FACTORS CONTRIBUTING TO THE SUCCESS OF PELIS STRATEGY IN FOREST PLANTATION ESTABLISHMENT: CASE STUDY OF MUCHEENE FOREST

Ikiara Isaac Gichuru*
Masters Student, Africa Nazarene University, Kenya

Full Length Research

*Gichuru Ikiara is currently a lecturer in strategic management and entrepreneurial skills at the University of Nairobi, Meru University and Kenya Methodist University. He holds a Bachelor of Commerce (Business Administration) and Masters in Project Planning and Management, both from the University of Nairobi, and MBA (strategic management) at Africa Nazarene University and is currently a PhD student in Business Administration at Kenya Methodist University.

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15 | P a g e

ABSTRACT

This applied research project is to a large extent concerned with the factors that contribute to the success of forest plantation establishment through the PELIS strategy i.e non-residential cultivation in the forest. The former shamba system has lately changed to Plantation Establishment for Livelihood Improvement Scheme (PELIS) to make it acceptable. Our country's forest cover was at less than 2% of the total land area as opposed to the internationally required standards of at least 10%. The researcher briefly outlined the general factors affecting forest plantation establishment in the country and narrowed down the field research to Mucheene forest in Meru County. The objectives of the study included: to examine how the PELIS strategic policy guidelines affected forest plantation establishment; to assess the effect of community participation in forest plantation establishment; to evaluate the role of the Sub-District Development Committee's in forest plantation establishment; to explain how capacity building affected forest plantation establishment and to establish the extent to which monitoring affected forest plantation establishment. The PELIS approach was of great importance to the forest plantation establishment particularly in poverty reduction, employment creation, reducing government expenditure by reducing its staff and its contribution to environmental conservation. To realize the objectives, the study used both qualitative and quantitative approaches. Questionnaires and interviews were used to collect data from accessible population. The population comprised of one thousand six hundred and fifty cultivators who are members of the six Community Based Organizations (CBO's) namely; Kimbo, Nchooro, Mujujune, Muruguma, Kirukuru and Katheri which were operating in the Mucheene forest block. The researcher collected data from one hundred and sixty five cultivators and used descriptive and inferential statistics to analyze the data. The data was analyzed using frequency distribution tables, percentages, and distribution tables. The study was significant in that its findings will strengthen the Participatory Forest Management (PFM) concept of sharing benefits so as to address the causes of failure of the former shamba system and build on the successes of the PELIS programme. The findings of the study indicated that the forest plantation establishment through the PELIS strategy was faced with various challenges at various levels despite being the preferred method. Capacity building was low and which had direct reflection on the understanding of the policy guidelines, community participation at various levels and monitoring and evaluation of the strategy implementation. The researcher recommended that concerted efforts be made to sensitize the community on the PFM concept, avail funding to the programme, streamline the employment of casuals under the economic stimulus programme, and to physically count the planted trees with the objective of establishing the survival rate. The researcher recommends that further research be done on the issue of benefit sharing between the community and Kenya Forest Service, the prospect of establishing nature-based enterprises to address the issue of poverty and also address the issue of over grazing so as to maintain an optimal carrying capacity of the eco-system.

Key Words: *Pelis strategy, forest plantation establishment, Mucheene forest*

INTRODUCTION

The shamba system or Non-Residential Cultivation (NRC) that has been re-branded to PELIS was first introduced in Kenya in 1910 as a modified form of the Taungya system used in South East Asia. Source: Oduol, P.A (1986) Management of the shamba system. It was a method of forest plantation establishment in which farmers tend young plantation trees as they produce food crops. Resident forest workers were allocated freshly cleared areas to plant food crops for 2-3 years while tree seedlings become established. Kagombe, J.K. and James Gitonga, J. (2005).A case study on shamba system. The shamba system was originally used to convert natural forest to forest plantations and contributed to the establishment of 160,000 hectares of plantation forest to supply wood for industrial and domestic use in the country and ease pressure on the natural forests. The conversion of natural forest to plantations was stopped in 1979 but the shamba system continued as Kenya's preferred method of re-establishing harvested plantations. Source: Kagombe, J.K (1998).Suitability of shamba system in plantation establishment.

From 1910 to 1975 forest cultivators were integrated into the forest department (FD)as resident workers. The produce from the forest plots was considered as part of the workers pay as they tended the young trees. The system changed in 1975 (Kenya Forest Service, 2007) The resident workers were permanently employed by the forest department and required to rent the plots. The offers of tenancy were extended to others outside the forest and the number of cultivators rose significantly and supervision became a problem. Many of the new cultivators did not understand the concept of shamba system (NRC) and thus the tree survival rates declined forcing a presidential decree in 1987 to ban the system and eviction of the forest residents followed in 1988 (Kenya forest Service, (2007).

After the ban, no arrangements were put in place to continue with plantation establishment. The reforestation programmes stagnated. According to the plantation establishment review in year 2000 by the forest department less than 20% of clear felled areas were being replanted and that 80% of the replanted areas were not weeded. The civil service retrenchment programme of 1994 worsened the situation leading to an acute shortage of labour in forest stations. Kagombe, J.K. (1998). Suitability of shamba system in plantation establishment. The shamba system was re-organised and reintroduced in a few areas as non-resident cultivation (NRC) in 1994. (Here farmers are only allowed in the forest during working hours). This was due to increasing replanting backlog and inadequate financial resources – the budgetary allocation to the FD was on a declining trend. The allocation was Shs. 390 million in 1996 declining to Shs 95 million in year 2004.Forest department (2005).Funding towards forest plantation establishment.

Under the new NRC system cultivators were not allowed to reside in the forest areas, and that the final authority in the management of the NRC was vested with the District Development Committee (DDC). In 1997 the NRC had spread to all major forest plantations in the country except Ukambani and Coast regions where the hilly terrain was a hindrance. Kenya Forest Service (2007).A proposal for phased implementation of the PELIS strategy in forest reserves. The politicians and the provincial administrators in the DDC's exerted strong influence over the technical departments. According to the KFS some unsuitable areas for plantation establishment had been cleared for cultivation and with no meaningful replanting of trees. In the year 2000 the FD re-issued NRC

management guidelines and established a task force with representation from the FD, the Kenya Forestry Research Institute (KEFRI), Kenya Wildlife Service (KWS), and the Nyayo Tea Zones and Development Corporation (NTZDC) to review the implementation of the NRC. Kagombe, J.K. (1998).Suitability of the shamba system in plantation establishment.

The task force revised the NRC management guidelines and presented recommendations for reforms, with an emphasis on sound management of areas under cultivation, involvement of the cultivators in reforestation efforts, and closure of those areas that could not be replanted immediately. A NRC monitoring team was set up to monitor the day to day NRC implementation. Forest department (2005).Despite the general improvement in plantation establishment, some areas lagged behind and the NRC was banned again in 2003 through a cabinet directive and the ban became effective in early 2004. Later in the same year authority was given for NRC to be piloted in Dundori and Bahati forest stations under new guidelines. According to a survey by the FD (Kenya forest service) in 2007 a total of 700 hectares out of the 900 hectares which had been opened up for cultivation had been replanted with trees in the past two (2) years in Dundori and Bahati forest stations. After an evaluation of the performance of the NRC, the shamba system was re-branded and named plantation establishment for livelihood improvement scheme (PELIS). PELIS was started in 2007 in 16 districts that had replanting back log. The programme was started with 8000 hectares out of the targeted 16100 hectares which had replanting backlog. The programme was geared to assist and/or benefit the most vulnerable groups of the society and to be implemented by the Community Forest Association (CFA's), under the participatory forest management (PFM) guidelines, the amended forest Act 2005, and the PELIS guidelines, Standard newspaper (1-12- 2008).The PELIS strategic policy guidelines of forest establishment are envisaged to deliver benefits such as; boost conservation efforts, improve food security for the forest adjacent communities and the country at large; boost incomes for the least advantaged in the society; revenue to the Treasury from the land rent of the plots; and savings by the FD realized in establishing the forests.

STATEMENT OF THE PROBLEM

Our forests have been disappearing at an alarming rate and that they remain highly threatened. According to sessional paper No. 1 of 2007 on forest policy, our country had less than 2% of its total land under forest cover as opposed to the internationally required standards of at least 10% of the total land area which the country is aiming to attain. The State of Environment (SoE) report for Kenya (2011) estimated that Kenya had 19500 million m^3 of renewable surface water converting to $650m^3$ per capita. This was estimated to drop to $250m^3$ per capita in 2025 with the population projected to grow to 60 million. This is against a global recommendation of $1000m^3$ per capita and put the country in the category of chronically water scarce countries. This is a serious environmental challenge, especially in Kenya's low potential areas which totals to 83% of the country's area, commonly called ASALS. Source: Ministry of Environment (2011), State of Environment report for Kenya.

The PELIS strategy is an important strategy aimed at realizing this goal. It reduces the competition from weeds, has better growth and a higher survival rate of planted trees. The working relationship between Kenya Forest Service and the cultivators has greatly improved from the previous situation when the problem was the interpretation of the purpose of the cultivation while planting trees. The

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18 | P a g e

consequence of this has been low growth and survival rates of planted trees, low forest cover and therefore low per capita water level. The study therefore assessed the factors that contribute to the success of forest plantation establishment and identified measures that can be taken to answer the research questions and ensure the realization of the 10% forest cover.

OBJECTIVES OF THE STUDY

1. To examine how the PELIS strategy policy guidelines affect forest plantation establishment.
2. To assess the effect of community participation in forest plantation establishment.
3. To explain how capacity building on the cultivators affect forest plantation establishment.

LITERATURE REVIEW

Conservation and Protection

The forests need to be conserved and protected in that forests catch, store and release water essential for human, wildlife, agriculture and industry; they help protect and enrich soils, reduce severity of floods and landslides, and moderate climate.

Forest Cover

From a global perspective, the world forest cover is nearly from (4) billion hectares or about 30% of the world land area but between 1990 and 2005 the world lost 3% of its total forest area and Africa alone lost 9% of its forest cover between 2000 and 2005. Source: Butler (2005).World deforestation rates and forest cover statistics 2000-2005.Butler further put it that wealthier nations like North America, Europe and China were increasing their forest cover while it was diminishing in the tropics. The biggest losers in the region were Nigeria, Sudan, Zambia, Tanzania, Democratic Republic of Congo and Zimbabwe. Forests were among the world's chief carbon sinks, store a vast amount of carbon and when trees are cut and converted into another use, carbon become released back into the atmosphere and whose repercussions are rise in temperatures (global warming) (Butler, 2005).

Around the globe, our forests were disappearing at an alarming rate and that they remain highly threatened. According to the Green peace / Food and Agriculture Organization of the United Nations/Wildlife Fact-file / The Mitchell Beazley family Encyclopedia of Nature (2000); at least 4.5 million hectares of the rainforest were logged each year for commercial needs. Hardwoods such as mahogany, teak, menanti and ebony take hundreds of years to mature, so they cannot be replaced easily. The rainforest occupy about 10 million sq km of the wettest land on earth and supports some of the richest concentrations of wildlife and vegetation and all these existed in a delicate balance with a largely self-perpetuating climate. It was estimated that at least 2million different species of plants and animals thrive in rainforests. The Food and Agricultural Organization (FAO); Forest Resource Assessment of 1990 classified Kenya among the countries with very low forest cover of less than 2% of the total land area.

The United Nations Conference on human and environment at Stockholm in 1972 put environment on the global agenda for the first time. Later the United Nations Conference on Environment and Development (UNCED) in Rio de Jeneiro in 1992 re-affirmed the need to balance development and

environmental concerns. Kenya participated in this conference which came up with agenda 21 which called for improved environmental information for decision making. To realize this goal the Kenya Government developed the National Environment Action Plan (NEAP) in 1994 which led to the enactment of the Environmental Management and Coordination Act (EMCA) no 8 of 1999. The Environmental Management and Coordination Act creates the National Environment Management Authority (NEMA) to be the principal agency of government that coordinates all matters related to the management of the environment including the preparation of the State of Environment Report (SoE) every year. According to the State of Environment (SoE) report for Kenya, 2003, it was estimated that Kenya had 19500 million m^3 of renewable surface water converting to 650m^3 per capita. This was expected to drop to 250m^3 per capita in 2025 when the projected population grows to 60 million. This was against a global recommendation of 1000m^3 per capita and puts the country into the category of water scarce country. Source: Republic of Kenya, (2003), State of Environment (SoE) report for Kenya. Since the Rio conference in 1992 countries globally adopted a State of Environment (SoE) reporting on environmental issues and of measuring progress towards sustainable development. This report provided scientific information that formed the basis to develop policies, formulate plans and initiate processes for the management of the environment in Kenya.

The response to the recognition within the international community that deforestation and forest degradation in developing countries played a significant role in climate change, the International Small Group and Tree planting program (TIST); a component of the United States Aid for International Development (USAID) was launched in 1999 as a carbon dioxide sequestration credit scheme geared to assist developing countries in planting trees to reverse deforestation and the adverse effects on climate change. The information brief by the Reduction of Emissions from Deforestation and Forest Degradation (REDD) programme of the Kenya Forest Service (March 2010) painted a dim picture on Kenya. This report shows that the country lost 54000 hectares of forest cover every year. The major reasons for this loss were conversion of forest land to agriculture and other uses, illegal logging, charcoal burning, forest fires and encroachments. Source: Environment Ministry, Kenya (2010), Reduction of Emissions from Deforestation and Forest Degradation Programme.

On the destruction of Karura forest in Kenya, Toeffer, (2000) the Executive Director of the United Nations Environmental Programme (UNEP) said that "the forest is a precious natural resource which the city of Nairobi cannot afford to lose. The forest cleans the air by absorbing of carbon dioxide and offers unique sites for recreation and education of city dwellers. It provides other environmental functions like climate moderation for the inhabitants of the Nairobi City and its environs". A Kenya Wildlife Service (KWS) Survey by Gathaara, (2000) on Mt. Kenya forest revealed widespread destruction of the forest cover. A physical count revealed 2400 charcoal Kilns between forest plantations, shamba system and human settlements lying beyond the forest boundaries. There was cultivation of Marijuana in the indigenous parts of Mt. Kenya forests with about 143 marijuana fields spotted covering about 200 hectares and spread deep into the forest reserve. Spots of live forest fires were detected. Large heads of cattle (4258 in 2000) were allowed in the forest without due regard to the carrying capacity of the ecosystem. Heavy logging of both indigenous and exotic trees and incidences of landslides were observed. According to Mwasame

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20 | P a g e

(2000) the Director of Tourism, forests play a complementary role in the tourism industry, and were emerging as a single most important attraction for tourists. However, it was observed that the Amboseli National park was degenerating into an arid landscape and that the depletion of the forest cover was adversely affecting the climate change. The destruction of these catchment areas could force wildlife to relocate resulting to a big decline in national earnings in terms of foreign exchange. Due to the extent of damage, the Kenya Wildlife Service was mandated by the Government to take over the management of Mt. Kenya forest in year 2000.

The effects of the Mau catchment forest degradation were being felt across the region.With the reduction of the forest cover the forests lost their ecological functions of water catchment, biodiversity conservation and amelioration of climatic conditions. Most of the rivers originating from the Mau complex in the west of Rift Valley had been turned into seasonal streams. The reduction of water flow had very serious implications on the ecosystem and livelihoods of the communities downstream. The effects of climate change were being felt in Lake Nakuru where the water levels had declined forcing flamingoes to migrate, thus affecting the tourism industry. According to Dr. Douglas Kivoi in a paper on Water and Environment in Kenya (Daily Nation. 2012. Nov.27).A ban on irrigation was imposed in Jan 2011 by the Ministry of Water through the Director of Water Development on the Eastern part of Mt. Kenya forests. The affected were areas adjacent to Mucheene and Marania forest blocks where rivers had become seasonal streams. The ban was imposed in line with sec 4 (2) and 33 of the amended water Act 2002 (Ministry of water and irrigation -Meru sub-region, 2011).
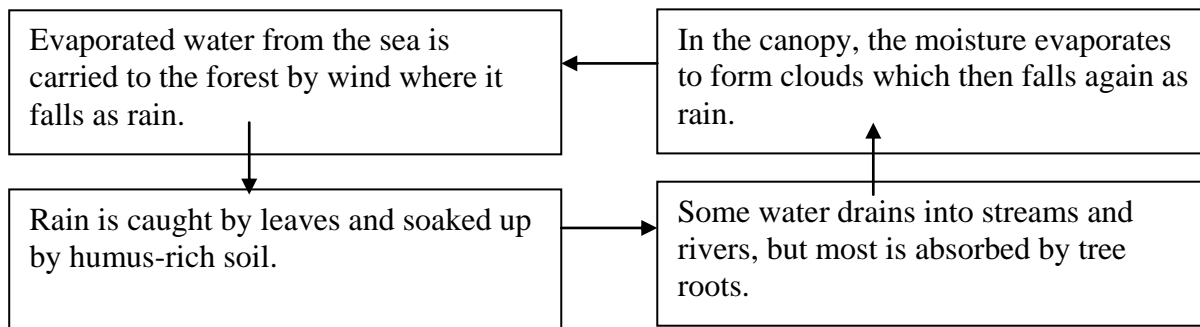
Figure 1: Precipitation cycle in the rainforest

*Source:*Greenpeace / Food and Agriculture Organization of the United Nations/wildlife fact-file / The Mitchell Beazley Family Encyclopedia of Nature (2000).

Climate Change

The vulnerability of human societies to climate change mainly lies in the effects of extreme weather events rather than gradual climate change. Impacts of climate change so far include adverse effects on small states, indigenous populations in high-latitude areas, and small but discernable effects on human health. Over the 21st century, climate change was likely to adversely affect hundreds of millions of people through increased coastal flooding, reduction in water supplies, increased nutrition and increased health impacts. (http://en.wikipedia.org/wiki/Global.warming) assessed on 24/10/12.

According to Human Impact Report (2009) Climate Change- The Anatomy of a Silent Crisis (2009) at least 325 million people globally were affected by climate change and that the global annual economic cost of the climate change was estimated at Shs. 9.8 trillion which was greater than the amount of aid that flows into developing countries annually. Worst hit were developing countries where livelihoods were destroyed when income from agriculture, livestock, tourism and fishing got lost due to weather-related disasters and desertification. Supply of clean water had become more erratic due to severe floods and droughts. The number of climate displaced people was expected to increase due to rise in sea level, desertification and floods. To address the impact of climate change, projects which reduce the gases that cause global warming were being backed under the United Nations brokered carbon markets under the Clean Development Mechanism (CDM). This programme allowed developed countries to offset some of their emissions from cars, factories and homes by funding clean energy projects in developing countries for example the tree planting programme under TIST (The International Small Group and Tree Planting Program).TIST, component of the United States Aid for International Development (USAID) was launched in 1999 as a carbon sequestration credit scheme geared to assist developing countries in planting trees in order to reverse deforestation and the adverse effects on climate change. The TIST programme is also being implemented in Mucheene forest. On 6th June 2011 the Mucheene based Community Forest Association signed a memorandum of understanding between the Kenya Forest Service and Clean Air Action Corporation to have the community association benefit from the programme. To mark the World's Environmental Day, Kenya's then Environment Minister Michuki, (2011) lamented that the current magnitude of climate change was attributed to irresponsible human activities. The indiscriminate cutting of trees for timber, fuel wood and charcoal burning, and clearing of vegetation for agriculture and settlement were the most serious and common human practices that contribute to local or regional environmental degradation.

The ongoing negative effects of climate change would continue to impact workers and their families especially those dependent upon agriculture, and tourism. Alternative sources of employment need to be looked into and urgently. According to a United Nations Environmental Programme (2009) Towards Decent Work in a sustainable low carbon world. Report titled green jobs; changing patterns of employment and investment due to efforts made to reduce climate change and its effects were already generating new jobs across various sectors and economies. The *Kazi KwaVijana* programme in Kenya was a step forward in this direction. It was geared to create employment, hence reduce poverty, rehabilitation and reforestation of degraded forests. At Mucheene forest the youths were involved in seed production, pruning and maintenance. The conservation environmental facility (CEF) programme of the Community Development Trust Fund (CDTF) which was a joint initiative of the DANIDA, EUROPEAN UNION and Kenya Government had released a funding of Shs. 20 million to assist in conservation and poverty eradication efforts (May 2012) within Mucheene forest.

Implementation of the PELIS Policy Guidelines

According to a paper by Oduol, P.A(1986) of the International Council for Research in Agroforestry (ICRAF) on the management of the shamba system; the origin of the shamba system could be traced back to the 1850's in Burma where it was used as a means of replanting teak plantations of badly degraded land. It was essentially a modification of the traditional shifting

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22 | P a g e

cultivation, but various forms of the practice are found in different parts of the tropics. The shamba system is a form of taungya (shifting cultivation) where agricultural food crops are grown alongside the forest tree species. The origin of shamba system (taungya) could be traced back to the 1850's in South East Asia (Burma) where it was used as a means of replanting teak plantations of badly degraded land. The successful implementation of the taungya system in Burma saw Myanmar continue to supply substantial stocks of timber (especially teak) to India and Indonesia.

According to internet: Mynamar's statistical year book (2007) a total 525,785 acres of plantation had been established between 2000 and 2007.In the 1930's Ghana launched taungya system (shifting cultivation) of plantation development adopted from Myanmar (Internet: FAO 2001) where farmers were given parcels of degraded forest reserves to produce food crops and to help establish and maintain trees. The purpose was to produce commercial timber in a short time as well as address the shortage of farmland in communities bordering the forest. A total of 75% of Ghana's commercial public and private forest plantations (35000 hectares) were established under this system. Farmers however, had no rights to benefit sharing or decision making and the result was neglect and abuse of the system i.e. refusing to weed, over pruning and debarking. Source: Mitton and Birikorang (2001).

The shamba system practices continued to change over time. From 1910 to 1975, the forest cultivators were integrated into the Forest Department (FD) as resident workers in plantation establishment (Source:Kagombe, and Gitonga 2005). They were allocated forest plots (shambas) and guaranteed work for nine months per year. The produce from the plots was considered as part of the workers pay as they tended the young trees. The system changed in 1975 and the resident workers were permanently employed by the FD and required to rent the plots. The offer of tenancy was extended to others outside the forest and the number of cultivators rose significantly and supervision became a problem. The involvement of third parties resulted to abuse of the whole system. The resident workers (cultivators) assumed squatter rights and started encroaching on prohibited areas. During the evictions of 1988 there were schools, health centres, and shopping centres within forest stations. The Government did not have labour for plantation establishment and therefore introduced non-residential cultivation. The cultivators saw this as unviable since there was no one to protect their crops from game damage.

Since late 1980's, extensive investigations were conducted by Kenya Forestry Research Institute (KEFRI) into alternative methods of establishing plantations, including natural regeneration, slashing, spot hoeing and total cultivation. Studies were conducted in Uplands forest station in Kiambu district to determine the results of various methods of site preparation and management of both the growth and cost of plantation establishment. The growth in diameter after 3 years varied from 1.9cm for no preparation to 4.7cm under total cultivation (table 1 below). The high growth in total cultivation was attributed mainly to reduced competition from weeds (Source: Kagombe, and Gitonga 2005). The plantation establishment for livelihood improvement scheme or shamba system is an improved pro-poor NRC system and targets the most vulnerable people among the forest users and implemented under carefully controlled manner.

Therefore in Mid 2007 and acting in conformity with the provisions of the forest Act 2005 and sessional paper No. 1 of 2007 on forest policy, the KFS in collaboration with key sector partners

reviewed the advantages and disadvantages of the NRC. After this review they developed a new model and changed the name from NRC to PELIS. People had misunderstood the concept and therefore the need to change the name to make it easily understood. In 2007 the KFS therefore started the implementation of the provisions of sec 47 of the Forest Act 2005 which provides for the signing of a management agreement between the Director KFS and the CFA for the later to undertake plantation establishment through NRC in forest reserves. After the agreement was signed, the KFS marked areas for cultivation. This gave room for the survey work to be done. The allocation of the plots was then done democratically through secret ballot by the Committee members of the Kamulu Community Forest Association. The study recommended that the first PELIS programme would involve opening up 8000 hectares of fallow forest plantation area for cultivation and reforestation for phase one of the scheme. The 8000 hectares were to be replanted with trees by the end of the second year of cultivation. The target areas were 15 districts in Kenya with each district having not more than two forest stations under the scheme so as to make it easier to supervise by the Zonal manager. In Eastern Province (Eastern conservancy) there were only two sites (Mucheene and Ontulili forest stations) both in Meru Central district. A total of 200 ha was allocated in 2008 and a further 135 ha in 2011 in phase II of the programme.

Table 1: Areas with planting backlog as at August 2007 and to be covered in phase 1 of PELIS Scheme

	Province	District	Backlog (Ha)	Remarks
1	Eastern	Meru Central	500	Mucheene/Ontulili
		Makueni	500	
	Sub-total		**1000**	
2	Rift valley	Koibatek	1700	
		Nakuru	500	Dundori / Bahati
		Kericho	600	
		KFC Masaitablock	1000	
		UasinGichu	1500	
		TransNzoia	1800	Excluded settled areas
		Keiyo	1500	
		Laikipia	700	Excluded settled areas
		Nandi South	200	
	Sub-total		**9500**	
3	Central	Nyeri	400	In Gathiuru station
		Kiambu	400	Kinale / Kamae
		Nyandarua	1400	OlBollosat / Geta
		Thika	500	Most of the area enclosed by solar fence
	Sub-total		**2700**	
4	Western	Lugari	1700	
		Kakamega	700	
		Mt. Elgon	500	
	Sub-total		**2900**	
	Grand Total		**16100**	

Source: Kenya forest service (2007)

Note: The above forest stations were selected on the basis of having big planting backlogs and were outside or on the peripheries of the major catchment areas.

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24 | P a g e

Table 2: Cost of plantation establishment per hectare

Activity	Total cultivation Shs.	Slashing Shs.	Slashing & spot hoeing Shs.	No preparation Shs.
Clearing	10,000.00	3,500.00	4,500.00	0
Stacking	1,500.00	1,500.00	1,500.00	1,500.00
Planting spots	1,500.00	3,000.00	3,000.00	3,000.00
Planting	1,500.00	1,500.00	1,500.00	1,500.00
Yr. 1 tending	10,000.00	3,500.00	4,500.00	0
Yr 2 tending	10,000.00	3,500.00	4,500.00	0
Yr 3 tending	10,000.00	3,500.00	4,500.00	0
Total cost	44,500.00	20,000.00	25,000.00	6,000.00

Source: Task rates from FD currently in use 2005

The cost of plantation establishment per hectare for the first 3 years was as low as Shs. 6000.00 for no preparation and as high as 44,500.00 for total cultivation. The plantation was considered well established after the third year, when the tree canopy closed in. The cost distribution for each method was as provided in table 3above.Under the shamba system most of the costs are borne by the cultivator, who benefited from the planted food crops. However, the system had been abused such that prohibited farming tools are used, non-specified crops were planted and penalties for wrong doers were not honoured especially for those who rented out plots to outsiders who were not interested in conservation.

Limited Participation of All Stakeholders

In Guyana the involvement of communities started immediately after the Second World War where colonizers set up pilot plantations as permanent research plots to investigate the growth rate under different treatments – soil types, pruning and fertilizer. The steady rise in prices for timber products led to the demand to establish more plantations. Communities benefited from managing nurseries, producing seedlings and sale and employment for women and the aged. Source: Guyana Forestry Commission (2006), Benefit sharing with forest adjacent communities. According to a journal on Agro forestry systems by Nwonwu(2004) of Rivers State University of Nigeria, the costs of labour under the Taungya (shamba system) were lowest by between 30% and 47% than when labour was engaged on permanent or casual basis. The benefits were:- improved forest cover through higher tree survival, food security to meet increased population demand and incomes to the forest adjacent communities and reduction in costs. The issue of benefits was supported as a strategy for plantation development with the active involvement of the rural communities (www.fcghana.com/publications/forest).

There was an unstable working relationship between the KFS and the community (cultivators) and the problem was the interpretation of the purpose of PELIS strategy. The consequence of this was low growth and survival rates of planted trees, low forest cover and therefore low per capita water level. However according to research, forestry management agencies were slowly moving away from the command and control of forestry management to participatory forest management approaches that require the involvement of a broad spectrum of stakeholders, from the planning to the implementation. This concept was borrowed from experiences from countries like India, Nepal,

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25 | P a g e

Uganda, Ghana, Tanzania and Zambia. In Tanzania the management of the forest was under the Joint Forest Management (JFM) guidelines, while in Uganda there was Collaborative Forest Management (CFM) guidelines. Ministry of Environment, Natural Resources and Wildlife (2004); Participatory forest management guidelines. These approaches tended to improve the working relationships between key stakeholders in these countries and thus improve forest management.

According to Kenya's Vision 2030, the first medium term plan 2008-2012 about 42% of our gross domestic product (GDP) derive from natural resource based sectors of agriculture, forestry, tourism, mining, water and energy that were otherwise closely related to the state of the environment. (Republic of Kenya: Vision 2030). Sound environmental conservation resulted in preservation of natural resources thus, assuming continuous supply of environmental goods and services. In addition, proactive management of the environment pre-empts serious calamities and occurrences e.g. drought, floods, and global warming that would otherwise take up a lot of resources to deal with their eventualities. Since 1968, the country had experienced a major decrease in forest cover, which had resulted in reduced water catchment, biodiversity, supply of forest products and habitats for wildlife. Also according to sessional paper No. 1 of 2007 on forest policy, the forest sector had been beset by conflicts between forest managers and forest adjacent communities over access to forest resources.

Lack of Adequate Resources for Capacity Building

According to the Global Environmental Facility (GEF) – a component of the European Economic Commission, capacity building for village vigilantes helps change peoples attitudes towards management and biodiversity conservation and was very necessary. Lack of adequate capacity had negative impact on tree nursery establishment, tending of the seedlings, agro forestry extension and fire management. Participative monitoring could also not be realized without adequate capacity.
According to the community development handbook – A tool to build community capacity by Frank, and Smith, (1999); "All people and communities have a certain amount of capacity and no one is without capacity but we need to develop it. Capacity was simply the ways and means needed to do what has to be done. It was much broader than simply skills, people and plans and includes commitment and resources etc. It is supposed to empower people to take control over their lives, set their own agenda, and to also build self confidence in their affairs." Therefore lack of enough resources to build the peoples capacity up to the grassroot was an impediment to effective participation in forest plantation establishment. The issue of participatory forest management was not clearly understood. The contents of sessional paper No. 1 of the forest policy of 2007 and the forest Act of 2005 were not understood by all who participate and especially in regard to the aspect of benefit sharing between the KFS and the community and also for participating in forest establishment.

According to the provisions of the Forest Act 2005 the cultivators in the forest (under PELIS Scheme) were supposed to sign a permit to allow them entry into the forest. The permit specified the rights and obligations of anyone who was allowed into the forest. It also specified the types of crops to be planted and the penalties for misuse of the forest resources. The KFS was supposed to facilitate in capacity building on PFM but was not effective due to limitation of funds.

Insensitive Approach to Gender and Youth Issues

The disappearance of our natural resources had severe impact on the lives of women and their children. Community involvement was in favor of men in all aspects of project design and implementation. According to Sessional Paper No. 1 of 2007 on forest policy, traditional gender roles had inhibited the participation, of women and youth in forestry development. In particular, the role of women and youth in forest and tree resource utilization and management was not fully recognized. Initiatives by women and youth have convincingly demonstrated the necessary and potential value of their participation in forestry development, especially at the community level.

There was gender inequality to the enjoyment of equal status, entitlements, rights and access to natural resources. United Nations Development Programme (UNDP) refers to equality as the norms, values and attitudes and perceptions required to attain equal status between women and men without neutralizing the biological differences between men and women. There were gender imbalances in enjoyment of benefits from the forest. Women benefit from firewood, water and grass cutting. It was wrongly assumed that only men, who could harvest trees, benefit from forest treatment (thinning and pruning) and cultivation. There was little participation of women and youth in decision making.

Conflict over Scarce Resources

According to the United Nations Secretary General Mr. Kofi Annan in the Conflict Prevention, Management and Resolution, (Juma, M.K 2007) there were particular situations which provide broader sources of conflicts and these includes the competition for scarce land for cultivation, pasture and water resources against an increasing population. The competitive nature of our politics introduced conflict in the competition for opportunities and share of the scarce resources. The result was to mismanage our forest resources due to corruption in order to achieve political power. This was through forest excisions and encroachments on catchment areas to reward supporters. Those unable to use the political powers resulted to unexplained forest fires, illegal logging, over extraction of water and charcoal burning illegally. In 1992 fire destroyed 6170 hectares of plantations and in 1997 a further 4726 hectares were burnt according to KFS survey. This happened during the electioneering period. The extensive destruction of the forest results to prolonged droughts in ASAL (Arid and Semi-Arid lands) areas (Kagombe, J.K and Gitonga: 2005). The climate changes had reduced the pastures and water sources for the pastoralists and therefore made them to migrate to better areas of Mucheene forest in Mt. Kenya. This resulted to conflicts between the pastoralists and the community forest association members who participate in the shamba system. Crops and tree seedlings were occasionally destroyed. The survival of the planted trees was also threatened by the animals. With poaching being under control and the erection of the wildlife migratory corridors (from Lewa wildlife conservancy to Mucheene Forest in 2011) there were increased incidences of game damage to crops and planted trees. This human/wildlife conflict needed to be addressed before the situation got out of hand.

Inadequate Funding by the Treasury

The funding of forestry activities was mainly from the Central Government and from development partners. This funding was inadequate for the efficient management and conservation of the country's forest resource. The funding availed to the FD for plantation development had declined

significantly over time, from Shs. 390 million in 1996 to Shs. 25 million in the year 2000. The situation began to improve in 2002 and 2003 when funding attained a level of Shs. 85 million and Shs. 104 million respectively. After the 2003 ban on NRC the funding levels were expected to rise further to cater for planting and maintenance, but only Shs. 98 million was made available. This implied that the FD could not maintain the plantations established in 2004.

Table 3: Funding availed for plantations under the forest department

Year	Amount allocated (shs)
1996	390m
1998	195m
2000	25m
2002	85m
2003	104m
2004	98m

Source: Forest Department (2005)

In addition, to the termination of the World Bank funded Kenya forestry development project in 1998, the FD labour force declined following the implementation of the staff retrenchment programme. These factors greatly affected the replanting programme. About 6000 members of staff were retrenched. This therefore meant that funds allocated to the FD for forest operations, covering seedling production, planting, weeding and general plantation maintenance were grossly inadequate – there had been very low level of public investment in forestry development.

RESEARCHMETHODOLOGY

Research Design

This study was a descriptive research by use of survey method. This method was very versatile particularly in collecting primary data. The method was more efficient and economical. Information could be gathered by a few well-chosen questions that would take much more time and effort than by other methods. However, the main difficulties involved in this method were mainly, ensuring that the questions to be answered were clear and not misleading, getting the respondents answer the questions honestly and getting sufficient number of questionnaires answered. The advantage of using this method was the potential to provide a lot of information obtained from quite a large sample of individuals. The research was designed to gather data from forest cultivation in the Mucheene forest in order to establish the factors that contribute to the success of the forest plantation establishment in Mucheene forest of Meru Central District.

Target Population

Gay and Airasian (2003) defined the target population as the group to which the researcher would like the results of the study to be generalized. The target population for this study therefore consisted of all the forest cultivators in the Mucheene forest block of Mt. Kenya forest. Mucheene forest was one of the pilot projects where forest cultivation was being implemented under the PELIS scheme in Eastern conservancy. Cultivation was being practiced on 500 acres involving 1000 cultivators, in phase one and 325 acres involving 650 cultivators (April 2012) meaning that each person was on half an acre plot. The cultivation plots were spread in various forest sub-

compartments where there was backlog in tree planting (plantation establishment).The target population was made up of forest users of various forestry products who were directly or indirectly involved in conservation and protection of the forest. These were the most vulnerable groups in the society. They were the landless; slum dwellers, former forest workers and the unemployed whose livelihood depended on the forest. They were involved in plantation establishment and conservation of catchment areas and were in return compensated by the small PELIS plots that they cultivate to grow food crops. The cultivators form the target population and who were directly involved in the implementation of the PELIS strategy which was the most preferred method of forest plantation establishment. The researcher targets 165 cultivators.

Table 4: Target Population: Forest Cultivators Mucheene Forest Station 2012

Beat / CBO	No. of Cultivators
Kimbo	334
Nchoro	196
Mujujune	393
Muruguma	365
Kirukuru	184
Katheri	178
Total	**1650**

Source: Members register - Kamulu Community Forest Association (2012)

Sampling Procedure

Sampling was an important aspect of research. Somer (2003) defined a sample as a portion of a population while sampling referred to the selection of a subject of cases from some population of interest. Thus sampling was a systematic process of selecting a number of individuals for a study to represent the larger group from which they were selected. Demcing (1975) defined sampling as the selection of a subset of the population. Charndran (2003) pursued this further and said that a sampling method was a way of selecting a portion of population such that the selected portion represented the population adequately.

Sample Size

According to Mugenda and Mugenda (1999) a descriptive study should take 10% or above of the accessible population and this can be enough for a specific study and also according to Orodho (2005); 10% of the target population was regarded as an adequate sample that was representative of the population. The sampling frame used was the register of all forest cultivators maintained at the Kamulu Community Forest Association offices (Kamulu CFA Offices) at Mucheene Forest Station. There are 66 committee members where 11 represent each of the six CBO's. Therefore, 10% of these members form the focus group discussion with at least one (1) representing each CBO. According to Mugenda and Mugenda (1999) a descriptive study should take 10% or above of the accessible population and this can be enough for a specific study and also according to Orodho (2005); 10% of the target population was regarded as an adequate sample that was representative of the population.

Table 5: Sample Size: Forest Cultivators Mucheene Forest Station 2012

Beat / CBO	No. of Cultivators	Sample Size
Kimbo	334	33
Nchoro	198	20
Mujujune	393	39
Muruguma	365	37
Kirukuru	184	18
Katheri	178	18
Total	**1650**	**165**

Source: Members register - Kamulu Community Forest Association(2012)

Methods of Data Collection

Datawas collected using the survey method. This method involves the respondents in filling the questionnaires. It was more efficient, and also quite economical as compared to other methods. The study was both primary and secondary sources of data. According to Kothari (2003), primary data was collected from the immediate source for the purposes of research. In this study the questionnaires and interviews were used as the primary data collection tools. In order to collect data on the factors that contribute to the success of forest plantation establishment, growth and survival of planted trees, the questionnaires were administered to 165 cultivators. Babbie (1989) observed that questionnaires were more appropriate when addressing sensitive issues, especially when the survey offered anonymity to avoid reluctance or deviation from the content by the respondents. The researcher used questionnaires because they were regarded as the most appropriate. The questionnaires could be administered to the sample forest cultivators at the same time and ensure uniformity from one measurement to another due to the impersonal nature. The researcher distributed 165 questionnaires and during working hours so as to ensure a high and fast return rate. The study used both open ended and close ended questions. The open ended questions were designed to provide greater uniformity of responses. The close-ended questions were suitable for this study because of their efficiency and specialty. Since the study also measures the cultivators' opinions in relation to the constraints hindering forest plantation establishment, growth and survival, then open ended questions come in handy. Open ended questions were also used to gather in-depth information from the respondents. The researcher will make face to face contacts with respondents as a follow-up and in order to clarify terminologies not clearly understood by some respondents. The interviews do pursue in-depth information around the topic and were useful as follow-up to respondents to questionnaires or further investigate their responses to questionnaires or further investigate the responses (McNamara, 1999). The advantages of in-depth interviews were ideal for investigating personal, sensitive and confidential information. However, the disadvantage was that the respondent can be unwilling to open up.

The researcher used the focus group discussion which involved six (6) committee members. There were 66 committee members of the CFA and where eleven (11) represent each of the six (6) CBO's. Therefore, 10% of these members form the focus group discussion with at least one (1) representing each CBO. This group provided an opportunity to dig deeper into issues, and was easier to handle controversial issues, reduced individual inhibitions and fear and allowed the group to build on each others ideas. The focus group discussion was more participative and the facilitator helped the group

remain focused and avoid side-tracking. It encouraged group members to speak with equal opportunity, dig deeper into meanings and attitudes to responses such as "yes" and "no", avoids being critical or judgmental (there was no right or wrong answer), respect peoples' opinion and discipline to listen and listen carefully. There were many sources of secondary data, but the selection of the sources was crucial in ensuring data validity. Secondary data provided validation for primary data because it allowed the researcher to assess the quality and consistency of the primary data. According to Yin (1994), six sources of evidence for data collection in the case study protocol were listed, namely, documentation, archival records, interviews, direct observation, participant observation, and physical artifacts. In this study, interviews were relevant, since they directly relate to the investigation. Consequently, the researcher will examine the available data from the Kamulu CFA's office.

Methods of Data Analysis

The data processing and analysis was done so as to make the data meaningful. Data analysis consisted of examining the evidence so as to address the initial propositions of the study. The researcher used descriptive statistics and inferential statistics which involved summarizing data and describing the sample by use of frequency distribution tables, percentages, cross tabulation of relationship and chi square test. Since it was not possible to present every result of the analyses, was therefore guided by the study's objectives and research questions stated in chapter one. The researcher made the interpretation of the findings guided by the objectives and research questions as reviewed in the literature review.

RESEARCH RESULTS

Relationship between policy guidelines and successful forest plantation establishment

This study sought to determine if there existed any significant relationship between PELIS strategy policy guidelines and successful forest plantation establishment in Mucheene Forest. Table 6 shows that 63.6% of the respondents indicated that they had fully understood all the PELIS strategy policy guidelines while 36.4% claimed that they had not. Out of those who claimed to have an understanding of the policy guidelines, 89.3% reported that forest plantation establishment was successful while only a small percentage (10.7%) reported it was not successful. Out of those who claimed to have no understanding of the policy guidelines, 0.0% reported that forest plantation establishment was successful while majority (100.0%) reported it was not successful. This implied that full understanding of PELIS strategy policy guidelines resulted in successful forest plantation establishment. This was further confirmed by the Chi square test shown in table 7.

Table 6: Cross-tabulation of PELIS strategy policy guidelines and successful forest plantation establishment

			Successful forest establishemnt plantation (75% establishment)		Total
			Successful	Not Successful	
Understanding PELIS strategy policy guidelines	Fully understood all guidelines	Count	75	9	84
		% within Understanding PELIS strategy policy guidelines	89.3%	10.7%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	100.0%	15.8%	63.6%
		% of Total	56.8%	6.8%	63.6%
	Did not fully understand the guidelines	Count	0	48	48
		% within Understanding PELIS strategy policy guidelines	.0%	100.0%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	.0%	84.2%	36.4%
		% of Total	.0%	36.4%	36.4%
Total		Count	75	57	132
		% within Understanding PELIS strategy policy guidelines	56.8%	43.2%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	100.0%	100.0%	100.0%
		% of Total	56.8%	43.2%	100.0%

Table 7: Chi square test (PELIS strategy policy guidelines)

Chi square	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	99.248(b)	1	.000		
Continuity Correction(a)	95.642	1	.000		
Likelihood Ratio	123.325	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	98.496	1	.000		
N of Valid Cases	**132**				

A Chi-square test was conducted on the frequencies to establish whether a statistically significant relationship existed between policy guidelines and successful forest plantation establishment. The computed Chi square value of 99.248 was significant with $p=0.000<0.05$ at 5% level of significance and with 1 degree of freedom. It was therefore concluded that there was a significant relationship between policy guidelines and successful forest plantation establishment.

Relationship between community participation and successful forest plantation establishment

This study sought to determine if there existed any significant relationship between community participation and successful forest plantation establishment in Mucheene Forest. Table 8 shows that

38.6% of the respondents indicated that their communities actively participated in seedlings production while 61.4% claimed that their communities did not actively participate. Out of those who claimed that their communities actively participated, all (100.0%) reported that forest plantation establishment was successful with 0% reporting that it was not successful. Out of those who claimed that their communities did not actively participate in seedlings production, a small percentage 29.6% reported that forest plantation establishment was successful while majority (70.4%) reported it was not successful. This implied that active community participation resulted in successful forest plantation establishment. This was further confirmed by the Chi square test shown in table 9.

Table 8: Cross-tabulation of community participation and successful forest plantation establishment

			Successful forest establishemnt plantation (75% establishment)		Total
			Successful	Not Successful	
Community participation in seedlings production	Active participation	Count	51	0	51
		% within Community participation in seedlings production	100.0%	.0%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	68.0%	.0%	38.6%
		% of Total	38.6%	.0%	38.6%
	No participation	Count	24	57	81
		% within Community participation in seedlings production	29.6%	70.4%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	32.0%	100.0%	61.4%
		% of Total	18.2%	43.2%	61.4%
Total		Count	75	57	132
		% within Community participation in seedlings production	56.8%	43.2%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	100.0%	100.0%	100.0%
		% of Total	56.8%	43.2%	100.0%

Table 9: Chi square Test (community participation)

Chi square	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	63.164(b)	1	.000		
Continuity Correction(a)	60.329	1	.000		
Likelihood Ratio	82.082	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	62.686	1	.000		
N of Valid Cases	**132**				

A Chi-square test was conducted on the frequencies to establish whether a statistically significant relationship existed between community participation and successful forest plantation establishment. The computed Chi square value of 63.164 was significant with p=0.000<0.05 at 5% level of significance and with 1 degree of freedom. It was therefore concluded that there was a significant relationship between community participation and successful forest plantation establishment.

Relationship between role of sub-development committee and successful forest plantation establishment

This study sought to determine if there existed any significant relationship between role of sub-development and successful forest plantation establishment in Mucheene Forest.

Table 10: Cross-tabulation of role of sub-development committee and successful forest plantation establishment

			Successful forest establishemnt plantation (75% establishment)		Total
			Successful	Not Successful	
Role of SDDC in supporting the CBOs in forest establishment	Supportive	Count	60	11	71
		% within Role of SDDC in supporting the CBOs in forest establishment	84.5%	15.5%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	80.0%	19.3%	53.8%
		% of Total	45.5%	8.3%	53.8%
	Non-supportive	Count	15	46	61
		% within Role of SDDC in supporting the CBOs in forest establishment	24.6%	75.4%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	20.0%	80.7%	46.2%
		% of Total	11.4%	34.8%	46.2%
Total		Count	75	57	132
		% within Role of SDDC in supporting the CBOs in forest establishment	56.8%	43.2%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	100.0%	100.0%	100.0%
		% of Total	56.8%	43.2%	100.0%

Table 10 shows that 53.8% of the respondents indicated that the sub-development committees played a supportive role in forest establishment while 46.2% claimed that the sub-development committees did not support CBOs in forest plantation establishment. Out of those who claimed that sub-development committees were supportive, 84.5% reported that forest plantation establishment was successful while only a small percentage (15.5%) reported it was not successful. Out of those who claimed that sub-development committees not supportive, 24.6% reported that forest plantation establishment was successful while majority (75.4%) reported it was not successful. This implied that support from the sub-development committees resulted in successful forest plantation establishment. This is further confirmed by the Chi square test shown in table 11.

Table 11: Chi square test (role of sub-district development committee)

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	48.009(b)	1	.000		
Continuity Correction(a)	45.598	1	.000		
Likelihood Ratio	51.253	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	47.645	1	.000		
N of Valid Cases	**132**				

A Chi-square test was conducted on the frequencies to establish whether a statistically significant relationship existed between role of sub-development committees and successful forest plantation establishment. The computed Chi square value of 48.009 was significant with p=0.000<0.05 at 5% level of significance and with 1 degree of freedom. It was therefore concluded that there was a significant relationship between role of sub-development committees and successful forest plantation establishment.

Relationship between capacity building and successful forest plantation establishment

This study sought to determine if there existed any significant relationship between capacity building and successful forest plantation establishment in Mucheene Forest. Table 12 shows that 49.2% of the respondents indicated that they had attended the forest users course and seminars (i.e. capacity building was done) while 50.8% claimed that they had not attended (i.e. capacity building was not done). Out of those who claimed that capacity building was done, 76.9% reported that forest plantation establishment was successful while only a small percentage (23.1%) reported it was not successful. Out of those who claimed that capacity building was not done, 37.3% reported that forest plantation establishment was successful while majority (62.7%) reported it was not successful. This implies that capacity building resulted in successful forest plantation establishment. This was further confirmed by the Chi square test shown in table 13.

A Chi-square test was conducted on the frequencies to establish whether a statistically significant relationship existed between capacity building and successful forest plantation establishment. The computed Chi square value of 21.097 was significant with p=0.000<0.05 at 5% level of significance and with 1 degree of freedom. It was therefore concluded that there was a significant relationship between capacity building and successful forest plantation establishment.

Table 12: Cross-tabulation of capacity building and successful forest plantation establishment

| | | | Successful forest establishemnt plantation (75% establishment) | | Total |
			Successful	Not Successful	
Attendance of forest users course and seminars	Yes	Count	50	15	65
		% within Attendance of forest users course and seminars	76.9%	23.1%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	66.7%	26.3%	49.2%
		% of Total	37.9%	11.4%	49.2%
	No	Count	25	42	67
		% within Attendance of forest users course and seminars	37.3%	62.7%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	33.3%	73.7%	50.8%
		% of Total	18.9%	31.8%	50.8%
Total		Count	75	57	132
		% within Attendance of forest users course and seminars	56.8%	43.2%	100.0%
		% within Successful forest establishemnt plantation (75% establishment)	100.0%	100.0%	100.0%
		% of Total	56.8%	43.2%	100.0%

Table 13: Chi square test (capacity building)

Chi square	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	21.097(b)	1	.000		
Continuity Correction(a)	19.514	1	.000		
Likelihood Ratio	21.781	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	20.938	1	.000		
N of Valid Cases	**132**				

SUMMARY OF FINDINGS

The findings indicated that a total of 48 respondents (36.36%) did not understand the PELIS strategy policy guidelines and that 33 respondents (25%) had not renewed their cultivation permits. A total of 31 respondents (23.48%) either bought or leased the plots from the original allotees. This situation was found to be similar as in the literature review. However, the allocation of the plots had changed from the past. It was through secret ballot, the allotees got the authorized size and that the cultivators planted a one season crop; a total deviation from the past.The findings further revealed that all plot allotees must be members of registered CBO's dealing with conservation matters. The survey further revealed that 114 respondents (86.36%) were satisfied with the manner of plot allocation (secret ballot) where their elected officials actively participated. All the cultivators participated in tree planting but the level of participation in seed production is low (38.64%).The level of capacity building was low where only 64 respondents (48.48%) had attended forest user's

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36 | P a g e

seminar/course and only 45 respondents (34.10%) had attended a course in conservation. The survey also revealed that the role of the Provincial Administration had greatly changed with the operationalisation of the Forest Act 2005 which embraced the concept of community participation. The role was found to be more facilitative. The survey revealed that monitoring had not taken root due to lack of funds set aside for the exercise. The same also affected the level of capacity building.

Understanding of the Guidelines

The survey found that 84 out of the 132 respondents understood the guidelines. A total of 48 respondents did not understand the guidelines representing 36.36%. One key condition in the guidelines was that if the survival rate of the planted trees was less than 75% then the cultivator could be ejected from the forest. This meant therefore that the cultivators should be made to know more about the contents of the guidelines. Failure to do this would have a negative impact on the forest plantation establishment.

Renewal of Cultivation Permits

The main objective of using the community to participate in forest plantation establishment was to share the benefits with the forest adjacent communities. The community benefits by growing the food crops, while the Kenya Forest Service gained from the free labour provided by the community in seedlings production and maintenance and also revenue collection from the sale of cultivation permits. The survey found out that 23 respondents (25.0%) had not renewed their permits. This was a big loss of revenue to the Kenya Forest Service. The same number of respondents reported that they had no knowledge of any rent payable meaning that they were not the initial allotees. This was a serious breach of the guidelines as the plots were not supposed to be sold or transferred. There should not be any sale. Anybody who wanted to leave the forest can surrender the plot officially so that it can be transferred to other deserving people.

Types of Crops and Food Sufficiency

The survey found out that 100% of the respondents planted the one season food crop as provided for in the guidelines. A total of 114 respondents (86.36%) were able to satisfy their domestic food requirements and leave some to meet the market demand. This tended to boost their incomes and therefore reduce poverty levels and also improve food security for the forest adjacent communities.

Method of allocation of the Cultivation Plots

The method of allocation was through secret ballot whereby all registered members of the community had a chance to be allocated. However, 31 respondents representing 23.48% of the cultivators corruptly bought the plots. The implication here was that those who purchase the plots were likely not to take care of the planted trees as their main objective is to recover the money used to buy or lease the plot. This affected the survival rate of the trees and defeated the purpose of the PELIS strategy as a preferred method of forest plantation establishment.

Guidelines Relating to the Size of Plots Allocated

The allotees were cultivating the exact size of the allocated plots. There were no extensions or encroachments into the catchment areas. This showed that continuous monitoring should be

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37 | P a g e

maintained in order to ensure the success of the PELIS strategy as a preferred method of forest plantation establishment.

Participation in Seedlings Production

The survey revealed that participation at seedlings production was low at 38.64%. Reasons were that limited finances had been availed for this purpose. Funds were mostly required to make the Swaziland beds, purchase or collect seedlings, purchase of polythene tubes, hose pipes, watering cans, and transportation of soil from selected sites inside the forest. The implication of this is that the low level of participation cannot contribute much towards improving the forest cover. It was important therefore to identify donors, increase the Government funding such that tree nurseries were established at every sub-station whereby all the community members can be actively involved in seedlings production and maintenance.

Participation in Plot Allocation

The survey revealed that 116 respondents (87.88%) were happy with the participative manner of plot allocation. The plots were allocated through secret ballot where every member stood a chance to benefit. The implication here was that corruption had reduced, the concept of ownership boosted and which in turn encouraged the survival rate of the planted trees.

The Roles of the Provincial Administration and Local Politicians

With the introduction of the concept of participatory forest management (PFM) in the Forest Act (2005) and sessional paper 1 of 2007, the role of the sub-DDC's had changed. This view was supported by 71 respondents (53.88%) who felt that the Provincial Administration had become more facilitative in capacity building. They also did not interfere in the running of the community based organizations. However during discussions, respondents noted that the leaders do exercise some influence during the employment of casuals especially under the economic stimulus programme (*Kazi Kwa Vijana*). The implications were that this influence could end up introducing corrupt practices in the programme and in turn affect the forest plantation establishment.

How Capacity Building Affected Forest Plantation Establishment

The level of capacity building was average. A total of 64 respondents (48.48%) had attended some forest user's courses and seminars while 68 respondents (51.52%) had not attended any. 45 respondents (34.10%) had some training in conservation while a total of 87 respondents (65.91%) had little knowledge in conservation. However all the cultivators have been sensitized on how to do the staking, planting and maintenance of planted seedlings. They were motivated and expected a high survival rate so that they could be allocated fresh areas. About 53.79% of the cultivators kept records which assisted them in planning. The implications of low capacity building were that the importance of forest cover in relation to climate change and the state of water in Mt. Kenya forest could not be realized. Also if the survival rate of the planted trees is interfered with due to lack of knowledge, the overall purpose of the PELIS strategy in forest plantation establishment could be defeated.

CONCLUSIONS

The findings of the study indicated that the forest plantation establishment through the PELIS strategy was faced with various challenges at various levels despite being the preferred method.

A total of 79 men (representing 59.85% of the respondents)and 53 women (40.15%) took part in the study. The survey found out that there was youth and gender representation at the membership level and at the management. This indicated that decisions were representative. The education of the respondents was that majority were illiterate or semi-illiterate implying that they could not adequately understand the importance of forest cover and state of the water in the country i.e. 650M3 per capita against the global recommendation of 1000M3 per capita per year and that put the country into the category of water scarce countries.

The survey found out that 48 respondents (36.36%) did not understand the policy guidelines while 33 respondents (25%) were not aware of the existence of cultivation permits. The survey further revealed that the same number purchased the plots from the members who were not the original allotees. All these went against the policy guidelines that permits should be paid for in January every year and that plots were not supposed to be sold or transferred but rather returned to the issuing authority.

Members had adhered 100% to the regulation requiring them to only plant one season food crops. The reasoning was that since the tenancy was temporary, perennial crops could not thrive. This regulation has meant to prevent a situation whereby one could be tempted to assume ownership if he/she planted crops such as tea.

The method of plots allocation was through secret ballot. This tended to minimize corruption whereby people with speculative motives were locked out. The allocation was overseen and done by the elected community leaders who were accountable to their members. The key objective of the Government by allowing the community to manage the forest and cultivate was meant to improve the food security of the forest adjacent communities. This had been realized in that 114 respondents (86.36%) reported to have satisfied their domestic food needs and were left with some for the market. This tended to increase their incomes and therefore contribute to poverty reduction efforts.

The aspect of community participation had taken root in Mucheene forest through the participatory forest management (PFM) concept whereby the communities participate in conservation and protection of the forest. The survey revealed that a total of 76.52% of the target population were active members. However, the level of community participation in seedlings production was very low at 38.64% due to inadequate financial resources. Seedlings were produced in only one sub-station while the remaining five did not have any. However, the survey revealed that all members were involved in planting trees.

The role of the Provincial Administrators (chiefs) and councilors was changing positively. The administrators were becoming more facilitative in capacity building and sensitizing the community on the importance of conservation. However, the survey revealed (during discussions) that they do interfere in employment of casual labour through the Kazi Kwa Vijana programme where they exert

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39 | P a g e

influence to have their people employed. This interference tended to jeopardize the success of the forest plantation establishment programme.

A total of 64 respondents (48.48%) had attended training in forest user rights and obligations while only 45 respondents (34.10%) had attended some basic conservation courses and seminars on record keeping. However 62 respondents (46.97%) did not maintain any records. This resulted to poor planning for the costs, pricing and profit from their plots. In case of losses, cultivators could be forced into destructive acts such as debarking, and this could in turn affect the survival rate of the planted trees.

There was youth and gender representation in forest plantation establishment and that the management was representative of a wide spectrum of forest users. The consultative committee meetings were not regular and were held once in two to three months. The low level of capacity building especially in record keeping and lack of financial support were an impediment to effective monitoring. All in all PELIS strategy had greatly contributed to poverty reduction through increase in incomes for the forest adjacent communities (cultivators) and food security.

RECOMMENDATIONS

1. That concerted efforts should be made to sensitize the community on the importance of community participation through the participatory forest management (PFM) system. Benefit sharing will be realized with proper implementation of the PFM system. This will motivate and encourage cultivators to increase and improve the forest cover and therefore the state of water which is very important in climate moderation.
2. Facilitation through funding should be quickly addressed. There is urgent need for further and regular capacity building for the community on issues such as seedlings production, maintenance, and planting. Facilitation is also needed to start tree nurseries in all the other five sub-stations so as to produce enough seedlings to assist in farm forestry.
3. The employment of casual labour, especially under the economic stimulus programme should be streamlined in order to reduce interference from members of the local sub-DDC's (chiefs and councilors).
4. It is further recommended that the community should be empowered through capacity building on the concept of PFM, and the impact of environmental issues on their livelihood. The community should also be sensitized on the importance of the forest cover and the state of water in the country since we are a water deficient country.
5. The monitoring of the forest plantation establishment through the PELIS strategy should be strengthened by ensuring that the management and general meeting and field visits are held regularly, and that the records of the meetings, field visits and discussions are all properly kept.
6. A physical count to determine the survival rate of the planted trees should be regularly done and where necessary recommendations should be made to open up new areas for cultivation so as to reduce the re-planting backlog.

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