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DETERMINANTS OF SUSTAINABILITY OF COMMUNITY BASED PROJECTS POST DONOR FUNDING; A CASE OF NOGIRWET SMALL SCALE IRRIGATION PROJECT, BOMET COUNTY KENYA

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Abstract: **Many food security projects in Kenya have been funded by the Kenyan Government in collaboration with other development partners with an intention of mitigating food insecurity. However, such projects tend to lack sustainability after the departure of the donors hence little impact on the problem. Sustainability of the rural and Community based projects remains a big challenge. Despite the effort to engage Community participation in these projects, sustainable development after the phase out remains a thorn in the flesh of project managers. In irrigation projects globally, there exists a difference between irrigation potential and actual size of land under irrigation. The level of exploitation of the potential can be used to determine the level of sustainability of the irrigation project. The purpose of this study is to identify the factors that influence the sustainability of Nogirwet Small Scale Irrigation Project in Chepalungu Sub-County, Bomet County. The study was guided by the following objectives: To determine the extent to which technical factors influence the sustainability of community based projects post donor funding, To establish the extent to which Financial factors influence the sustainability of community based projects post donor funding, To assess the extent Stakeholder participation in project implantation influence the sustainability of community based projects post donor funding, To examine the extent to which Farmers` level of education and Training influence the sustainability of community based projects post donor funding. Also the study endeavors to ascertain the moderating influence of farmers` level of education and government/county policies, soil characteristics and fertility. Data was obtained by administered questionnaire, both structured and unstructured. Stratified random sampling will be used to get the sample size. A sample of 132 respondents was drawn from a target population of 200 people. Qualitative and quantitative data was collected through questionnaires. A research instrument was pilot tested for validity and reliability using split-half test. Data was analyzed using both qualitative and quantitative techniques. For quantitative data entry and analysis, the Statistical Package for Social Sciences (SPSS version21) was used. The results showed that technical factors, financial factors, stakeholder participation and farmers` level of education and training had significant influence on the sustainability of small scale irrigation projects. Community based projects to be assisted to get efficient and affordable spare parts, training of management committees to be assisted in setting up tariffs for water consumption fees that would be used in repairs and maintenance of irrigation systems. Women should be encouraged to participate in this economic activity to boost the living standard of the people in the county. The result of the study was used to inform policy on ways to improve sustainability of post donor funding irrigation projects.**

Keywords: **Determinants of Sustainability of Community Based Projects Post Donor Funding.**

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LIST OF ABBREVIATIONS AND ACRONYMS

ASAL – Arid and Semi-Arid Lands

CBPs – Community Based Projects

CDF – Constituency Development Fund

CWFS - Committee on World Food Security

CBP – Community Based Project

CBO – Community Based Organization

EU – European Union

FAO – Food Agricultural Organization

GDP – Gross Domestic Product

GoK – Government of Kenya

GTZ – German Technical Co-operation

IFAD – International Fund for Agricultural Development

ILECF – International Lake Environment Committee Foundation

KADP – Kilimanjaro Agricultural Development Project

MD – Millennium Declaration

MDG – Millennium Development Goal

NIB – National Irrigation Board

WFS – World Food Summit

NGO – Non-Governmental Organization

ToCs – Theories of Change

UNESCAP – United Nations Economic and Social Commission for Asia and Pacific

WRMA -Water Resource Management Authority

1. INTRODUCTION

About 30% of earth`s surface is dry land and out of this only a small portion has suitable environmental conditions for agricultural production. The rest is either desert as seen in green lands arctic and Antarctic regions, or is hot desert that comprises of arid and semi-arid land which hardly receive sufficient rainfall to support agricultural production. Global population is estimated at 7.3 billion (FAO, 2014) out of this one –ninth is suffering from chronic malnutrition. This represent 791 million who live in developing countries which account for one-eight (13.5%) of population in developing countries (FAO, 2014). These undernourished children are children who suffer up to about 160 days of nutrition related illnesses each year. This plays a role in half of 10.9 million deaths every year and 26% of these malnutrition cases are found in Africa.

In 1996 the World Food Summit (WFS) set the target for eradicating hunger in all countries with a view to reducing the number of undernourished to a half by the year 2015. The Millennium Declaration (MD) promoted this target to half between the years 1990 to 2015. The fast increase in world population has resulted to pressure exerted on arable lands as people clears and sub-divide for agricultural production to meet the increasing food demand. This has led to land fragmentation which in turn has adverse effects on agricultural production thus aggravating the food shortage.

Efforts have been put in place to reclaim land for agricultural production. In Europe, dykes have been created to push sea water back, thus creating land for crop production. In Africa, just like in many parts of the world, irrigation projects have been set up to reclaim land through application of water to provide sufficient moisture for crops. Key players in Africa have been JICA among others that have sponsored many irrigation projects in various countries such as Kilimanjaro Agricultural Development Project (KADP) in Moshi Tanzania (1974-1993), Water Management Improvement Project in Nile Delta in Egypt (1989-1993), Mwea Irrigation Development Project in Kenya (1991-1998), and Agricultural Machinery Development for irrigated rice cultivation in Ivory Coast (1990-1997).

Sustainable growth of agricultural production is paramount and will go a long way in ensuring self-food sufficiency, food security, reduce the number of undernourished, especially children, and decrease poverty. This can also serve to turn around the stagnant economic growth. In Kenya, irrigation schemes have a long history running over 400 years. Irrigation projects are run by National Irrigation Board that was established by the ACT of Parliament in 1966. The board took over the running of Mwea, Hola, and Perkera irrigation schemes, and later developed Ahero, West Kano, Bunyala and Bura schemes. Of late many others have come in various parts of the country such as Turkana, Kibwezi and Tana Delta.

The area of Kenya is about 582,046 km^2, 17% of which is classified as medium to high potential land with more than 700 mm of rainfall per year, suitable for rain fed agriculture. The remaining 83% of land is classified as ASAL and cannot reliably support rain fed agriculture. This implies that for agricultural production to take place, other technologies such as irrigation and water harvesting should be deployed. Agriculture contributes to about 55% of GDP and provides 80% employment and accounts for 60% of export and creates about 45% of Government Revenue (Ragwa et al, 1998). From these findings therefore, it is apparent that reclaiming land for agricultural production, through irrigation projects will boost production so as to meet the needs of fast increasing population, create more jobs, and thus empower people especially in rural areas and hence stop rural-urban migration.

Sustainable irrigation is defined pragmatically (Abrams, 1998) as `when the irrigation scheme continues to work overtime after the initial donor support has been withdrawn`. Parry –Jones, Reed and Skinner (2001) defined sustainable small-scale irrigation dry land farming as involving the notions of minimal external support, village-level financing and the continuation of beneficial service overtime, long after the withdrawal of donor support. The World Summit of 1996, defined sustainable irrigation of small-scale dry land as `when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life`.

Sustainable irrigation of small-scale dry land farming pertains to multiple aspects including availability of arable land as influenced by the land tenure systems of a country, adequate water supply, water use legal rights, diseases, lack of peace, farmer`s education, and training levels which could enhanced use of irrigation of dry land farming, irrigation technology and infrastructure for successful agricultural production and transportation (Gabre-Madhin, 2009). Africa needs a sustainable irrigation technology for agricultural food production in order to improve in its agricultural food production to a level that can sustain the high population growth rate (Slater,et, 2007).

Sub-Saharan Africa alone is the home of nearly 240 million of chronically food insecure population, which makes 25% of the total population living in developing countries (Jama, 2011). But agricultural production is significant in Africa (Gabre-Madhin, 2009). In 1995, over one-third of the African continent grain consumption apparently depended on food imports (Aileen, 2003) and each year some 30 million people require emergency food aid. In the year 2000, food aid in Africa amounted to 2.8 million tons (Slater Peskett, Ludi and Brown, 2007). However, rain fed dry land farming has failed to attain sustainable food production in the Sub- Saharan Africa (Gabre- Madhin, 2009).

Some of the irrigation technology constraints influencing small-scale irrigation in ASAL, include high cost of equipments, and their repair and maintenance, especially the motorized pumps (Baker, 2005) A lot of effort has been put in place to alleviate food shortage in the area through concerted efforts by Donors, such as European Union, Red Cross, and Kenya Government through the ministry of Agriculture, ministry of water and irrigation and even Constituency Development Fund (CDF).

Community Based Projects have been established by government organs in partnership with Non- Governmental Organizations (NGO). However, when funders phase out of the projects, the activities collapse. A world Vision (2009) Report showed that most community based projects have failed to be sustainable after withdrawal of financial support. To stop this trend, modalities need to be worked out to prevent project collapse after certain duration of time. Community Based Projects apply the concept of social impact assessment and situation evaluations as a way of advocating for citizen and minority group's needs. This is targeted at improving the standard of living in the communities where such projects are implemented.

However, these projects tend to over rely on the contributions made by donors. When this support is phased out, they lack sustainability, a situation which results in pit falls and ethical dilemmas. Ethical disagreements and concerns have been raised which may lead to redirection of the programmes away from their initial course (Welch, 2001). It is only a small

number of projects that have been phased- out that have managed to major impacts on the communities` overall standard of living. This can be to their lack of self-reliance (Blank, 2003). Poor management of projects has led to failure to achieve sustainability and new projects have the likelihood of joining the graveyard of other community projects which have failed to create an impact on the communities.

Once conceptualized, designed and implemented, irrigation projects show a brighter future in achieving their goals. But soon after the implementing agency has pulls out, their sustainability proves to be a challenge leading to their collapse. Faced with climate uncertainty and fragility of ecosystems that the sub- county especially Cheleget location, irrigation and crop improvement through the use of rain water collection techniques appear to be the most important factors to lay the groundwork for an economic and social development. Mobilization and control of water to meet the needs of irrigation becomes an imperative to be tackled in order to enhance food security and improves the income of the population.

The Government recognizes that the development of the country depends largely on the ability to better manage its natural resources, by promoting a more holistic approach, more oriented towards the stakeholders, particularly the rural communities. Much needs to be done to ensure sustainability of irrigation projects in the Sub- County which will go a long way in achieving the Millennium Development Goal No. 1 that aims at eradicating poverty, hunger and empower the less advantage by creating employment, food sufficiency and reduction of malnutrition. It is from this background that the influence on stakeholder participation, the level and training of farmers, the technical factors and financial factors have been identified as some of the objectives under investigation.

2. LITERATURE REVIEW

The Concept of Sustainability of Community Based Projects, Post Donor Funding

Irrigated agriculture has made a major contribution to food productivity and food security throughout the world. Without irrigation, much of the impressive growth in agricultural productivity over the last 50 years could not have been achieved. Nevertheless, it is widely accepted that the overall performance of irrigation investment has fallen short of the expectations of planners, governments and financing institutions Auka(Report No. 13676, a Review of World Bank, Washington DC, 1994).Inadequate consideration of institutional constraints, poor planning for implementation, lack of commitment to the success of the project by governments and users. In the case of irrigation investment, these problems are manifested in poor project management, both at implementation and thereafter and poor operation and maintenance resulting from inadequate budget allocations or from rent seeking by users and officials. These core problems usually give rise to or accompanied by a host of other technical, social and economic problems such as; implementation delays and cost overruns, premature degeneration of civil works and equipment, unreliable water supplies or over-irrigation, water logging and salinity. Social problems including problems of organization, equity, land tenure and gender exclusion. Lower than expected output values due to poor technical performance or reflecting over-optimistic price projections by planners.

According to Kumar (2006), sustainability concerns are being expressed that the input levels have to be continuously increased in order to maintain the yield at all levels. This poses a threat to economic viability and sustainability of crop production. A sustainable farming is a system in which natural resources are managed so that potential yield and the stock of natural resources do not decline over time. However each of the components of sustainable agriculture is complex and some quantifiable measures are needed to check whether a farming system is sustainable or not. Due to the multi-dimensional nature of the concept of sustainability, the difficulties in determining specific threshold values for this dimension are not over emphasized.

Sustainable development is a term that is difficult to define despite its daily application by people. In 1887, the Brunt Land Commission defines it as “development that addresses the needs of the present generation without compromising the ability of the future generation to meet their own needs” (World Bank, 2005). Roy (2003) perceives sustainable development as that which is for the people and by the people. This proposal argues that sustainability can be attributed to peoples` attitudes which later impact on their habits. Many years of intensive research revealed the three `E`s of Economy, Environment and Equity. Sustainability has the capacity to help the poor improve and maintain their natural resources without compromising their human resource development. Robert (2003) argues that sustainability is a vague ideology and it would be wrong for it to be considered as precise or having the capacity to attain precision, hence

attracting various definitions. The overall performance of many irrigation projects is disappointing. Evaluations, document a wide range of problems including; cost and time overruns, poor management, the non-realization of full planned benefits, adverse environmental and health impacts and exacerbation of inequalities in existing social and economic distribution of assets among farmers (FAO, 2014).

Technical Factors and Project Sustainability

For irrigation systems to be sustainable they require proper management to avoid salination and must not use more water from their sources than is naturally replenishable (Tardiu, 2004). Otherwise the water source effectively becomes a non-renewable resource. Improvements in water well drilling technology and submersible pumps combined with the development of drip irrigation and low pressure pivots, have made it possible to regularly achieve high crop yield in areas where reliance on rainfall alone had previously made successful agriculture unpredictable. However, this progress has come at a price. In many areas such as Ogallala Aquiver, the water is being used faster than it can be replenished.

According to FAO Technical Paper No. 11(1996), common sense dictates that the choice of technology for irrigation should be based on its appropriateness for the cropping patterns intended and also considers cost-effectiveness. Irrigation engineers have in the past overlooked an additional need for the technology also to be matched to the level of sophistication or operational capacity of the users. It has become increasingly obvious that the design process must start from a consideration of how the users will operate the systems. This should then be design to provide the optimum combination of efficiency in water use and cost effective operation and maintenance. Equally important the designer must consider how the user will cultivate his land and the implications that this may have for the project layout. Thus it may be that the design which involves the lowest investment cost per hectare may not be the most cost-effective solution if it also involves large number of staff for its operation; it cannot be utilized to capacity. On the other hand, a design to improve water use efficiency on a traditional irrigation system by the introduction of modern water control structures may not result in overall efficiency gains if the users reject the modern controls in favor of their traditional proportional dividers.

The choice of technology, whether for new or new development or rehabilitation of existing schemes, has been the subject of debate over the years. While most irrigation engineers would now agree that the starting point for design must be ease of operation, they still tend to polarize into two camps. One sees the problem largely as overcoming the hydraulic instability of extensively-gated manually operated systems; it sees the solution as the modernization of these systems, adding automatic downstream control structures and other feedback mechanisms design to achieve hydraulic stability. The other accepts the reality of farmer damage in wet season, drought and so favors designs based on cruder and more robust structures, the possibility of just one-time, demand based, delivery of water to crops is foregone to the hope of preserving the civil works from interference.

Technology has been applied over the years to address some of the environmental problems around the globe. Some of the challenges concern lack of sustainability of projects after phase-out. Technological changes are important in dealing with emerging environmental concerns especially those that the past has not managed to fix. Beder(1994) proposes that sustainable development seeks to boost economic growth rather than limit it. Through technological advancement, alternative ways of dealing with emerging environmental problems are identified and implemented. Utilization of resources in the most efficient t manner entails technological changes such as waste minimization, recycling, change of production processes, substitution of materials and pollution control.

In irrigation projects, innovative practices enhance water efficiency, acquisition of competitive advantage and reduction of environmental burdens. Extension services help farmers to adapt and implement viable mechanisms, thus deriving more benefits from irrigation. Most of the time, higher water prices are incurred due to technological improvements. However, full potential benefits must be targeted by improving water efficiency. Farmers tend to lack adequate means and incentives to determine the water use, application and crop yield in response to different water management practices (Levidow et al, 2014). It is therefore important that the influence of technology chosen and its influence of sustainability of Nogirwet small scale irrigation project be assessed.

Financial Factors and Project Sustainability

Construction and operation costs for irrigation projects have risen steadily over the past four decades as the world`s best land and most of the readily available water supplies have been developed

Majority of farmers, especially those in smallholder category, lack financial resources to invest in irrigation projects (Peacock, 2005). To access credit facilities, farmers are required to provide collaterals by financial institutions. This coupled with the risk the financial institutions experience to administer such credits, so many small scale farmers are precluded from obtaining such credit facilities (Small and Carruther, 1991). The inadequacy to access those credit facilities has slowed down the development of small holder irrigation development in Kenya.

According to FAO Technical Paper No. 11(1996), farmer managed irrigation schemes of a few hundred square meters, to a several thousand hectares are developed, operated and maintained by individual farmers, communities or local rulers and land owners, independently of government and generally for the production of food fiber from small plots of paddy in south east Asia, shallow tube wells in the Indo-Gangetic Plain, tank irrigation systems elsewhere in south Asia, Qanat systems in Iran, Afghanistan, the swamp and flood recession areas with partial water control in Sub-Saharan Africa to spate irrigation systems in Southern Arabia, some of these systems are hundreds of years old, in which case they are often referred to as traditional irrigation.

According to FAO Technical Paper No. 11(1996), the above discussion, focuses on irrigation development in formal systems and takes no account of the existence in various parts of the world, of large areas of informal or traditional irrigation. These by definition have been developed on the initiative of farmers rather than government, and have continued their existence the same way. Traditional irrigation systems are often characterized by poor water control, and consequent low cropping intensities and yields. In many cases, improved water control can be achieved at comparatively low cost and is often easily justified by incremental production that can be achieved as a result. Thus given that in some countries the area under traditional irrigation far exceeds the area under formal irrigation, the scope for obtaining increased food production these systems could be significant. The identification of opportunities for such improvements may therefore be a priority for planners. However, it must also be noted that the most important feature of these systems is local initiative, responsibility and control; proposal improvements should avoid inadvertent transfer of responsibility to government.

Apart from traditional irrigation systems, other opportunities exist for low cost irrigation, partially for low localized irrigation, including systems based on the use of clay pots for storage and gradual release of irrigation water. These and other similar devices often bring nutritional benefits to local communities because they are generally used for fruit and vegetable production. They make efficient use of scarce water but are generally unsuitable for large-scale food production.

Stakeholders` Participation in Project Implementation and Project Sustainability

The principles of participation are rooted in Paulo Freires psychosocial methods in which people discussed their own life situation, identified their problems, and planned for transformation, and Mahatma Gandhi`s principles of self-help (Mulwa, 2008a, Mansuri and Rao, 2004). The principles require developers to focus on creating situation and finding out what to do with its inadequacies, planning for collective action to transform whatever is undesirable, acting to change the situation and finally identifying failures and succeses from action taken so that it transforms the nest plan of action (Mulwa, 2008a). It is a reversal from the top-down to bottom-up approach, from centralized standardization to local diversity, and blue print to learning process (Chamber, 1994)

Community members are a rich source of knowledge about their community and energy and commitment to that community. Genuine participation by community members, including youth is the key to effective project implementation (Cheetham, 2002). According to Bhatnagar(1992), experience has demonstrated that people can devise their own alternatives if they are allowed to make their own decisions. If implemented properly, community participation can be effective for a number of reasons.

Communities have different needs, problems, beliefs, practices, assets and resources related to sexual health. Getting community involved in program design and implementation helps ensure that strategies are appropriate for and acceptable to the community and its youth. Community participation promotes shared responsibility by service providers, community members and youth themselves for the sexual health of adolescence in the community.

When communities “own” adolescence sexual health programs, they often mobilize resources that may not otherwise be available. They can work together to advocate for better programs, services, and policies for youth. Community support

can change structures and norms that pose barriers to sexual health, information and services for youth and can increase awareness regarding youth`s right to information and treatment. Community participation can increase the accountability of sexual health programs and service providers. Participation can empower youth within the community.

There is no single definition of participation by communities but rather, a potpourri of definitions varying mostly by the degree of participation. `Participation` ranges from negligible or "co-opted "in which community members serve as token representatives with no part in making decisions- to "collective action"- in which local people initiate action, set the agenda, and work towards a commonly defined goal.

Capra (1996) sees members` participation as essential for establishment of community cohesiveness. It enables members to live together, share common norms, values, fears and challenges. It also embraces the principle of partnership with the dynamic of change and development which bring about democracy and personal empowerment. It further builds the tendency to associate, establish links, live inside each other and co-operate as well as bring about the sustainability of community efforts as a result of interdependence, partnership, flexibility and diversity (Copra, 1996).

The other factor, which is seen as the most important by Mansuri and Rao (2004), is the involvement of members in the project design and implementation. That is the incorporation of local knowledge into project decision process. This, they say, is important because it helps in building social capital which is extremely important for project success. According to Mansuri and Rao (2004), members' participation builds the social capital that could improve efficiency by facilitating coordinated action, and also strengthens the ability of individuals to build bonds within their groups. It builds bridges to other groups and strengthens the belief that the quality and quantity of group activity are key sources of community strength and ability to work to its own betterment. This further enables the project to build stock from which people can draw to improve their incomes and which can be build to facilitate economic growth and development (Bastalaer and Grootaert, 2001). A form of participation can be traced back to 1940s in Nigeria where a colonial senior district officer in charge of community development wrote frequently about how self-help development could transform the capacity of Nigerians to identify their needs and strengthen their abilities to improve their own conditions (UNESCAP, 2005).

Ekong(2003) defines participation as the engagement of stakeholders` influence and control over development plans and the decisions which involve the allocation of resources. Unless the community is involved in the interventions designed to improve their livelihood, the benefits that accrue to the engagement are likely to be missed. Community participation plays an active role in influencing decisions on local knowledge and interventions. It enables the sharing of needs within certain geographical area and thus enables decision making to address those needs. Ofuoku(2011) refers to community development as the unity of peoples` efforts with those of government authorities towards social, economic and cultural well-being of the community.

Locally, sustainable community development requires that support is given to community life by identification of local resources and talents to foster economic growth. It further poses a challenge of the distribution of benefits that arise from project initiatives in their quest for transparency and equity. The need to improve the quality of life needs to be the target instead of mere improvement to the standard of living (Elizabeth, 2006).

Farmers` Level of Education and Training and Project Sustainability

Farmers with little education and training are often insufficiently prepared for either irrigation tasks or land management (Underson and Heimlich, 2000). They often lack knowledge about sustainable land management and integrated plant protection. Targeted training for farmers in both issues is thus an urgent need. And particularly, in cases involving the introduction of farming to nomads, or people who live from fishing. The target group as rule lack traditional preliminary farming know-how (Rukuni, 1994).

There is need for greater empowerment of communities through education and training over the conservation of their environment. Knowledge is power, with education and training, greater empowerment of the local communities could be attained (GoK, 2010).At the provincial level, co-ordination between irrigation authorities and agricultural authorities is essential as a means of harmonizing training measures and combining in reasonable ways (Blank, Mutero& Murray-Rust, 2002). After training the farmers, delegation of responsibility and authority and creating administrative and institutional mechanisms that are legitimate, influensive and accountable in the control of land use and natural resource utilization was possible (German Technical Co-operation(GTZ), (Carter, 2006).

Communities can utilize common property, resources, influensively and sustainably provided they clearly benefit from resources and they are empowered through local level institutions and training (Blank, et al, 2002). This concept needs to be extended to the use and management of water resources by small scale irrigation agricultural communities (Carter, 2006). Irrigation can be used to sharply improve food security in both qualitative and quantitative terms (Blank, et, al, 2002).

However, the incomes generated by this connection play fewer roles due to marking problems, expected in the areas where these vulnerable people live (International Lake Environment Committee Foundation (ILECF), (Carter, 2006). Nomads can benefit from an irrigation approach that creates sustainable irrigation of small scale dry land farming in addition to making a good economic sense, as in the comparison of irrigation of small scale dry land farming gained with the costs that would have otherwise been required to provide food aid for them (Carter, 2006). In developing countries, rural household farmers have limited resources to support large proportion of the population, who do not dominate the agricultural production sector.

Thus the availability of education and training on the agricultural research and technologies to these household farmers is crucial towards ensuring sustainable food supply (IFAD, 2006). Education and training has been supported in research as one of the ways that ensures stable food production and supplies as well as alleviation of poverty due to its ability to enhance the farmers` adoption of innovative modern methods of farming (Ahmed and Carlo, 2006). While lack of education and training endangers a state of poverty, poverty itself hinders the advancement of education and training. Poverty forces families to employ children at home and in the fields to provide income for their households (Ahmed and Carlo, 2006)

Impoverished households, in many cases, cannot pay school fees for their children, and the necessity of earning income for survival of the households discourage them from educating their children (Ahmed and Carlo, 2006). Goklany(2007)asserts that education and training closely relates to increased food production and food access, a relationship that also intersects with the relationship between good health and greater wealth. Both of these relationships promote progress, economic growth and technological change.

If people get education and training that allows them to gain sufficient income and obtain food for survival, the state of poverty and hunger is reduced. Thus educating the youth can be useful in addressing the current and future food insecurity, through adoption of small scale irrigation with the application of appropriate irrigation technology (Goklany, 2007).

Small scale farmers in Kenya accounts for 70% of total agricultural production, allowing them to dominate the sector because they produce 70% of maize, 65% of coffee, 50% of tea, 90% of sugar, 80% of milk, 85% of fish, and 70% of beef and related products on small land holdings of two to three hectares (Hazell, 2006).

Ensuring that the small -scale irrigation dry land farmers are educated means that they have the knowledge to increase farm production which is the first part of the farm produce marketing chain. With knowledge to increase farm production, the other factors, like to ensure that they have access to arable land, markets and ability to export products would be organized by use of this education and training to enhance increase in agricultural production.

Hazell (2006) states that although farmers need access to land, appropriate technology and key inputs like seed, fertilizer and access to credit, this might not be the end by itself. Farmers limited access to land, infrastructure, technology, and poverty-related factors are not the only barriers to improving food security, but the key barrier would be, lower levels of education and training which acts as the organizer of the other factors of agricultural production.

3. RESEARCH METHODOLOGY

Research Design

Descriptive survey design was adopted in the study. Kothari (2004) elucidates that descriptive research requires a broad definition and elaboration of a well-designed problem. The design enables the researcher to gather information, summarize, tabulate and interpret the findings for the purpose of clarification. Descriptive design applied and used to identify and explain the factors that influence the sustainability of Nogirwetsmall scale irrigation project in Chepalungu sub-county, Bomet County.

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Data collection Instruments

Data collection was done using questionnaires. This is a research tool that gathers data from a large sample (Kombo, 2006). These are used to obtain information about the population in the irrigation project area. The questionnaire is divided into three sections. The first section covers personal information of respondents; the second section deals with project status; the third section addresses factors influencing the sustainability of the irrigation project, namely; technical factors, financial factors, stakeholders` participation factors and farmers` education and training factors. The questionnaires unveiled the information on both dependent and independent variables gave answers to the research questions.

Data Collection Procedures

Both primary and secondary data was engaged in this study. First time respondents provided primary data which formed the main source of information. Questionnaires and interviews were scheduled concurrently to obtain information that harmonized during data processing for the purposes of analysis. Secondary data was obtained throughout the study based on the objectives.

Validity and Reliability of Research Instruments

Validity and Reliability of the research instruments is discussed here below;

Validity of Research Instruments

This refers to the accuracy of data during the research about the variables being studied. (Mugenda and Mugenda, 2003) states that the accuracy or the meaningfulness is the degree to which results obtained from analysis of data represented in the phenomena of study. Joppe(2000) says validity determines whether the instrument truly measures what it intended to measure or how truthful the research results are. Validity determines the extent to which the instrument measure what it purports to measure. According to Wintersein(2008), content validity depends on the experts in the field. Expert judgment is used to assess the content validity of the instruments by discussing the results with the supervisor and other experts in the field. Pre-testing of research instruments is done to address standardization and avoid ambiguities.

Reliability of research Instruments

This is the stability and consistency with which the data collection instruments measure the content (Mugenda and Mugenda, 2003). Joppe(2000) says reliability is the extent to which results are consistent over time and research instruments are reliable if the results of a study can be reproduced under a similar methodology. The commonly used tests for reliability are; test-retest and split-half reliability tests.

Methods of Data Analysis

Data was analyzed using both qualitative and quantitative techniques. For quantitative data entry and analysis, the Statistical Package for Social Sciences (SPSS) will be used. The data was presented in tables that indicate percentages of a given attribute. These percentages were analyzed systematically to provide trends, patterns and relationships from which conclusions were drawn. For qualitative data, systematic analysis of data was done to arrive at meaningful and useful conclusion.

4. DATA ANALYSIS PRESENTATION AND INTERPRESENTATION

Technical factors influence the sustainability of Nogirwet small scale irrigation project, Bomet County.

The first objective was to establish how technical factors influence sustainability of Nogirwet small scale irrigation project, Bomet County. To achieve this objective, the respondents were required to indicate whether the project was being carried with skilled personnel and effective Equipments

Table 1: Technical factors influencing the sustainability of the irrigation project

	Frequency	Percentage
Yes	35	37
No	60	63
Total	**95**	**100**

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Table 1 shows that majority (63%) of the respondents indicated that qualified and suitable equipment were not used in execution the project, this is likely to affect the management of the projects. Only37% indicate that the project was performed by skilled personnel

Table 2: Application of Water to the Crops

Application	Frequency	Percentage
Canal	70	74
Drip	15	16
Underground pipes	0	0
Overhead irrigation	0	0
Canal and drip	4	4
No response	6	6

The findings on Table 2 indicate that majority 70 (74%) of the farmers agreed that the water is applied using a canal, 15 (16%) through the drip and 4 (4%) through the canal and drip. The findings support FAO Technical Paper N. 11 (1996) which notes that for irrigation systems to be sustainable; they require proper management to avoid salinization and must not use more water from their source than is naturally replenishable. Otherwise, the water source effectively becomes a non-renewable resource. Improvements in water well drilling technology and submersible pump, combined with the development of drip irrigation, and low pressure pivots, have made it possible to regularly achieve high crop yields in areas where reliance on rainfall alone had previously made successful agriculture unpredictable

Testing the First Hypothesis as per the Objective and Discussions

H_1: Technical Factors have a significant influence on the sustainability of Nogirwet Small Scale Irrigation project

Table 3: Chi- Square Testing

F	f_e	f_d	$(f_d)^2$	$(f_d)^2$
4	**13**	**-9**	**81**	**6.23**
3	**13**	**-10**	**100**	**7.69**
10	**13**	**-3**	**9**	**0.69**
23	**13**	**10**	**100**	**7.69**
25	**13**	**12**	**144**	**11.1**
				$\sum(f_d)^2 / f_e = 33.4$

X^2 c = 33.4 > $x^2_{0.05}$ = 9.488 at degrees of freedom and 5% level of confidence**.**

Since the calculated Chi-square value of 33.4 is greater than the critical Chi-square value at 5% level of confidence, we accept the alternative hypothesis. Thus Technical Factors has a significant influence on the sustainability of Nogirwet Small Scale Irrigation project

Financial factors influence the sustainability of Nogirwet small scale irrigation project, Bomet County.

In question two on the questionnaire, the Water Point Executive Committee members were asked to rate how they agreed/disagreed with the fact that the level of funding received for their irrigation project had significant influence on sustainability of Post donor funded projects at Nogirwet. The results were as shown in Table 4.5, which shows the influence of financial factors on sustainability of donor funded projects at Nogirwet Bomet County.

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Table 4: Financial factors influence the sustainability of Nogirwet small scale irrigation.

Activity	1	2	3	4	5	Mean	Std dev
Satisfied that the Budget line items funded were as needed	6	15	4	30	40	3.83	3.37
Dissatisfied that Budget allocation per item/ was not adequate	40	30	0	5	20	2.43	2.7
Dissatisfied with funds received	50	25	15	5	0	1.67	2.4
Mean of means on (1-5)						2.64	2.49

According to the results shown in Table 4, a mean of 2.43 the irrigation project committee members respondents had disagreed that they were satisfied that the budget line items were funded as needed, 3.83 of the committee members' respondents had agreed that they were dissatisfied with the fact that budget allocation per item was adequate and mean1.67 of the water committee members' respondents had agreed that they were dissatisfied with the amount of funds received from the donors.

Testing of the second Hypothesis as Per the Objective and discussions

H_1: Financial Factors have a significant influence on the sustainability of Nogirwet Small Scale Irrigation project

Table 5: Chi- Square Testing Second Hypothesis

F	f_e	f_d	$(f_d)^2$	$(f_d)^2 / f_e$
4	**13**	**-9**	**81**	**6.23**
3	**13**	**-10**	**100**	**7.69**
10	**13**	**-3**	**9**	**0.69**
23	**13**	**10**	**100**	**7.69**
25	**13**	**12**	**144**	**11.1**
				$\sum(f_d)^2 / f_e$ = 33.4

X^2 c = 33.4 > $x^2_{0.05}$ = 9.488 at degrees of freedom and 5% level of confidence**.**

Since the calculated Chi-Square value of 25.4 is greater than the critical chi- square value at 5% level of confidence, we accept the alternative hypothesis. Thus, Financial Factors has influence on the sustainability of Nogirwet Small Scale Irrigation project.

Influence of Stakeholder participation in project implementation on the sustainability

In question three the participants from line ministries and NGOs or donors' representatives were asked to rate to what extent they thought involvement of stakeholders influences sustainability donor funded water projects by saying if they agreed/or disagreed with given statements on level of community involvement in the project implementation process. The findings were illustrated as shown in Table 6, which shows the influence of involvement of stakeholders on sustainability of post donor funded projects

Table 6: Influence of involvement of stakeholders on sustainability of post donor funded projects

Statement	1	2	3	4	5	Mean	Std dev
Involvement of WPECs in water project conceptualization and identification	5	15	5	40	30	3.55	1.95
Community was involved in Project implementation by cost sharing	40	50	5	0	0	1.60	2.30
Community involvement in decision making by financial transactions	0	20	20	50	5	4.00	1.40
Community involvement in sharing of water project benefits	25	70	0	0	0	1.90	1.30
Mean of 4 means on (1-5) & Std						**2.76**	**1.74**

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The mean value of 2.76 on average from the likert scale range of (1-5) indicates that the respondents were slightly undecided/neutral about whether community involvement had any significant influence on sustainability of post donor funded Nogirwet irrigation project in Bomet County. The fact that the standard deviation calculated (Std dev = 1.76) was within two deviations from mean shows that we can be 95% confident that the respondents were in agreement in their responses.

Testing of Third Hypothesis as Per the Objective and discussions

H_1: Stakeholders` participation has a significant influence in project implementation the sustainability of Nogirwet Small Scale Irrigation Project.

Table 7: showing Chi-Square testing for the Third Hypothesis

F	f_e	f_d	$(f_d)^2$	$(f_d)/ f_e$
19	**13**	**6**	**36**	**2.8**
20	**13**	**7**	**49**	**3.8**
12	**13**	**-1**	**1**	**0.1**
8	**13**	**-5**	**25**	**1.9**
6	**13**	**-7**	**49**	**3.8**
				$\sum (f_d)^2 / f_{e=1}$ 12.4

$X^2 c = 12.4 > x^2_{0.05} = 9.488$ at 4 degree of freedom and 5% level of confidence**.**

Since the calculated Chi-Square value of 12.4 is greater than the critical Chi-Square value at 5% level of confidence, we accept the alternative hypothesis. Thus, Stakeholders` participation has a significant influence in project implementation the sustainability of Nogirwet Small Scale Irrigation Project

Farmers` level of education and Training influence the sustainability of Nogirwet small scale irrigation project

The researcher sought to find out the level of education and training influence the sustainability of Nogirwet small scale irrigation project. Farmers with little education and training are often insufficiently prepared for either irrigation tasks or land management

Table 8: Farmers` level of education and Training

Academic Achievement	Frequency (F)	Percentage (%)
No school	5	5
Primary incomplete	20	21
Secondary complete	40	42
Tertiary institution	20	21
University level	10	11
Total	**95**	**100**

The results in table 4.7 indicate that, majority 40 (42%) of farmers have attained secondary level of education, 20 (21%) have not completed secondary school, 20 (21%) have completed primary level of education, 10 (11%) have attained University level school of education and 5 (5%) have not attended at all. The findings point that majority of farmers have attained basic education. These points out that having attained the basic education majority can easily understand various methods and new technologies in farming which can greatly influence positively the sustainability of post donor funded irrigation projects.

Testing the Fourth Hypothesis as Per the Objective and Discussion

H_1: Level of education and training have a significant influence the sustainability of Nogirwet Small Scale Irrigation project

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Table 9: Testing of the Fourth Hypothesis as Per the Objective and Discussion

F	f_e	f_d	$(f_d)^2$	$(f_d)/f_e$
5	13	-8	64	4.92
8	13	-5	25	1.92
9	13	-4	16	1.23
20	13	7	49	3.77
23	13	10	100	7.69
				$\sum (f_d)^2/ f_e$= 27.3

X^2 **c = 27.3 > $x^2_{0.05}$ = 9.488** at 4 degrees of freedom and 5% level of confidence.

Since the calculated Chi-Square value of 27.3 is greater than the critical Chi-Square value at 5% level of confidence we accept the alternative hypothesis. Thus, Level of education and training has a significant influence on the sustainability of Nogirwet Small Scale Irrigation project

5. SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION, RECOMMENDATIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

Summary of the findings

Majority of the respondents (74%) use canals to supply water to their projects, followed by drip. A big number of respondents use plastic pipes (89.7%), only a small number (1.3%) use metallic pipes. A big number of respondents (79.5%) cannot access a qualified technician to repair maintain their irrigation systems. The technicians who are available (82.1%) are not competent to handle /repair these irrigation systems. The spare parts are quite available (75.5%) at a reasonable cost (82.1%).

Financial factors in any intervention plays a pivotal role in its success, as it enables acquisition of all the necessary inputs. Majority of respondents (88.5%) indicated that they lack external financial support to run the projects. Only a handful (9%) gets support. NGO account for the highest external source of financial support (6.4%), with government accounting for only (2.6%). The said finances are not adequate as shown by (91%) of respondents who get the support. Majority rely on their own savings (92%). Which and again is not adequate. Subscription for water usage is quite low (2.6%) and majority pay less than kshs 300/- done by CBO. This confirms that the funds for management of water system is inadequate thus negatively affecting the sustainability of the irrigation projects by women, which aggregates the situation. Majority of those 50 interviewed lie between 35-44 years which is the age actively involved in economic activities. Most of them earn income of less than Kshs. 10,000/-, which means they are unable to meet their financial requirements for sustainability of irrigation projects such as water subscription fee and purchase of spare parts for irrigation systems. Although many people are involved in irrigation activities most of these are done on a very small scale of less than one acre. This implies that there several financial needs and also economic investment in the small scale irrigation projects.

Community participation enhances ownership of the project which promotes effective contribution by the community hence sustainability. Community participation forms the basis for community empowerment as observed by Mazibuki (2007). Community participation leads to higher rates of resource acquisition and yields better results. It promotes higher levels of volunteerism and a brighter community spirit that motivates communities to own the community project and therefore enhances its sustainability. Appropriateness of design and technology in a water project is quite important and so is the knowledge of how to operate and maintain it if it is to be sustainable. Lack of community education and training on technology used, is one of the factors which could lead to breakdown and non-sustainability of water supply projects in developing countries as observed by (Adimiluyi and Odugbesan, 2008).

Discussion of the Findings

From the findings its evident that majority of respondents are a male 63% which points out that only a few women 37% are actively involved in irrigation projects. This negatively influences the sustainability of the projects as most of rural population is composed of women. This implies that projects in the sub County have not benefited from immense labour force provided by women. Majority of farmers interviewed lie in age bracket of 34-44 years and majority have attained

secondary education 40%. This points out that the irrigation is done by energetic and literate group which could spur economic development in Bomet County.

For irrigation projects to be sustained, they need proper water management systems. Targient (2004) states that there is need for natural replenishment of water, otherwise it becomes a non-renewable resource. Proper technology to convey water to fields, with minimal loss will lead to increased sustainability of irrigation projects.

FAO technical paper No, 11 (1996) points out that choice of technology for irrigation should be based on appropriate use of crop patterns and cost effectiveness. The level of technology should match the operational sophistication of capacity of users. Based on the research findings, most farmers use canals to convey water to irrigation projects 74%, while only a few 15% use drip pipes. This points out that a lot of water is wasted through evapo-transpiration and seepage. Most of staff charged with running of water systems is not trained as only 15% have formal training. This negatively influences sustainability of the projects. Only a small number of farmers use plastic pipes that have a shortcoming of becoming brittle if exposed to the sun. Drip irrigation is suited to areas with water scarcity. So there is need to trained technical staff to effectively manage the water systems, through installation of modern water saving technology such as drip systems. This will ensure sustainable use of the resources which would in turn lead to sustainability of irrigation projects in the County

According to Peacock (2005) construction and operation costs of irrigation projects has greatly increased over decades. Majority of farmers especially in small scale holder category lack financial resources to invest in projects. The study has unveiled the same trend as most farmers in the sub County earn less than Kshs. 10,000 which is too low to provide sufficient funds for irrigation projects. Only a small number got assistance (17.9%). There are no water subscription fees. Farmers cannot access financial credits as this needs collaterals which they don't have. Small and Caruther (1991) state that lack of access to credit facilities has slowed down irrigation development in Kenya. Therefore, there is need to establish a sound water tariffs managed by CBOs for water use which would be used to fund for repairs and maintenance of irrigation systems. Some soft credit facilities should be availed to farmers for the said purpose. This would greatly increase sustainability of irrigation projects in the sub County.

Group leadership of community projects is a very crucial factor in project implementation. If the project is strong and has the support of the majority of the members, the members` participation is greatly enhanced. The leadership directives are obeyed and activities performed as desired. However, if the leadership is considered weak and with little authority over members, most of the groups` activities are disjointed and lack coordination. The implementation of such projects is slow and inefficient. These findings are in agreement with that of Franks and Cursworth (1993), who averse that a project can succeed or fail because of lack of strong management leadership, the cultural misfit of project activities within the environment and lack of local knowledge and leadership leading to rejection of the project by the intended beneficiaries.

The analysis indicates that education and training influence the sustainability of the small scale irrigation project. Farmers with high level of education and training impart positively on the sustainability of the project and low educated and trained negatively influence its sustainability. From the reviewed literature, it revealed that sustainable agricultural development is based less on material inputs (water, irrigation, improved seeds and fertilizers) than on the people involved on their use (Okoro and Amaechi, 2008). This therefore imply that education and training is a powerful tool for informing people and proving them with knowledge and skills they need to put agricultural science and production inputs to the best use (Mbah, 2008).

Conclusion

Based on the objectives and findings of the study the following conclusions were made. Based on the first objective the technology used for supply of water to the projects should be cost effective. It should be available on demand. There should also be qualified technical staff to repair and maintain the water systems. Spare parts should also be availed to facilitate a quick fix in case of any breakage. This will greatly influence sustainability of the projects.

Subscription for water use by those involved in the projects will ease the financial constant, hence avail funds for expenses of the water system through purchase of relevant spares parts for the system. Once put in place the above state factors will enable high degree of the projects sustainability to enhance the intervention run at increased economic gain to the community.

The study has also concluded that sustainability of irrigation projects can be achieved through establishment of community structure for water resource management. This is in view of putting in place policy by stake holders such as CBO, NGO and government as regards the above stated purpose. These would regulate and continuous supply of adequate water for projects throughout the year on institutional factors, management of CBO can improve through training, establishment of structures for water resource utilization, women representation in all aspects of irrigation project management can greatly enhance sustainability of the projects. The study concluded that sustainable irrigation of small scale irrigation farming cannot be sustainably achieved without a certain level of farmers` education training.

5.5 Recommendations

The following recommendations are suggested for enhanced improvement of sustainability of irrigation projects: -

The study recommends a bottom-up approach to water projects management, where stakeholder's participation plays an important role. The donor organization should only facilitate construction materials, knowledge and the required funding, keeping the total costs as low as possible. At the end of the pre-constructive phase, the community should select a committee who is responsible for the organization of the site and for the long term utilization of the water project. During construction and in the post-constructive phase several trainings should be given. These sub-location training sessions should cover subjects like project management, natural resource management and catchment development.

The community committee has the responsibilities, including supervision of the site, organizing the community, and managing and maintaining the water project. The other actors should also be actively involved such as: the highest institutional level is the Kenyan government. The various levels of government (ranging from national to County and sub counties or even wards) are not only regulatory institutions, but should also be active in setting up projects in sectors as agriculture, irrigation and health. This is mostly done through extension officers who visit communities and give advice on various topics.

For this reason, the ministries could play a major factor in making the donor funded irrigation projects successful and sustainable. The Ministry of Water and Irrigation should be responsible for the development of water resources, and therefore closely connected to the development of donor funded water projects. Although the Ministry has little cooperation with the donor agencies; making the outcome of the project less effective due to insufficient support and follow-up services from the Ministry. The Water Act 2002 is a new policy concerning the management of the water resources. The act supports a minimal role of the government and greater community participation. In the near future, water user groups may become an important entity at county level and it is recommendable that these groups work together with the community committees.

This study also recommended the involvement of the county Development Committee in the sustainability of water projects. In Bomet County, since 2002 the District Development Committee was incorporated into the development and maintenance of water projects as quoted in the Districts Development Plan (DDP for 2002-2008). The study also recommended increased community awareness through the government's extension services to the water point managing community committees that are better matched with their situation and proper utilization of the resources.

The study recommended to the policy makers for the formulation of irrigation policy and technology that should be supportive to the development and growth of small scale irrigation. These would include market access, credit access, transport and general provision of the required infrastructural facilities, that could help in sustainable irrigation of small scale irrigation projects` farming in arid and semi-arid lands.

On the appropriate irrigation technology, the research recommended to the Agricultural extension officers to have irrigation farmers to be sensitize on the appropriate irrigation technology and economical irrigation practices for sustainable water supply in the small scale irrigation projects. This is because the educated farmers would have broad range of options for adoption of appropriate technology and irrigation farming practices. Education and training level has been recommended as a farm tool that utilizes the organization of the farm`s inputs cautiously to ensure farm outputs exceed the farm inputs. The farmers` education and training also enhances the knowledge of the need for and application of manure, fertilizers, improved seeds and irrigation technologies for use in coordination.

Suggestions for Further research

The researcher suggested that further studies on factors influencing sustainability of donor funded water projects both in Kenya and the rest of the world should be conducted. A study on various water use and demand sites such as the: domestic, agriculture, livestock and other uses would help the policy makers and donor agency who are the water projects developers on the approximate water demands per Water Point Executive Committees community. In the reviewed studies it was noted that domestic water use is the most important, and it has the highest priority. Second important use is livestock, third is agriculture and the other uses have least priority

A study on the rainfall-runoff model dealing with water supply/water availability with a fixed amount flowing into the study area as so-called head flows and outflows from the study area would help in understanding the sustainability of the water projects in the area. This would help in educating the Water Point Executive Committees community water managers on their vulnerability to water shortages throughout the year. This study would consider the catchments, which are simplified rainfall-runoff processes and a detailed output for each area of these rainfall-runoff processes and the amount of water generated to supply the water reservoirs (as water projects).

Finally, the researcher suggested a study on the community preparedness to participate in and manage the donor funded projects regardless of any obstacles such as availability of cheap source of water among others. This would help in improving on the required community training which would boost the management of donor funded water projects.

REFERENCES

[1] Abdel-Dayem, S. (2005). *Quality of irrigation and drainage portfolio at entry*. PowerPoint

[2] Abrams, G. (1998). Understanding sustainability of local water services, (accessed: April 12, 2011) http://www.africanwater.org/sustainability.htmAcademy of Management Review, 22(4), 853-885.

[3] Aileen, K., (2003). Small scale farmers and the need for alternative, environment friendly irrigation Agricultural development. *Development Policy Review*. Vol.16 No.5, pp. 195-215.

[4] Baker, J. (2005). *The Kuhls of Kangra. Community-managed irrigation in the Western Himalaya.*

[5] Beder, S. (1994). The Role of technology in sustainable Development, *Technology and Society*, 13 (4): 14-19.

[6] Burke, J. (2002). *Implementation of national irrigation strategies: fuzzy vision, harsh realities and strange bedfellows.* Conference on Irrigation Policies: Micro and Macro Economic

[7] Carney, D. (ed.) (1998). *Sustainable Rural Livelihoods: What contribution can we make?* London: Department for International Development. International Fund for Agricultural

[8] Carrol, A.B. &Buchholtz, A.K. (2000). Business and Society: Ethics and Stakeholder Management. Cincinnati, Ohio, South Western College Publishing.

[9] Chambers, R. (1994). The origins and practice of participatory rural appraisal. World development 22(7).

[10] Chambers, R. (2003). Rural Development: Putting the last first. West publishing company: Trintoria.

[11] Christian S. and Mbuthia, K.P, (2008). *Smallholder farmers and the market: lessons learnt from a pilot project in Kitui district,. Kenya*. Nairobi: Agricultural

[12] Clarkson, M. B. E. (1994). A Risk Based Model of Stakeholder Theory. Proceedings of the Second Conference on Stakeholder Theory. Toronto, Centre for Corporate Social Performance and Ethics, University Of Toronto.

[13] Cleland, D. I. (1995). Leadership and the Project Management Body of Knowledge. International

[14] Cleland, D.I. (1986) Project Stakeholder Management. Project Management Journal, 17(4), 36- 45.

[15] Cleland, D.I. (1999) Project Management - Strategic Design and Implementation, 3rd edn, McGraw-Hill.Considerations, Agadir (Morroco), June 15-17, 2002.

[16] David, S. M. (2003). World without End, Economics, Environment and Sustainable Development. Deucht publishers: Edinburgh. December, 1-22.

[17] Development (IFAD) (1998). *Evaluation of the Specific Programme for African Countries Affected by Drought and Desertification.* Thematic Study on Small-Scale Irrigation and Water Control Activities. Written by FAO, Investment Centre. Rome: *Evaluation Study.* Washington, D.C.: The World Bank

[18] FAO, (2003): The State of Food and Agriculture in Africa: Working Document of Conference of Ministers of Agriculture of African Union, Maputo, Mozambique. http://www.fao.org: accessed on 12th November, 2011.

[19] Faures, J., Svendsen, M., &Turral, H. (2007). Re-inventing Irrigation. Chapter 9 in Molden, D. (Ed), Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture, London: Earthscan and Colombo, *International Water Management Institute*, 353-394.

[20] Food and Agricultural Organization Statistics FAOSTAT, (2004) FAO Statistics online found FAO website; http://www.fao.org: accessed on 12th November, 2011.

[21] Franks, T.R. &Curswoth, J. (ed) (1993). Managing Projects In Developing Countries. Pearsons Education Ltd. Edinburgh Gate. UK

[22] Freeman, R.E. (1984). Strategic Management: A Stakeholder Approach. Boston MA, Pitman Publishing.

[23] Fujiie, M., Y. Hayami, and M. Kikuchi. (2005) the conditions of collective action for local commons management: the case of irrigation in the Philippines. *Journal of Agricultural Economics* 33(2): 179-189.

[24] Gabre-Madhin E.Z, (2009). *A market for all farmers: market institutions and smallholder participation.* Research paper submitted in May, 2009. Journal of Development Studies, 30: 3 818-830.

[25] Gallivan, M. (2001) Meaning to Change: How Diverse Stakeholders Interpret Organisational Communication about Change Initiatives. IEEE Transactions on Professional Communication 44(4), 243-266.

[26] Gebrehiwot M. (2006) An Assessment of Challenges of Sustainable Rural Water Supply: The Case of OflaWoreda in Tigray Region. Msc Thesis, Regional and Local Development Study (RLDS). A.A.U. Ethiopia.

[27] Gibson, K. (2000) The moral basis of stakeholder theory. Journal of Business Ethics,

[28] Githinji, C. M. (2013). Factors Affecting Sustainability of Community-based Projects: A Case Study of Mutomo District of Kitui County.

[29] Government of Kenya (2010): *Kenya Vision 2030.* Compiled by the Ministry of State for Planning and National Development; Nairobi: Government Printers. 76

[30] Government of Kenya, (2009): *Population and housing census results in Kenya.* Compiled by the Central Bureau of Statistics; Nairobi: Government Printer Groups. New York: McGraw Hall Publishing Company

[31] Hall, A.W. (1999). Priorities for irrigation agriculture. *Agricultural Water Management.* 40(l):25-29.

[32] Harvey, A. & Reed, A. (2007) Community-Managed Water Supplies in Africa: Sustainable or Dispensable? *Community Development Journal* 42 (3): 365–378.

[33] IFAD (2001). *Participatory approaches for an impact-orientated project cycle.* Strengthening the impact orientation of IFAD"s project cycle. Rome, 34 p.

[34] IFAD (2004). *The Role of agricultural SWAps in rural poverty reduction: Implications for development assistance.* Sector-Wide Approaches in Agriculture. Issue Paper. Executive Board Informal seminar, 7 September 2004, 45 p.

[35] Jamah A, (2011), *Focus on food crops.* The standard news paper: February 27, 2011.

[36] Jayawardene, J. (1986). *The training of Mahaweli Turnout Group leaders in participatory management in Sri Lanka's irrigation schemes.* International Irrigation ManagementInstitute,Sri Lanka.

[37] John Wiley &sons.Singleton, R; Straits M.M; McAllister R. (1988). Approaches to Social Research: Oxford University Press: New York.

[38] Jones, W. (1995). *The World Bank and irrigation: a World Bank Operational Evaluation Study.*

[39] Jones, W. I. (1995). *The World Bank and irrigation. World Bank OED. A World Bank Operation* Journal of Project Management. 13 (2): 82-87.

[40] Kasomo D. (2006). *Research Methods in humanities and education and training.* Eldoret,

[41] Keita, M. (2004). *Irrigation planning and implementation: Mali case studies.* In: IWMI (2004)Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities.

[42] Keman, W., Larbi, E., Bakalian, A. & Whittington, D. (2008). Post Construction Support and the sustainability of Rural Water Projects in Ghana, Conference, Accra, Ghana: 287-294.Kenya: Zapf chancery*Bali.* Princeton University Press, Princeton, New Jersey,

[43] Kinyua J. (2004). *Assuring food and nutrition Security in Africa by 2020: Towards achie sustainable irrigation of small scale dryland farmingin Kenya.* Nairobi: Ministry of Agriculture, Government Printers.

[44] Koestler, A, G. & Koestler, L. (2008). Sustainability of Rural water Suplies through Monitoring, 33rd WEDC International Conference, Accra, Ghana: 399-402.

[45] Levidow, L., Zaccaria, D., Maia, R., Vivas, E. Todorovic, M. &Scardigno, A. (2014). Improving Water-efficient Irrigation: Prospects and Difficulties of Innovative Practices, *Journal of Agricultural Water Management* 146: 84-94.

[46] Lockwood, H. & Smits, S. (2011). Supporting Rural Water Supply, Moving Towards a Service Delivery Approach: Practical Action Publishing, Warwickshire, UK.

[47] McCartney, M., E. Boelee, O. Cofie, F. Amerasinghe and C. Mutero. (2005). *Agricultural water development in sub-Saharan Africa: planning and management to improve the benefits and reduce the environmental and health costs.*

[48] Mitchell, R.K. Bradley, R.A. and Wood, D.J. (1997) Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What really Counts. The

[49] Morardet, S., Seshoka, J., Sally, H. and Merrey, D. (2004b). *Irrigation project planning and implementation process.* In: IWMI, Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities. Case Studies Report.

[50] Morgan P. (2002). Technical assistance: Correcting the precedents. *Development Policy Journal*,

[51] Mugenda, M. O. & Mugenda G. (1999). Research Methods: Quantitative and Qualitative

[52] Mugenda, O. M. and Mugenda, A. G. (2003): *Research Methods: Quantitative and Qualitative*

[53] Nijman, C. (1991). *Irrigation management processes and conditions: A case study of Sri Lanka's*

[54] Nijman, C. (1992). *Irrigation decision-making processes and conditions: A case study of Sri Lanka's Kirindioya Irrigation and Settlement Project*. Colombo, Sri Lanka: IIMI.

[55] Ofuoku A. U (2011). Effect of community participation on sustainability of rural water projects in Delta Central agricultural zone of Delta State, Nigeria**,** *Journal of Agricultural Extension and Rural Development Vol. 3(7), pp. 130-136*, online http:// academicjournals.org/JAERD ISSN- 2141 -2154.

[56] Olander S. (2006). External Stakeholder Analysis in Construction Project Management. Doctoral Dissertation. Construction Management, Lund University

[57] Omilola, B. (2004). *Irrigation planning and implementation: Nigeria case studies.* In: IWMI, Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities. . 60

[58] Omiti M.J, Otieno J.D, Nyanamba, O.T, and Mccullouch E, (2009), Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri- urban areas of Kenya.

[59] Orodho J. A. (2005). *Techniques of writing research proposals and reports in education and training and social sciences.* Nairobi: Kanezja HP enterprises.

[60] Orodho, J.A. (2004). Techniques of Writing Research Proposals and Reports in Education and Social Sciences. Nairobi. Masola Publishers.

[61] Orodho, J.A. (2005). Techniques of Writing Research Proposals and Reports in Education and Social Sciences. 2nd edition. Nairobi. Masola Publishers.

[62] Ostrom, E. (2002). *The challenge of underperformance in improving irrigation governance and management in Nepal.* ICS Press, Oakland, California, USA.

[63] Peacock, T. (2005). *Agricultural water development for poverty reduction in Eastern and southern Africa. IFAD. Report submitted to the Collaborative Program on Investment Agricultural Water Management in sub-Saharan Africa: Diagnosis of Trends a Opportunities 2005.* Penning de Vries, F., Sally, H., and Inocencio,

[64] Phillips, R. (2003) Stakeholder Theory and Organizational Ethics, Berrett-Koehler Publishers Inc.

[65] Post, J.E. Preston, L.E. and Sachs, S. (2002) Redefining the Corporation -Stakeholder Management and Organizational Wealth, Stanford University Press.

[66] Pouloudi, A. and Whitley. E. A. (1997). Stakeholder Identification in Inter-Organizational Systems: Gaining Insights for Drug Use Management Systems. European Journal of Information Systems (6), 1-14.

[67] PPOA-Public Procurement Oversight Authority (2009). Public Procurement for Schools and Colleges. 1st Edition. Nairobi. Government Printer.

[68] Project Management Institute (PMI). (2004) A Guide to the Project Management Body of Knowledge, PMBOK 3rd edn. Project Management Institute Inc.

[69] Rajoelison, J. (2004). *Irrigation planning and implementation: Madagascar case study.* In: IWMI Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities. Case Studies Report. Volume 2: Highlights findings of various components. November 2004.

[70] Robbins, S. P. (1998). Organizational Behaviour: Concepts, Controversies and Applications (8th Ed). New Delhi: Prentice Hall of India Private Limited

[71] Robert, M.**,** (2003) Humanizing the City, Public Affairs. Pamphlet press: New York.

[72] Rowley, T.J. (1997). Moving Beyond Dyadic Ties: A Network Theory of Stakeholder Influences. Academy Of Management Review. 22(4) 887-910.

[73] Roy, L., (2003) Community Development and Social Work Practice. Reportat Brandeis University: New York.

[74] Saunders, M., Lewis, P., & Thornhill, A. (2003). Research Methods for Business Students. Harlow, Prentice Hall, England. 60

[75] Schneider, M. (2002). Stakeholder Model of Organizational Leadership. Organizational Science Sector Support Programme, Kenya.

[76] Sekaran, U. (2000). Research Methods for Business. New York.

[77] Silvinus, G., Schipper, R., Planko, J., Brink, J. & Köhler, A. (nd). Sustainability in Project Management, Retrieved from http://www.gowerpublishing.com/isbn/9781409431695

[78] Slater, R., L. Peskett, E. Ludi, and D. Brown. (2007). *Climate change, agriculture policy and poverty reduction-How much do we know?* Natural Resource Perspectives 109, Overseas Development Institute, London.

[79] Smith, G. E. & Nagle, T. T. (1995). Frames of reference and buyers' perception of price and value. California Management Review, 38 (1), 98 - 116.

[80] Standish Group, (1994). The CHAOS report (1994). West Yarmouth, Massachusetts Standish Group International.