation and results indicated that 61(22.26%) strongly agreed, 97(35.40%) agreed, 36(16.14%) were neutral, 45(16.35%) disagreed and 35(12.85%) strongly disagreed giving a mean score of 3.37 and standard deviation of 0.823. This meant that majority of the respondents were undecided whether or not irrigation increased area of land under cultivation. The items that interrogated sense of ownership examined whether irrigation created sense of project ownership and the results showed that 81(29.42%) of respondents strongly agreed, 86(31.46%) agreed, 42(15.33%) were neutral, 39(14.22%) disagreed and 26(9.59%) strongly disagreed giving a mean score of 3.57 and standard deviation of 0.776. This meant that majority believed irrigation created sense of project ownership. The composite mean score for sustainability of smallholder irrigation scheme showed that 71(25.84%) respondents strongly agreed, 92(33.43%) agreed, 37(14.24%) were neutral, 42(15.29%) disagreed and 31(11.21%) strongly disagreed giving a mean score of 3.47 and standard deviation of 0.800. The results showed that majority of respondents were of the view that smallholder irrigation schemes in Busia County, Kenya were sustainable.

This analysis was confirmed through interviews when a farmer from Mabale Dynamic Irrigation scheme stated that,

> *".....our continued access to irrigation water makes a big difference between a good and poor harvest, the geographical location of an individuals' plot notwithstanding. This difference is observable through increased area under irrigation..."*

This means that farmers acknowledged that ones they have access to water, irrigation scheme schemes are sustainable. This observation supports a study by Olubode *et* al (2007) who

while assessing performance of 17 smallholder irrigation schemes for policy reforms in Lower Oshun Basin Lagos State, Nigeria, established that access to irrigation water increased area of land under irrigation. Despite this perception, CGB, (2017) report on Performance Contracting for 2016/2017 financial year, showed that only 904ha out of 15,900ha in the eight (8) smallholder irrigation schemes in Busia County was put under irrigation. This report therefore shows that the level of sustainability of smallholder irrigation schemes in Busia County was low and therefore contradicts the farmers' perception. The implication of this finding is that despite farmers' belief that their schemes are sustainable; the level of sustainability is actually quite low.

Farmer participation in identification and sustainability of smallholder irrigation schemes

Indicators of farmer participation in project identification were; feasibility study, project selection, and authorization which were tested using 15 items that are summarized as shown in table 4.

Table 4: Project identification on sustainability of smallholder irrigation schemes

Sub-variables	n	SA 5	A 4	N 3	D 2	SD 1	Mean	Std. Dev
Feasibility study	274	82 (29.78%)	106 (38.83%)	33 (11.9%)	25 (9.27%)	28 (10.22%)	3.71	0.638
Project selection	274	87 (31.97%)	120 (43.87%)	37 (13.43%)	20 (7.37%)	10 (3.36%)	3.93	0.814
Authorization	274	79 (28.98%)	101 (36.72%)	48 (17.45%)	34 (12.55%)	12 (4.31%)	3.65	0.729
Composite mean of participation in project identification	**274**	**83 (30.29%)**	**109 (39.78%)**	**39 (14.23%)**	**26 (9.49%)**	**17 (6.20%)**	**3.76**	**0.727**

The study sought to determine whether farmers participated in feasibility study and results showed that 82(29.78%) strongly agreed, 106(38.83%) agreed, 33(11.9%) were neutral, 25(9.27%) disagreed and 28(10.22%) strongly disagreed giving a mean score of 3.71 and standard deviation of 0.638. Their sense of ownership had a mean score of 3.57and standard deviation of 0.776. From decision point of view therefore majority of respondents participated in feasibility study and this created in them a sense of ownership. This means that farmer participation in feasibility study has influence on sense of ownership of smallholder irrigation schemes. This finding agrees with what Wadajo, Serbeh-Yiadom and Asfaw, (2014) found when they adopted descriptive survey design and cluster sampling technique to select a sample of 400 to determine that 71.2% of respondents who didn't participate in feasibility study never expressed sense of ownership. Interviews however revealed that farmer participation was only limited to provision of data for analysis. These sentiments were captured by a farmer from Maira Mukemo irrigation scheme when he remarked that,

".....our participation was only confined to a few of us who participated in the provision of information for the initial study. Although we did not understand most of what the experts were doing, they still insisted in involving us because they reckoned that our views on information gathered was critical for the project….".

This finding is consistent with observation by Nhundu *et* al, (2015) when they showed that although feasibility study is a technical undertaking that requires technical expertise, farmers' involvement was critical in securing project ownership. This means that although not all farmers participated in feasibility studies, involvement of those mobilized was altogether necessary in seeking their support.

The study further sought to determine whether farmers participated in project selection and results showed that 87(31.97%) strongly agreed, 120(43.87%) agreed, 37(13.43%) were neutral, 20(7.37%) disagreed and 10(3.36%) strongly disagreed giving a mean score of 3.93 and standard deviation of 0.814 while their sense of ownership had overall mean score of 3.57 and standard deviation of 0.776. From decision point of view, majority of farmers participated in project selection and it created sense of ownership. This means that farmer participation in project selection has influence on sense of ownership of smallholder irrigation schemes. This finding agree with what Nhundu, *et* al, (2015) found when they used cross-sectional survey design in a study with a sample size of 225 to show that 78% of those sampled did not participate in project selection and therefore expressed low sense of project ownership. Interviews revealed that farmers were mobilized according to the Smallholder Irrigation Development Programme and Smallholder Irrigation and Drainage Development guidelines although farmers' level of awareness during project identification was low yet it was this knowledge that was critical for their empowerment. This observation was confirmed by a farmer from Maira Mukemo who remarked that,

> *".....due to low levels of mobilization and subsequent awareness creation among the farmers, only a handful of us were involved in the selection of this project .....".*

This observation is consistent with findings by Marks, Komives, and Davis, (2014) that showed that empowered farmers influence decisions in project identification. This means that extensive farmer mobilization and subsequent empowerment is necessary for their participation in project selection.

The study also sought to determine whether farmers participated in project authorization and results showed that 79(28.98%) strongly agreed, 101(36.72%) agreed, 48(17.45%) were neutral, 34(12.55%) disagreed and 12(4.31%) strongly disagreed giving a mean score of 3.65 and standard deviation of 0.729. Their sense of ownership had overall mean score of 3.57 and standard deviation of 0.776. From decision point of view therefore majority of farmers participated in project authorization and this had influence on their sense of ownership. This means that farmer participation in project authorization has influence on sustainability of smallholder irrigation schemes. This finding agree with what Nkambule and Dlamini (2013) found out when they used descriptive survey design in Maplotini irrigation scheme in Swaziland to demonstrate that farmers who participate in project authorization exhibit sense of ownership compared to those who did not. This finding is supported by sentiments by a WUA leader from Mabale Dynamic Irrigation scheme, who stated that,

> *".....when the project team assured us that our views would form the basis for project authorization, I felt I had responsibility to fully participate....."*

This observation is consistent with what Wadajo, Serbeh-Yiadom and Asfaw, (2014) observed when they showed that beneficiary creation awareness enables farmers to make informed decisions. This means that creation of awareness at project identification stage offers farmers an opportunity to make informed decisions which they can identify with ultimately leading to sense of ownership.

Overally, farmer participation in project identification had a composite mean score of 83(30.29%) strongly agreed, 109(39.78%) who agreed, 39(14.23%) were neutral, 26(9.49%)

disagreed and 17(6.20%) strongly disagreed with a mean score of 3.76 and standard deviation of 0.630 while sustainability of smallholder irrigation schemes had a composite mean score of 3.47 and standard deviation of 0.800. These results showed that majority of the respondents participated in project identification and their participation led to sustainability of smallholder irrigation schemes. This means that farmer participation in project identification has influence on sustainability of smallholder irrigation schemes in Busia County, Kenya. Inferential statistical analysis showed that moderate positive correlation of 0.385 exists between farmer participation in project identification and sustainability of smallholder irrigation schemes while regression analysis indicated that 14.49 per cent in sustainability of smallholder irrigation schemes in Busia County is explained by farmer participation in project identification. Null hypothesis was rejected when F (1,272) = 46.5, at p =0.01 < 0.05 and it was concluded that farmer participation in project identification has significant influence on sustainability of smallholder irrigation schemes. This means that farmer participation in project identification has moderate influence on sustainability of smallholder irrigation schemes in Busia County.

Although study findings agree with what Wadajo, Serbeh-Yiadom and Asfaw, (2014); Nhundu *et* al (2015); Marks, Komives, Davis, (2014) and Nkambule and Dlamini (2013) established, it went further to demonstrate that a moderate positive correlation of 0.385 exist between farmer participation in project identification and also that 14.49 per cent in sustainability of smallholder irrigation schemes in Busia County is explained by farmer participation in project identification. Therefore, the knowledge gap which was the extent to which farmer participation in project identification influence sustainability of smallholder irrigation schemes was established as moderate making the finding confirmatory on relationships between the variables under investigation.

Farmer participation in project planning and sustainability of smallholder irrigation schemes

Indicators of farmer participation in project planning were; activity scheduling, information dissemination and plan approval. The sub-variables were analysed using data gathered by 15 items as summarized in table 5.

Table 5: Participation in planning and sustainability of smallholder irrigation schemes

Sub-variables	**n**	**SA 5**	**A 4**	**N 3**	**D 2**	**SD 1**	**Mean**	**Std. Dev**
Activity scheduling	274	71 (26.06 %)	109 (39.93 %)	40 (14.45 %)	34 (12.41 %)	20 (7.15%)	3.67	0.578
Information dissemination	274	81 (29.42 %)	113 (41.17 %)	48 (17.66 %)	28 (10.29 %)	4 (1.46 %)	3.899	0.801
Plan Approval	274	71 (26.06 %)	95 (34.67 %)	44 (15.77 %)	44 (16.06 %)	20 (7.45 %)	3.587	0.828
Composite mean of participation in project planning	274	74 (27.18 %)	106 (38.59 %)	44 (15.96 %)	35 (12.94 %)	15 (5.35 %)	3.719	0.736

The study sought to determine whether farmers participated in activity scheduling and results showed that 71(26.06%) strongly agreed, 109(39.93%) agreed, 40(14.45%) were neutral, 34(12.55%) disagreed and 20(7.15%) strongly disagreed giving a mean score of 3.67 and standard deviation of 0.578. their sense of ownership had an overall mean score of 3.57 and standard deviation of 0.776. From decision point of view majority of farmers participated in project scheduling and it had influence on their sense of ownership. This means that farmer participation in project approval has influence on sustainability of smallholder irrigation schemes in Busia County, Kenya. This finding agrees with what Wandera, Naku and Afrane (2013) demonstrated when they showed that farmer involvement in activity scheduling has influence on sustainability of smallholder irrigation schemes. This observation was further confirmed when a farmer from Mabale Dynamic irrigation scheme acknowledged that,

> *".....our limited understanding of project plans notwithstanding, the experts still consulted with us because they believed that our opinion was critical. Such consultations made us feel that our views on this project mattered a lot....."*

This observation was further confirmed by Ondrik, (2012) when he showed that extensive consultations with project beneficiaries enabled the project teams to secure the project. This means that although project planning is a technical undertaking, farmers' involvement is critical in legitimizing it ownership.

The study further sought to determine whether farmers participated in information dissemenination and results showed that 81(29.42%) strongly agreed, 113(41.17%) agreed, 48(17.66%) were neutral, 28(10.29%) disagreed and 4(1.46%) strongly disagreed giving a mean score of 3.899 and standard deviation of 0.801. Their sense of ownership had an overall mean score of 3.57 and standard deviation of 0.776. From decision point of view, majority of farmers participated in project information dissemination and it influenced on their sense of ownership. This means that farmer participation in information dissemenination has influence on sense of ownership. The finding disagrees with what Lee-Kelly and Sankey, (2008) established when they showed that information dissemination did not have influence on sense of ownership but instead only reduced decision making time in addition to building consensus when one farmer from Mabale Dynamic Irrigation scheme remarked that,

> *"....we were regularly briefed and consulted at individual level by members of the project team. Those interactions enhanced our trust in what they were planning although we hardly understood much....."*

This means that at planning phase, farmers were involved as individually and not as a WUA members and the engagement built trust in the planning process. This observation is supported by what McCallum, (2008) found when he showed that decision centred paradigm is a problem solving type of planning that is binding to some degree upon others and entails inclusiveness, reciprocity, and empowerment. This means that sustainability of smallholder irrigation schemes ensures that farmers are empowered through information dissemination.

The study sought to determine whether farmers participated in project approval and results showed that 71(26.06%) strongly agreed, 95(34.67%) agreed, 44(15.77%) were neutral, 44(15.77%) disagreed and 20(7.68%) strongly disagreed giving a mean score of 3.568 and standard deviation of 0.828 while sense of ownership had overall mean score of 3.57 and standard deviation of 0.776. From decision point of view, majority of farmers participated in project approval and it had influence on their sense of ownership. This means that farmer participation in project approval has influence on sustainability of smallholder irrigation schemes. This finding concurs with what ADB, (2003) demonstrated when it established that

farmer participation in project approval has influence on their willingness to pay for irrigation water by 1.5 times more. This observation was further confirmed through interviews when a farmer from Maira Mukemo stated that,

> *"....my participation in project approval was crucial because it enabled me to approve the project for implementation and later ensured my access to irrigation water, the result of which has been an increase in area under irrigation ....."*

This view is also supported by Muriungi (2015) who found out while investigating the role of project beneficiaries in participatory monitoring and evaluation in Ewaso Ng'iro North Development Authority funded projects in Kenya when he used descriptive survey design, and systematic sampling design to show that when beneficiaries approve a project it creates sense of ownership.

Overall, farmers participation in project planning had a composite of 74(27.18%) who strongly agreed, 106(38.59%) who agreed, 44(15.96%) were neutral, 35(12.94%) disagreed and 15(5.35%) strongly disagreed with a mean score of 3.719 and standard deviation of 0.736 while
sustainability of smallholder irrigation schemes had a composite mean of 3.47 and standard deviation of 0.800. These results showed that majority of farmers participated in project planning and their participation influenced sustainability of smallholder irrigation schemes in Busia County, Kenya. Inferential statistical analysis showed that a moderate positive correlation of 0.327 exists between farmer participation in project planning and sustainability of smallholder irrigation schemes while regression analysis showed that 10.68 per cent in sustainability of smallholder irrigation schemes is explained by farmer participation in project planning. Null hypothesis was rejected when F (1,272) = 32.53, at $p = 0.01 < 0.05$ and it was concluded that farmer participation in project planning has significant influence on sustainability of smallholder irrigation schemes. This means that farmer participation in has influence on sustainability of smallholder irrigation schemes in Busia County.

Although Wandera, Naku and Afrane (2013); Ondrik, (2012); McCallum, (2008); ADB, (2003); Muriungi (2015) agree with the study finding, Lee-Kelly and Sankey, (2008) disagreed when he showed that information dissemination did not have influence on sense of ownership. The divergence in findings of the literature reviewed notwithstanding, this study demonstrated that a moderate positive correlation of 0.327 exists between farmer participation in project planning and sustainability of smallholder irrigation schemes in Busia County and also that 10.68 per cent in sustainability of smallholder irrigation schemes is explained by farmer participation in project planning. In this study therefore the knowledge gap which was the extent to which farmer participation in project planning influence sustainability of smallholder irrigation schemes was established as moderate making this finding confirmatory on the relationship between variables under investigation.

CONCLUSION

In objective one, descriptive analysis showed that farmer participation in project identification has influence on sustainability of smallholder irrigation schemes. Inferential statistics indicated that a moderate positive correlation of 0.385 exists between farmer participation in project identification and sustainability of smallholder irrigation schemes while 14.49 per cent in sustainability of smallholder irrigation schemes in Busia County is explained by farmer participation in project identification. Null hypothesis, H_0 F (1,272) = 46.5, R^2 = 0.1449 at $p = 0.01 < 0.05$ was rejected and it was concluded that farmer participation in project identification has significant influence on sustainability of smallholder

irrigation schemes while document analysis revealed that only 904ha out of the 15,600ha total irrigation potential in schemes in Busia County or 5.8% of land is irrigated; meaning that the level of sustainability of smallholder irrigation schemes is very. Interviews revealed that a few farmers participated in feasibility study and their involvement was restricted mainly to the provision of data and in support for selection and authorization because the study was too technical for them to understand. It is therefore concluded that sustainability of smallholder irrigation schemes in Busia County, Kenya was low due to inadequate farmer empowerment and extensive participation in feasibility study, project selection and authorization.

In objective two, descriptive analysis showed that farmers participated in project planning and that their participation had influence on sustainability of smallholder irrigation schemes. Inferential analysis indicated that a moderate positive correlation of 0.327 exists between farmer participation in project planning and sustainability of smallholder irrigation schemes while 10.68 per cent in sustainability of smallholder irrigation schemes is explained by farmer participation in project planning. Null hypothesis, H_0 F (1,272) = 32.53, R^2 = 0.1068 at p = 0.01< 0.05 was rejected and it was concluded that farmer participation in project planning has significant influence on sustainability of smallholder irrigation schemes. Interviews however revealed that participation in project planning depended on the existence of WUA and its capacity to disseminate information to farmers. It also revealed that a few farmers were involved in planning and even those involved admitted that planning was complex for their understanding thereby reducing their involvement to only guaranteeing the Department of Irrigation their support through approval. It is therefore concluded that formation and empowerment of WUA prior to project planning be adopted in order to secure a wider support for a majority of farmers in order to enhance sustainability of smallholder irrigation schemes.

RECOMMENDATIONS

The study showed that project identification is a technical undertaking in which farmers' reduced to data provision and securing support for feasibility study, selection and ultimately project authorization. The study further confirmed that only a few farmers were empowered and subsequently involved in project identification the result of which was low sustainability of smallholder irrigation schemes in Busia County, Kenya. It is therefore recommended that prior to any feasibility study, extensive farmer mobilization, awareness creation and empowerment is critical. It was also demonstrated that the project managers involved farmers in project planning despite their limited knowledge in activity scheduling, information dissemination and securing project approval. Despite inadequate knowledge in planning their involvement was minimal since it was only restricted to those farmers who were initially mobilized. The study therefore established that farmer participation in project planning had low influence on sustainability of smallholder irrigation schemes in Busia County Kenya because their involvement was only restricted to few individual farmers. The study also established that during project formulation, farmers were mobilized according to the Smallholder Irrigation Development Programme and Smallholder Irrigation and Drainage Development guidelines. It is therefore recommended that extensive community awareness creation meetings be preceded by WUA formation immediately upon project identification in order to enhance mobilization of farmer during project planning. Finally it is the recommendation of the study that extensive capacity development be undertaken during project formulation to enhance farmer participation for increased sustainability of smallholder irrigation schemes in Busia County, Kenya.

Limitations of the Study

The main limitations to the study was time and cost because the researcher would have preferred to research on a wider region of Kenya with more smallholder irrigation schemes but the practicability of this approach was however prohibitive due to resource and time constraints. To overcome these challenges a sample size large and representative enough of the target population was considered. Sampling reduced the cost and time of collecting and analyzing data by ensuring that the sampling procedure was undertaken scientifically to the extent that statistical principle of randomization was not compromised in the sampling frame. Only farmers practicing irrigation within the schemes were considered in the study to ensure conformity during selection of smallholder farmers for the study.

REFERENCES

ADB, (2003).*Framework for Mainstreaming Participatory Development Processes into Bank Operations*. ADB.

Adeniji, E.O (2011).*The significance of participatory management on project execution through direct labour; A case study of Adamawa State Nigeria***.** Unpublished Doctoral thesis.

Afzal, M. and Barbhuiya, S. (2011). *Effects of Extreme Weather Events in Pakistan and Their Impacts on Sustainable Development.* University of the West of Scotland, UK.

Arnstein, S. (1969). *A ladder of citizen participation*, Journal of the American Institute of Planners, 35(4), pp. 216-224.

Bold, M, Quisumbing, A.R and Guisepe, S (2013). *Women's Empowerment and Nutrition; an evidence Review.* International Food Policy Research Institute, Disscussion paper no. 01294, October, 2013.

Burns, D., Hambleton, R and Hoggett, P (1994). *The Politics of Decentralization. Revitalizing Local Democracy*. London: MacMillan.

Chifamba, .E, Nyanga,.T and Gukurume,. S (2013). *Irrigation water pricing and cost recuperations for sustainability of irrigation projects in Nyanyadzi, Zimbabwe*. Russian Journal of Agricultural and Socio-Economic Sciences, 3(15).

Cornwall A and Pratt G (2003). *Pathways to Participation: Reflections on PRA. Intermediate Technology Development Group (ITDG),* London, UK.

County Government of Busia (2017). *Annual Performance Contract Report-2016/2017Financial year*. Department of Irrigation. County Government of Busia.

Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. Psychomerika. 1951; 16:297-334.

Denison, J and Manona, S (2007). *Principles, Approaches and Guidelines for the Participatory Revitalisation of Smallholder Irrigation Schemes*: Volume 2 – Concepts and Cases. WRC Report.

De Maio, T.J, Rothgeb, J and Hess, J (1995). *Improving survey quality through pretesting*. US Bureau of Census Washington DC 20233.

Dietz, T. (1995) *Fairness and competence in Citizen Participation*; Boston, pp. xvii–xix.

Elaine, B and Sundeep, .S (2007).*Participatory Design for Social Development: A South African Case Study on Community-Based Health Information Systems.* Information Technology for Development, Vol. 13 (1) 71–94 (2007).

Faludi, A. (1982). *Three paradigms of planning theory*. Planning theory: Prospects for the 1980s. Oxford: Pergamon Press, pp. 81-101.

Finsterbusch. K and Warren, W (1989).*Beneficiary participation in Development projects; Empirical Tests of popular Theories*. Economic Development and Cultural Change. Vol. 1pp 8-12.

Fisher,.K.T and Urich,.P,B.(1999).*Information dissemination and communication in stakeholder participation; the Bohol-Cebu water supply project.* Asia Pacific Viewpoint, Vol. 40, No.3,pp251-269.

George, D., and Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference.* 11.0 update (4th ed.). Boston: Allyn & Bacon.

Government of Serbia (2011).*Guide to the logical framework approach: A key tool for project cycle management.*Belgrade.2011.Global Print.

Ghosh, S and Kumar, A (2012).*How participatory irrigation management reform influences Agriculture performance*. Current science, Vol. 103, No. 4, 25 August, 2012.

GIZ/KfW(2016). *Feasibility study report for the proposed Nzoia River Watershed Management Programme in Kakamega, Bungoma and Siaya Counties in Kenya*. KfW. Nairobi. Kenya.

Hornby, A.S (2010). *Oxford Advanced English Dictionary*. Oxford University Press.

Innes, J. E. (1996) *Planning through consensus building: a new view of the comprehensive planning ideal*, Journal of the American Planning Association, 62(4), pp. 460–472.

International Water Management Institute. (2004). *Assessment of Experience and Opportunities Small Scale Irrigation, Rain Water Harvesting in Ethiopia.* Unpublished report.

Kalkheili, T.A and Zamani, G.H (2008). *Farmer participation in irrigation Management; The case of Doroodazan dam Irrigation Networks, Iran.* Agricultural Water Management. Vol.4 (5). pp110-117.

Koopman, J, Kweka, R Wngwe, S and Mboya. M (2001) .*Community participation in* traditional irrigation scheme rehabilitation projects in Tanzania: The National Poverty Eradication Strategy, Vice-President's Office.

Kolavalli, S and Kerr, J.N (2002). *Mainstreaming Participatory Watershed Development,* Economic and Political Weekly, Vol. 37, No. 3, pp. 225-42.

Kothari, C.R(2009). *Research Methodology; Methods and Techniques.* 2nd Revised Edition. New Age International (P) Limited, Publishers. New Delhi.

Kurt, F and Warren, .A(1989).*Beneficiary participation in Development projects: Empirical tests of popular Theories.* Economic Development and cultural change.pp574-595.

Lee-Kelley, L and Sankey, T. (2008). "*Global virtual teams for value creation and project success: a case study"*, International Journal of Project Management, 26 (1), pp. 51–62.

MacCallum, .D (2008). *Participatory Planning and Means-Ends Rationality: A Translation Problem1 Planning*. Theory & Practice, Vol. 9, No. 3, 325–343, September 2008. 4(2):133 142.

Marks,S.J Komives, K and Davis,.J (2014).*Community Participation and Water Supply sustainability: Evidence from Handpump Projects in Rural Ghana* .Journal of Planning Education and Research published online 2 April 2014.

Ministry of Planning and National Development, (2007). *Kenya Vision 2030.*Government Printers.

Ministry of Water and Irrigation, (2003). *Smallholder Irrigation and Drainage Development Guidelines*. *Handbook,* Government Printers. Nairobi. Kenya.

Ministry of Water and Irrigation, (2012) *Irrigation and Drainage Master Plan*. Printers. Nairobi. Kenya.

Ministry of Water and Irrigation (2012). *National Irrigation Bill,2013*. GoK Printers, Nairobi.

Mugenda,M and Mugenda,G.(2003).*Research Methods. Quantitative and Qualitative Approaches.* Nairobi: African Centre for Technology Studies Press.

Mulwa, F.W (2008). *Participatory Monitoring and Evaluation of Community Projects*.1st Edition, Paulines Publications Africa.

Munns, A.K and Bjeirmi, B.G (1996). *The role of project management in achieving project success.* International Journal of project management. Vol. 14. No. 2.pp 81-87.1996.

Muriungi, .T.M (2015).*The role of Participatory Monitoring and Evaluation Programs among*
Government Corporations: A case of Ewaso Ngiro North Development Authority. International Academic Journal of Social Sciences and Education Volume 1, Issue 4, pp. 53-76.

Nachmias,.C.F and Nachmias,. D (2005). *Research Methods in Social Sciences.* 5th Edition. Euston Road. London. NW13BH.

National Irrigation Administration Consultancy, (1993). *An Evaluation of the Impact of Farmers' Participation on the National Irrigation Systems (NISs) Performance*. NIACONSULT, Manila, 1993.

New York State Office for Technology, Project Management Office (2003). *The New York State Project Management Guidebook. Volumes 2,* New York State Office for Technology (2003).

Ndou, .P (2012).*Non-governmental organizations (NGOS) and beneficiary participation in agricultural development projects.* Journal of Development and Agricultural Economics. Vol. 4(14), pp. 384-392, December 2012.

Nhundu, K, Mushunje, A, Zhou, A and Aghdasi,. F (2015). *Institutional determinants of farmer Participation in irrigation development post "fast-track" land reform program in Zimbabwe.* Journal of Agricultural Biotechnology and sustainable development. Vol.7 (2), pp 9-18, April 2015.

Nkambule. B.L and Dlamini,B. S(2013). *Towards sustainable smallholder irrigation development Projects: A case study of the Maplotini irrigation scheme, Swaziland.* Journal of Agricultural Extension and Rural Development. Vol.5 (7), pp. 216-224, November 2013.

Nowak, D.J, Stein, S.M, Randler, P.B, Greenfield, E.J, Comas, S.J, Carr, M.A and Alig, R.J(2010) . *Sustaining America's Urban Trees and Forests*. United States Environmental Protection Agency. New York.

Nunnally J, and Bernstein L. (1994). *Psychometric theory.* New York: McGraw-Hill Higher, INC.

Ondrik, R. S. (2012).*Participatory Approaches to National Planning***.** Asian Development Bank.

Pennington, M (2004). *Participation, the 'Knowledge Problem' and Urban Land Use Planning: An Austrian Perspective on Institutional Choice*. The Review of Austrian Economics, Vol. 7pp. 213–231.

Porter, LW and Lawler, E.E (1968). *Managerial Attitudes and Performance.* Homewood. IL:Irwin 1968.

Salas, S. M. A. and Wilson, P. N., *Irrigat. Drain. Syst*., (2004), 18, 89–107.

Sam-Amoah, L. K. and Gowing, J. W (2001). *Engineering Designs for Irrigation*. Irrigation Drainage Systems. Vol. 15, pp. 21–38.

Sekaran, U and Bourgie,. R(2010). *Research Methods for Business. A Skills Building Approach.* 5th Edition. John Wiley & Sons Ltd, United Kingdom.

Svendsen,. M. and Huppert, W(2003) (1999), *Towards sustainable farming Development: The attitude of farmers in a selected area of Shimane Prefecture, Japan*. Irrigation Drainage System 2003, 17, 23–46.

Vroom, V. H. (1964). *Work and motivation*. San Francisco, CA: Jossey-Bass.

Wandera, D, Naku, C and Afrane, .S (2013).*Local Community Development and the Participatory Planning Approach: A Review of Theory and Practice.* Current Research Journal of Social Sciences 5(5): 185-191, 2013.

Wodajo, D, Serbeh-Yiadom, K.C and Asfaw, M (2014). *Improving People's Participation in Local Development Project: A Case of Urban Local Government in Oromia-Ethiopia.* Developing Country Studies. Vol. 4(8).2014.

World Commission on Environment and Development (WCED). (1987). *Our Common Future.* Oxford and New York. Oxford University Press.

Wotie, .T.G and Hanaraj, K (2013). *Challenges in farmer-managed small-scale irrigation schemes: Case study on South Achefer Woreda of Amhara region, Ethiopia.* Journal of Scientific Research and Reviews. Vol. 2(2), pp. 019 - 029, June 2013.