

Diversification of Household Livelihood Strategies for Tobacco Smallholder Farmers: A Case Study of Introducing Bamboo in the South Nyanza Region, Kenya

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ABSTRACT

Most of the tobacco production in Kenya is taking place in the Southern Nyanza Region, western Kenya. The land under tobacco has continued to grow rapidly at the expense of traditional food crops and livestock activities, with high demands on wood-fuel, serious health issues, and demanding in terms of the farmer's time. All these tobacco issues have led to increased poverty levels in the region. This kind of scenario calls for research that can solve a multiple of problems, i.e. economic and political problems, socio-cultural and gender issues, food insecurity concerns, occupational and environmental health hazards, and environmental concerns. This paper outlines the vision of the on-going 3-year research project on how tobacco production can be controlled through the diversification of household livelihood strategies among tobacco small-holder farmers. The study in particular is investigating on the existing potential of introducing Bamboo as an alternative and viable crop in the region. The other major task being undertaken is the analysis and ranking of the local household livelihood strategies used by tobacco and non-tobacco farmers in the study area. The study will also involve a detailed assessment of marketing dynamics on bamboo products as a feedback to investment in the tobacco industry. The research methodology being adopted involves the review of relevant literatures, field experimentations/demonstrations, local community household surveys and Participatory Rural Appraisal (PRAs) with stakeholder identification and analysis, and focused group discussions for meeting the data requirements of the research project. The vision of the project is to turn-around the dependence of local livelihoods on tobacco to bamboo cultivation in the long term through implementation of an action plan to be developed.

Key words: Tobacco, Poverty, Bamboo, Sustainable Livelihood, Action Plan

1.0 Background to the Study

Most of the tobacco production in Kenya is taking place in the Southern Nyanza region mainly in Suba, Kuria, Homa Bay and Migori Districts (GOK, 2002a; 2002b; 2002c; 2002d; Ministry of Agriculture, 2004a, 2004b; 2004c; 2004d). Despite the global policies aimed at reducing world tobacco productions and use, the Kenya Government's policies aimed at poverty reduction, are encouraging more tobacco production and crop diversification in this region (GOK, 2002a; 2002b; 2002c; 2002d; Ministry of Agriculture, 2004a, 2004b; 2004c; 2004d). This is evidenced by the current plans of the British American Tobacco Company (BAT) expanding its activities to other districts in the Nyanza Region, i.e. in Bondo and Siaya in the Central Nyanza region (GOK, 2001). It is also estimated that the number of farmers contracted by tobacco companies in Kenya increased by 67% in the period 1972 to 1991, and by 36% from 1991 to 2000. Alongside, the land under tobacco grew rapidly at the expense of food crops because more farmers are shifting to tobacco production (GOK, 2001; Ministry of Agriculture, 2004a, 2004b; 2004c; 2004d).

A 2-day workshop recently (27th –28th October, 2005) held in Migori town in Kenya funded by IDRC on the Diversification of Household Livelihood Strategies for Tobacco Small-holder Farmers in South Nyanza Region, Kenya indicated that the tobacco sector in this region is facing a multiple of economic and political problems, socio-cultural and gender issues, food insecurity concerns, occupational and environmental health hazards, and environmental concerns (Kibwage et al., 2005).

Some of the key economic and political problems associated with tobacco production in the region are outlined here: -

- Most farmers are attracted and trapped into tobacco production due to the belief that the crop has more and quick cash returns than other crops. Farmers are initially induced and trapped by tobacco companies to grow the crop by being given inputs for free initially and later on credit.
- The tobacco farming occupation requires and demands a lot of labour and it is a very tedious activity compared to its returns/ profits. The farmers indicated that the cost of producing tobacco is very high and when loans are deducted from total sales, they are left with very little earnings as compared to the high labour and time inputs. Furthermore, they have no control on prices of inputs and output.
- Tobacco farmers also face serious harassment, cheating, and exploitation during the leaf weighing process and recovery of input loans. Furthermore, tobacco companies have monopolized certain areas leaving farmers with no options of selecting a company of their choice. This has further enhanced exploitation of the farmers' ignorance, which is openly practiced by recruitment of new tobacco farmers mainly targeting the illiterate and the poor in their society.
- The local tobacco cultivation activities are not insured against natural calamities like hailstones, disease and fire outbreaks, etc. Bamboo farming has less risk associated with natural calamities like hailstones, diseases and fire outbreaks.
- Tobacco Companies indirectly use local political leaders to promote the crop in their constituencies, which has been a big blow to production of other crops like maize, sorghum, millet, etc. in the region.
- Finally, it became evident during this workshop that the Kenyan Government has no clear policy on tobacco production control. While the Ministry of Agriculture is promoting the growing of the crop, the Ministry of Health is seriously campaigning against the crop and smoking in particular.

The key socio-cultural and gender issues in this region include:-

- High child labour among the tobacco growing families especially during the harvesting and curing period to avoid crop damage and losses from climatic changes when it has matured. Bamboo harvesting will be a continuous activity and there will be no “period of panic” due to climatic changes.
- Exploitation of children and women by men and tobacco growing companies.
- The youths who have been trapped into tobacco farming have no time for social and community development activities.
- Increased HIV/AIDS cases in the region due to high levels of poverty.

- Increased cases of suicide among tobacco farmers especially associated with frustrations due to high debts, damages caused by hailstones, pests and diseases.
- Farmers' frustrations by companies is also the major factor responsible for the high reported cases of societal vices like mugging, robberies with violence, theft and cattle rustling in the region. Farmers' frustrations by companies arise from high debts from farm input loans, and crop damage caused by hailstones, pests and diseases. The tobacco companies don't take any responsibility in such cases. Some of the affected farmers resort to these social vices for economic survival.

Tobacco has also led to food insecurity concerns in the region in several ways: -

- The region is facing food shortages because of tobacco production since farmers spend most of their time in tobacco farming at the expense of food crops, which they eventually buy from surrounding districts at very high prices. Kuria district, for example, which used to produce and supply maize to most parts of Kenya, is currently categorized by the Kenyan Government as one of the areas that require and receive relief food aid every year.
- The land under tobacco is on the rise, at the expense of food crops.
- Tobacco is known to extract several mineral nutrients from the soil leaving it almost barren. Other crops like maize, cassava, millet, passion fruits, Soya beans, sunflower, tomatoes, cotton and sweet potatoes no longer perform well in the region, a scenario which farmers suspect tobacco cultivation, its associated diseases and its nutrient demands to be the root causes. Introduction of bamboo as a crop is normally associated with a lot of manure/compost from the decomposing leaves. This will act as a long term strategy to rehabilitate the soil needs.
- Livestock activities have also drastically gone down. The major constraint to agricultural activities/ diversification in the region is generally the lack of market for the local produce.

Since the introduction of Tobacco in the region, health status of the local people in the region has also drastically deteriorated. For instance, the Workshop participants alleged that 60% of the medical cases in Kuria district are tobacco production and processing related. There is generally lack of protective devices required during the production and preliminary processing of tobacco leaves. These include, gum boots, nose masks, overall coats, gloves, etc. During the harvesting and curing period, there is also serious shortage of storage facilities. Most farmers use their own houses to store the leaves, an act which is very hazardous to their health. Children and women are more vulnerable than men to tobacco-related health risks since they spend most of their time in the occupation.

Finally, tobacco farming in the region has raised several environmental concerns. The type of tobacco grown in the proposed study area is fire-cured. The curing process demands a lot of wood-fuel. Consequently, a lot of indigenous trees are felled for use causing deforestation. Soil erosion is rampant in these areas. In most instances, the eucalyptus tree seedlings are provided by tobacco companies to farmers for public relations. Scientific research has shown that this type of trees put a lot of demand on water and nutrients resulting to loss of soil fertility and low water table. Farmers at the moment are forced to buy firewood for cooking. This has even led to further reduction in food crop production, hence, increased poverty levels in the area. Rainfall patterns and amounts are no longer predictable by farmers in the region due to extreme deforestation to obtain firewood for curing. The availability of firewood for tobacco curing and

domestic use is currently critical. The distance covered and time in firewood collection by women and children has been increasing from season to season and year after year.

The growing of tobacco along riverbanks and general use of fertilizers and pesticides has also caused the death of some valuable fish species in the local streams and rivers. The fish and aquatic life that used to be common in rivers and other water bodies have disappeared since the introduction of tobacco in the region. This is supported by recent studies in the region, e.g. Kibwage, et al, (2003). Some farmers attributed the emergence of the Striga weed in the region to tobacco farming. Environmental pollution due to poor disposal of wastes (expired fertilizers, chemicals, uncollected tobacco) by the tobacco companies was also reported to be high.

This kind of scenario calls for research that can solve a multiple of problems facing tobacco farmers in the region, i.e. *economic and political issues, socio-cultural and gender issues, food insecurity concerns, occupational and environmental health hazards, and environmental concerns*. This proposed research project is based on this rationale and it fits very well with other on-going or recent research interests as indicated below.

1.1 Research Problem

Various research initiatives are currently being carried out to address poverty issues in the Lake Victoria Basin. The Swedish International Development Agency (SIDA) is currently funding about 50 regional research projects in the areas of wetland resources management and land use planning to alleviate the high levels of poverty in the region. The World Agroforestry Center (ICRAF) is planning to initiate a bamboo research project in the Lake Victoria basin as a possible solution to water pollution. The project being funded by the Swedish International Development Co-operation Agency aims at developing an ecological wastewater treatment that would serve the dual function of filtration and purification of polluted Lake Victoria Waters (World Agroforestry Center (ICRAF), 2005). The development comes in the wake of reports by the World-Bank funded Lake Victoria Environmental Management Project (LVEMP) that Lake Victoria's pollution had reached alarming levels.

The tobacco-related issues in the South Nyanza region, which is within the Lake Victoria Basin, have been prioritized in the current Development Plans of the South Nyanza tobacco growing Districts (GOK, 2000a; 2000b; 2000c; 2000d). To address these issues, the Government policy encourages crop diversification as the long-term solution. To address the current problems in the region, this study intends to examine the current and traditional household livelihood strategies used by tobacco farmers in comparison to non-tobacco farmers. The study will experiment on the cultivation of two bamboo species (**Giant Bamboo** and **Bambusa Vulgaris**), as an alternative crop and source of livelihood for tobacco-growing communities. This study is mainly based on facts obtained during the above-mentioned workshop, which concluded that all small-holder tobacco farmers are willing to shift to other viable alternative agricultural crops. Since farmers are keen on the market dynamics, this study will undertake a market research on bamboo products in the Lake Victoria Basin and Kenya in general. The research vision is that the tobacco industry in the region may to a large extent be replaced in the long run with the bamboo industry to address the tobacco-related issues outlined earlier.

1.2 Rationale for Selecting Bamboo as an Alternative Crop to Tobacco

There are nearly 1,200 species of Bamboo in the world. Kenya has about 150,000 hectares of bamboo forests, partly pure and partly in mixture with trees and shrubs. The bamboo resources

in Kenya consist of indigenous *Arundinaria alpina* K. Schum and introduced (exotic) species. The indigenous bamboo species is mainly found in gazetted indigenous forests and small proportions are in farmlands.

Bamboo has been selected for experimentation because of its economic productivity which can reach up to an annual yield of 20-40 tons per hectare on a managed plantation. This has been documented very well in Asian countries. Due to its lightweight, high elasticity and great resistance to rapture, bamboo is ideal for numerous construction uses. It can also be used in the production of pulp and paper, handicrafts, household goods, rehabilitation and stabilization of gullies and riverbeds and recycling and filtration of domestic and industrial wastewater. Bamboo shoots are also a good source of human food, while the leaves have been widely used for animal fodder. With a growth rate that is three times faster than eucalyptus, bamboo usually mature in about 3-5 years (depending on different environmental field conditions), after which harvests are possible for up to 80-120 years.

In Asia, over 1,500 uses of bamboo have been recorded! (RELMA, 2003; Madhab, 2003, National Mission on Bamboo Applications, 2004). But in Africa, largely due to lack of awareness, bamboo's great potential is rarely exploited. Bamboo in Kenya plays a very important role in fencing, house construction, water harvesting, cottage industries dealing with matchsticks, baskets, tooth-picks, and various other handicrafts and, in agricultural farming especially for supporting horticultural crops. Kenya has so far recorded up to 48 local bamboo uses (Ongugo et al, 2000).

With the numerous problems associated with tobacco farming in Kenya as earlier outlined, tobacco is so far used only for cigarette manufacture. Farmers have no any other local alternative use of the crop produce as compared to bamboo which has a multiple of uses.

1.3 Literature review

Studies that have been carried out on tobacco indicate that, tobacco is the root cause of high poverty levels among the affected farmers (World Health Organization, 2004; Chacha, 2000; Panchamukhi, 2000). However, a recent study indicates that tobacco is the only viable livelihood in some regions in Kenya due to general climatic and soil conditions (Nyangito, 2000). He indicates that tobacco is also preferred because of its ready market and demand. However, the author recommends for research on alternative crops due to the major threats to the sector, especially the proposed Tobacco Bill in Kenya and international unstable prices.

The application of bamboo in enhancing the economic and ecological well being of resource-dependent communities in Asia has been extensive and well documented. Systematic studies of the potential of bamboo, previous and current uses, and the social, cultural and political perspectives of these resources have been invaluable in promoting development through innovative and sustainable use of bamboo (Bamtek and Kleinhardt-FGI Pty Ltd, 2002). The International Network for Bamboo and Rattan (INBAR), initiated by IDRC, has played a pivotal role in advancing the bamboo sector in the Asian and African regions. INBAR has facilitated and coordinated research (including action-research) on biodiversity and genetic conservation, production systems, processing and utilization and socio-economics and policy, while promoting capacity building at the national level. A number of rural development programs are being implemented in the region. INBAR has also been instrumental in promoting technology transfer and information exchange between network partners (Kigomo, 2000; Ongugo *et al*, 2000).

The replicability in Latin America and Africa of the success stories from South and South-east Asia is yet to be assessed, despite the immense interest from the private sector, non-governmental organizations and government institutions in using bamboo to fuel rural development in the region. The dearth of information on the bamboo sector has been the main constraint to the development of systematic and sustainable development programs. This is the gap that the proposed study intends to fill.

Literature review indicates that over 20 exotic bamboo species have been introduced into Kenya during the last two decades using demonstration plots established at various ecological zones as part of bamboo promotion strategy, largely through the support of IDRC. These species are yet to be widely planted by farmers (Kigomo, 2000, Ongugo *et al*). These studies concluded that some of the species introduced (*Bambusa brandisii*, *B. vulgaris var. striata*, *B. bambos*, *B. tulda*, *Dendrocalamus membranaceous*, *D. strictus*, *D. brandisii*, *Gigantochloa aspera*, *Oxytenanthera abyssinica*, *Phyllostachys pubescens* and *Thyrsostachys siamensis*) are successfully growing in the field and on-farms in western, central and coastal parts of Kenya. However, farmers are not aware of their cultivation methods, market potential and processing.

As indicated earlier, Kenya has so far recorded up to 48 local bamboo uses (Ongugo *et al*, 2000). The main uses are in fencing, construction, props in the flower industry, bamboo shoots, and toothpicks and skewers. The other products produced from bamboo are incense sticks, baskets and handicrafts (Kigomo, 2000; Ongugo, *et al.*, 2000). Furniture making using bamboo is not a specialization in Kenya but the potential is there (Ongugo, *et al.*, 2000). Toothpick production is one other enterprise that is growing very fast in Kenya but it uses very small quantities of bamboo. On commercial scale, bamboo has increasingly gained importance in flower farming industry where it has been used for support purposes. Its use in horticulture does not also involve any substantial processing. To a large scale, but less documented, is the use of bamboo by farmers in the highlands to support pea farming. Ongugo, *et al.* (2000), noted that many local people who live in urban, peri-urban and rural areas derive their income from the various activities of the bamboo production to consumption system. These activities include harvesting and assembling, transportation, processing, packaging and marketing.

Most of the raw materials are obtained from natural forests which are currently restricted by the Government. A major constraint to the development of the bamboo sector in Kenya is the short supply of bamboo from state forests as a result of this government ban on the utilization of the resource. Other problems are the poor infrastructure, poor processing technology, poorly developed marketing structures and lack of alternative sources (Kigomo, 2000; Ongugo, *et al.*, 2000). All these factors have affected the effective utilization of bamboo in the country because harvesting from Government forests is presently illegal. The research team will work at every project phase with government policy makers and implementers to address the problems of poor infrastructure, processing technology and marketing structures.

To develop and sustain a vibrant bamboo sector in the country, this on-going study is experimenting on the growing of bamboo on private farms which have previously been or not been used for tobacco farming. The findings of this study will be used to promote the development of on-farm bamboo plantations in replacement of tobacco in the region and other parts of Kenya. Results from the study will therefore form the basis for policy recommendations and local community action plans with strategies for sustainable and improved livelihoods among tobacco farmers.

1.4 A conceptual framework for analysis of rural livelihoods

The research will utilize the Sustainable Livelihoods Approach (SLA) as a framework for micro policy analysis of rural livelihoods in addressing the research objectives. This ‘household assets – mediating processes-activities–outcomes’ approach has been used in analysis of poverty-environment interaction, e.g. (DFID, 2001) livelihoods systems approach to gender analysis; and in research on sustainable rural livelihoods and natural resource management, (Ellis, 2000; Scoones, 1998; Bebbington, 1999). The framework analyses the main factors that affect people’s livelihoods and relations between them. It can be used in both planning new development activities and assessing the contribution to livelihood sustainability made by existing activities (DFID, 2001).

In the context of this study, the framework will be used to analyze the relationships between tobacco and non-tobacco farming -based livelihood strategies/activities and outcomes to community household assets (natural, physical, human, financial, and social capital) modified by social relations (gender, age and ethnicity), and institutions; as well as demographic and policy trends and environmental shocks (drought, floods, diseases, civil war, etc.). The findings of the study are expected to lead to development of sustainable livelihood strategies that lead to income security and conservation of natural resources.

2.0 Research Objectives

The overall research goal is to investigate the sustainability of traditional and modern household livelihood strategies of tobacco farmers and how they would be diversified through the introduction of Bamboo as an alternative crop to reduce tobacco production in the South Nyanza region.

Specific research objectives of the study are:-

1. To examine the current and historical changes in household livelihood strategies used by tobacco farmers in comparison to non-tobacco farmers.
2. To experiment on the potential and people’s attitudes of adapting Bamboo as an alternative crop or source of livelihood to tobacco farming in the region.
3. To undertake an assessment of marketing dynamics as a feedback to investment in the bamboo industry in the region and Kenya.
4. To develop community action plans to ensure a reduction of tobacco production in the region through livelihood diversification/ poverty alleviation strategies.

3.0 Research Methodology

The research methodology will involve qualitative and quantitative tools used in both social and scientific research analysis. These will include relevant literature reviews, field experimentations/ demonstrations, local community household surveys and Participatory Rural Appraisal (PRAs) with stakeholder identification and analysis, and focused group discussions for meeting the data requirements of the stated research objectives. This research project will basically be done in a period of 3 years (April 2006-April 2009). Below is a detailed description of the study area, key research tasks, study population/ sampling methods/ procedures, data collection and analysis methods.

3.1 Demographic profile and socio-economic activities within the study area

Kenya's economy is basically dependent on agricultural production. The study area of this project as indicated earlier is the South Nyanza region (see the map below), which comprises four Districts (Kuria, Migori, Homa Bay and Suba). By 1995, all these districts were under one district officially referred to as South Nyanza District. Due to population increase and internal Kenyan politics, they are currently 4 administrative districts.

The study area's brief profile is as outlined below:-

Geography: South Nyanza region is located in the south-western Kenya, along Lake Victoria and covers an area of about 7,778 sq. km. (5,714 sq. km. Land area and 2,064 sq. km. Water) which is 48% of the Nyanza Province's land area. From the lake shoreline, the study area's altitude ranges between 1,163m to 2000m above sea level (GOK, 1989).

Ecology and Water Resources: The region has basically an inland equatorial climate, modified by the effects of altitude, relief and the influence of Lake Victoria waters. The normal temperatures range between 17°C to 30°C. Rainfall occurs almost throughout the year with a maximum in April to May. December to February is usually a dry season. The main perennial Rivers are Kuja, Migori, Awach Tende and Awach Kibuon (GOK, 1989; GOK, 2000a; 2000b; 2000c; 2000d).

Soils and Land-use patterns: The region has a variety of soils, most of which are highly localized. The lowlands striding along the shores of Lake Victoria, have rich alluvial soils in most parts and sandy loam soils in other areas. The medium potential zone has patches of loam and grey soils. The high potential zone is dominated by loam soils and brown clay soils. Tobacco growing is currently being practiced in high, medium and even low potential zones (GOK, 1989; GOK, 2000a; 2000b; 2000c; 2000d).

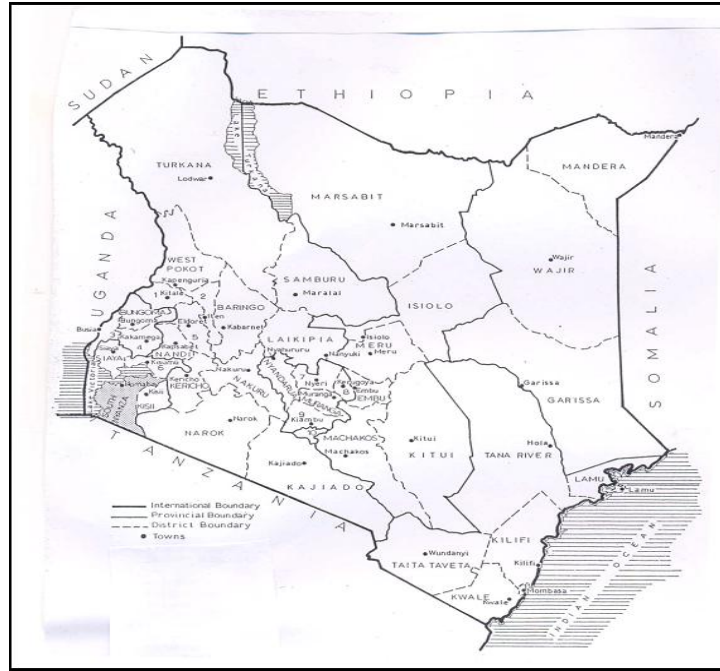


Figure 1: The location of the South Nyanza Region (Study area) in Kenya

Population and Natural Resource Base: The study area is estimated to have about 2.0million people at present. Apart from agricultural land, other major natural resources in the region are the Lake Victoria waters, Fish from the Lake, unexploited mineral resources and wildlife resources (GOK, 1989).

3.2 Research Tasks, sampling, data collection and analysis methods

With reference to the specific objectives of this study, there are 4 research tasks to be achieved in this project, namely:-

Task one: To study and rank the household livelihood strategies used by tobacco and non-tobacco farmers in the South Nyanza region. The task is being under taken in the first year of the study. The key research questions to be answered here include:-

- What are the basic tobacco cultivation requirements (inputs required and sources, farming procedures and standards, rules and regulations)?
- Have there been any changes in land tenure system and physical area under tobacco?
- What crops have been replaced by tobacco at the household level?
- What are the agricultural input-output functions for tobacco and other local cash crops?
- Why are the farmers undertaking tobacco farming?
- Why have certain farmers abandoned or never engaged tobacco farming?
- Are farmers willing to shift from tobacco farming to bamboo farming if the latter proves to be a viable investment in the region?
- Are there any other local uses of tobacco?

- What is the local price elasticity of tobacco?
- What are the economic and political issues related to tobacco?
- What are the socio-cultural and gender issues related to tobacco?
 - What role do men, women and children play in the production of tobacco?
 - Is food still grown by the farmers and, if so, who is responsible for that?
 - Does tobacco production interfere with the schooling of the children?
- Is tobacco production responsible for food insecurity at the household level of tobacco farmers and, if so, how?"
- What are the occupational and environmental health hazards associated with tobacco at the household level?
- Are there environmental concerns related to tobacco production?
- What are the expected socio-economic, cultural and environmental implications of introducing bamboo at the household level?
- What impact will the introduction of bamboo have on women, children, youths and men?

The general hypothesis guiding this objective is that: ***farmers in the region have been changing their household livelihood strategies over time in response to increasing poverty levels caused mainly by tobacco cultivation.***

This task is being carried out in the four (4) Southern Nyanza Districts of Migori, Suba, Kuria and Homa Bay. A multi-stage and stratified random sampling procedure was used to select households for the study. One administrative location with the highest concentration of tobacco farmers was selected from each district for the study. Farmers were then be stratified into three (3) groups, i.e. *contracted tobacco farmers, non-contracted tobacco farmers and non-tobacco farmers*. The socio-economic data on livelihood strategies, diversity and their vulnerability in selected households was done using a standard questionnaire with both structured and non-structured questions relevant to the study. The questionnaire was developed and tested within the first two months of the study.

An average representative random sample of 40 farmers in each category listed above was selected from the 4 Districts. This minimal sample size will allow statistical conclusions for each of the three categories, i.e. *contracted tobacco farmers, non-contracted tobacco farmers and non-tobacco farmers* for every district. This means that a total of 120 farmers are being studied in each district. This gives the total sample size of the study to be 480 farmers from the region. The interviews will be supplemented with participatory methodologies, group discussions and participant observations to cover all the study objectives in detail. Kiswahili, which is the National language in Kenya, will be used during all the PRAs. Four PRAs-Focussed Group Discussions (i.e. one for each district) will be organized accordingly. All PRAs will be gender sensitive by including adult men and women, and youths during all meetings and household surveys to be carried out during all phases of the study. The PRA tools to be used and their purposes are as outlined below: -

1. *Construction of community social and resource maps:* To indicate the community geographical boundaries, major resources, and social features. This will show the strong

environmental and social inter-relationships that exist. The community members will take a lead in this through guidance by the PRA team.

2. *Historical time lines:* Groups of old members of the community will assist to trace the significant events in the region. This will give us a background of a heritage of experience and knowledge that influences present attitudes and behaviour in the community with special reference to historical tobacco farming practices. This tool will document the major events, which have influenced the community life since the introduction of tobacco, the kind of interventions tried in the past and their present impact, both positive and negative on the lives of the community.
3. *Seasonal calendars:* This will involve everybody in the community to establish cycles or patterns of farming activities and occurrences over a year. These yearly cycles will be important to determine, for example, labour productivity, timing for project activity, potential absorptive capacity for new activities, times of disease and food shortages, and variations of cash flow, etc.
4. *Historical resource analyses:* This tool will show the availability of key resources to the community over time from the past, current and future. It will also indicate the reason in changes of these resources. This will be an important planning tool because it will indicate to the community the changes on the resources on which their developmental action plan will be based on as required in the last objective of this study.
5. *Farm sketches:* This will show individual farm practices, and will enable the PRA team to compare facilities and strategies in the micro-zones. It will also portray, on relative basis, the socio-economic status within the community, in terms of farm management, standards of resource management, productivity and income levels. Farm sketches of different households may reveal variations in terms of farm sizes, crops cultivated, planting strategies, and other variables of household resource use.
6. *Resource flow matrix:* This tool will be used to indicate visually the flow of the resources to and from the communities. It will show where the community resources are exported to and imported from. The tool will also show in what form (raw or processed) the resources are exported or imported by the local community. This tool is expected to indicate to what extent the communities depend on tobacco cash to pay for some resources imported.
7. *Livelihood mapping:* This will basically be the process of identifying the basic resources used by the community. It will involve identification of all the basic life support resources of the community and what they consider as important to their livelihood. This tool will also be useful in ranking of community resource problems and opportunities. In particular, the local traditional crops like cassava, sweet potatoes, groundnuts, maize, beans, sorghum, finger millet, onions, tomatoes, pepper and kales (*Sukuma wiki*) will be prioritised using this PRA tool.
8. *Institutional and stakeholders analysis:* This tool will assist in identifying the activities of various groups and organisations within the community as expeditiously as possible. It will also be used to examine the community perception on the existing institutions (rules of the tobacco production and processing game) and organisations and understanding their importance.
9. *Gender analysis and daily calendars:* This tool will be utilised by the PRA team to determine the roles and problems of women, men, young and old in the tobacco industry. Daily calendars for each gender group will be established for comparison purposes and further analysis.

On the other hand, the data obtained from the 480 respondents will be coded and clustered for subsequent statistical analysis using SPSS computer program. The analysis will generate summary statistics for background variables as well as test relationships between hypotheses variables in order to meet the research objectives. Descriptive statistics and regression will be used at the univariate, bivariate and multivariate levels of the analysis, respectively. The results will be presented by use of text, frequency tables, charts and tables presenting results of significance of relationships between statistical test variables.

Task two: *Experimentation on the potential and people's attitudes of adapting the Bamboo species as an alternative crop or source of livelihood to tobacco farming in the region.* The setting of the field farms has been done in first year (October, 2006) during the short rains, but monitoring and evaluation of the performance of the bamboo plantings will be carried throughout the project period. The key research questions/ issues to be answered or investigated include:-

- What are the bamboo establishment costs per hectare?
- What will be the advantages and disadvantages of bamboo cultivation as compared to tobacco and other crops grown in the region?
- What are the gross and net income margins of tobacco, other local cash crops as compared to bamboo products?
- Growth rates of bamboo plantings, i.e., per month, culm diameter, height.
- Survival rates and general health of the plantings under different environmental conditions, e.g. agro-ecological zones,
- Tillering rates, i.e. number of shoots per clump of bamboo.
- Number of culms per clump.
- Number of culms (poles) harvested for timber.
- General observation on response to fertilizer/ compost application.
- Time taken to maturity/ harvesting for various products.
- Farmers' willingness and attitude to bamboo farming.

The general hypothesis guiding this objective is that: ***Bamboo cultivation will have more advantages and economic benefits than tobacco farming.***

To obtain information on the above research questions and issues, a manageable and representative number of experimental farms (averagely 30 farms from each district each approximately ¼acre) were selected with the consent of 15 tobacco and 15 non-tobacco farmers, on formerly tobacco and non-tobacco farms, respectively. This gave a total of 120 sites/farms to planted with Bamboo plantings in the whole region. Each experimental farm site has averagely 20 plantings (i.e 10 Giant bamboo and 10 Bambusa vulgaris). A total of 2,429 bamboo plantings have been planted and this is expected to have a major impact of the project in the region in the long term.

Selection of farms was flexible and representative depending on diversified land characteristics. The bamboo was planted around the perimeters of the fields, homesteads, near riverbanks and any other free land abandoned after used to grow tobacco or other crops (since tobacco

companies only accept virgin land for tobacco farming from season to season). Availability of land for bamboo experimentation was not an issue in the region. In principle, the project is avoiding competing for land with tobacco farming and other crops at this experimentation stage.

With reference to accepted bamboo growing practices (National Mission on Bamboo Applications, 2004; China National Bamboo Research Center, 2001), these farms were planted with Bamboo plantings at spacing of about 5m X 5m.

The plantings raised through culm cuttings were obtained from Thika town (60Km from Nairobi City and about 600km from the study area, South Nyanza). Planting of young bamboos was done at the beginning of short rains, i.e. October 2006. This was important and critical to the project in order to avoid high watering expenses and increasing the survival rate of the young bamboo trees. Daily and monthly monitoring on the performance of bamboo trees will be carried out by farmers, and the research team, respectively. A calendar of field days has been developed to fit the farmers' operations.

The experimental farms will also act as farmer training and demonstration centres. Trainings on livelihood diversification and the need to reduce tobacco production will be carried alongside the training on planting and care of bamboo plantings. The livelihood diversification trainings will target both tobacco and non-tobacco farmers at the community level.

The plantings are expected to take a period of about 3-5 years to mature. Some products like shoots, compost from bamboo leaves, fodder for animals will be realized within 3 years. However, the culms will require another 2 years to harden for a variety of products. Forecasting on the production of other products will be done at that stage.

Management of the plantings, evaluation and monitoring will be done in collaboration with the farmers to ensure success of the research project. The second and third years will also be dedicated to market research on bamboo poles and other products. Further trainings will also be carried out on harvesting techniques, use and marketing of bamboos and the products. Change of attitudes and willingness to adopt the new livelihood strategy under experiment will be a continuous process during the project period.

Task Three: *The assessment of marketing dynamics on bamboo products as a feedback to investment in the tobacco industry.* This will give special reference to the Lake Victoria Basin and Kenya in general. This will be carried out in the second year of study. However, a reconnaissance survey and a pilot study of the task will be carried out towards the end of the first year in preparation for the second year of study. The key research questions to be answered here include:-

- What are the forecasted yields and profit margins of bamboo in comparison to tobacco and a range of local cash crops grown?
- What are the local existing bamboo product markets?
- What will be the target bamboo product markets?
- Who are the bamboo customers and potential customers in Kenya?

- What kind of people are they, and where do they live?
- Can and will they buy new bamboo products?
- Are the bamboo retailers offering the kinds of goods or services wanted at the best place, at the best time, and in the right amounts?
- Are the current prices consistent with what buyers view as the product's value?
- Are there any local bamboo promotional programs and are they working?
- What do customers think of bamboo products business?
- How does the bamboo business compare with other similar product competitors?
- What are the expected market entry obstacles (tariffs, regulations, policies) within these markets?
- What are the preferred product types? Why are those products preferred?
- Who are the local and international competitors currently supplying target markets?
- What are the projected product prices?
- How easy will it be for farmers to get their crop to the market?
- How long will it take to get paid for their product?
- What distribution strategies will bamboo growers prefer?
- Who are the potential partners to farmers in the bamboo industry sector?
- What is the existing potential for setting up village level bamboo processing enterprises?
- Is the present infrastructure in the Nyanza region allow easy and reliable supply of raw materials to existing processors or whether new factories will need to be set up in the region?

The general hypothesis guiding this objective is that: ***Bamboo materials and products have a high market potential in the Lake Victoria Basin and Kenya in general due to their diversified and unique characteristics.*** Using the data obtained in *Tasks two* and *three*, a trade-off model between Tobacco and Bamboo will be worked out. Different costs of production and market demand assumptions will be tested for a rational decision to be made.

This objective of the study will not be limited to the South Nyanza or Lake Victoria region. It will be carried out in areas where bamboo production, processing and utilization are common. These are Mt. Kenya, and the surrounding towns of Nyeri and Nanyuki; and the Aberdare mountain ranges including Nairobi and Naivasha towns. Other study centers will include the Mau mountain ranges, the Cheranganyi hills, Mt. Elgon, Nakuru, Kitale, Malindi and Mombasa. In the Lake Victoria region, the study will focus on urban Centres within the study area and region, e.g. Homa Bay, Migori, Mbita, Kehacha, and Kisumu City.

The parameters for data collection at the primary and secondary levels will be undertaken. The primary data will be collected from field surveys and informal interviews with a selected sample of raw bamboo producers, collectors, processors, retailers, importers/traders and consumers. A semi-structured questionnaire will be designed for the study. The research team will administer the questionnaire. Interviews will involve several visits to host villages and collection centers and major processing, manufacturing and market centers in Kenya.

Secondary data will be gathered from literature on previous work on bamboo, especially at Kenya Forestry Research Institute Centers and ICRAF.

To understand the consumption / utilization, analysis of the product range, pricing and mode of payments will be undertaken. Other parameters to be considered include volume of sales income and profits of handicraft operators, supermarkets, projected sales and future outlook, and trade restrictions, royalties, taxes, and other fiscal and regulatory measures. The Nakumatt chain of Supermarkets in Kenya who currently sell over 30 bamboo products will be of major focus by the study.

A quota sampling technique will be used to select the bamboo collectors and processors in all the study sites. Harvesting, collection, and processing individuals in rural and urban towns will be selected based on relative distribution patterns of target stakeholders in the various parts of country. Since the precise distribution of all bamboo collectors and processors is unknown beforehand, the actual survey will be done following the initial interviews with key informants in urban areas and forest stations.

In brief, the following categories will be interviewed to obtain information on existing and potential bamboo market in the Lake Victoria Basin, Kenya and beyond: Bamboo producers/farmers, bamboo collectors/harvesters, primary processors, retailers and consumers (market centers in urban towns/cities), policy making institutions, and other stakeholders. In the Lake Victoria region, PRAs and field visits will be used to assess the potential market of bamboo products like firewood for the fish, tea and sugar industries; charcoal; construction materials; etc in the region. Four PRAs (i.e. one for each district) will be organized accordingly. In brief, bamboo marketing research task will focus and organize marketing information in Kenya. It will ensure that such information will permit bamboo entrepreneurs to:

- Reduce business risks
- Spot current and upcoming problems in the bamboo market
- Identify market/ sales opportunities
- Develop plans of action

Data analyses will be done using SPSS and Excel computer packages. Descriptive statistics will mainly be used in the analysis. Frequency tabulation will be used to present the collected information on the various aspects of the bamboo sector. Where appropriate, the distributions will be summarized, using the statistical central measures of tendency such as mean, mode and median. Percentages will be used to compare frequencies and to express qualitative variables in a numerical format.

Task Four: *Development of four (i.e. one for each district) Community Action Plans (CAPs) aimed at reducing tobacco production in the short, medium and long terms.* This is planned to be carried out in the third and last year of study. The CAPs will act as a record on each District's bamboo cultivation and development priorities and the potential/ willingness in reducing tobacco production in the region. They (CAPs) will act as the basis for addressing tobacco-related issues in the region. This task will basically be achieved by running district-based PRAs. To ensure reliability of the CAPs, multiple goal linear programming will be used in the analysis for determining what livelihood strategy will be best against poverty and environmental objectives.. Since different actors will use the CAPs to extract sectoral projects for funding, the PRAs will ensure that they include all stakeholders and local change agents

(tobacco farmers, non-tobacco farmers, relevant government line Ministries, NGOs, local leaders, donors, etc) will all participate. The CAPs will also capture other local livelihood strategies (based on other local cash crops) prioritised by the community in Year I of the study.

Four PRAs (i.e. one for each district) will be organized accordingly. However, the farmers will take a lead in developing the CAPs. The research team and other project collaborators will act as facilitators, and make technical information available to the community to help them come to rational decisions. It will be preferable to involve the NGOs and donor agencies in this activity because in many cases, external input, especially funds, technical support, and training, may be critical for success of the CAPs implementation process. Implementation and monitoring of the CAPs will mainly be the responsibility of the community.

4.0 Capacity Building

Capacity building to ensure long term and sustainable livelihoods will be of priority. This will be achieved in the following ways: -

- Training of tobacco and non-tobacco farmers on the benefits of livelihood diversification and reduction of tobacco production.
- Training of farmers on how to produce bamboo plantings and seedlings and their care, harvesting, processing technology, uses and market networks.
- Two Maseno University Masters-level students will work on full-time basis as research assistants in this project and will receive on the job training on bamboo production. They will be expected to develop their PhD research proposals by the Mid-2007 on Bamboo production and processing/ tobacco production control. They will have the capacity to handle future strategic research works aimed at tobacco production control.
- The development of such manpower and institutional capacity at Maseno University will lead to establishment of a regional Bamboo Promotion and Tobacco Control Research Centre (BPTCC) before the end of project period.

5.0 Users and Beneficiaries

The tobacco farmers are the main target as users and beneficiaries of the research project results. However, other non-tobacco farmers in the region are expected to adopt bamboo farming to diversify their livelihoods too to ensure sustainability of household income portfolios. However, all participating farmers in the bamboo farming experimentation will have to give formal consent to use their land for bamboo experimentation to avoid any unforeseen land use conflicts later. The tobacco-affected women, children and youths are expected to be the major beneficiaries. The results will also benefit other tobacco farmers in other parts of Kenya and the East African region in general. At the policy level, government officers at all levels (local, regional and national) in the country will use the results to promote the growing of bamboo as an alternative cash crop, because farmers are always willing to switch to any crop that has a ready and diversified market as indicated during the Project Planning meeting with various stakeholders.

The research is expected to attract young researchers in studying several aspects on bamboo as a crop and tobacco control aspects in the region. At present, there is a lot of research going on in the Lake Victoria Basin focusing on poverty alleviation. Maseno University is the only University in the region and one of the leading research Centres on various issues.

The research project anticipates a lot of interest from various tobacco farming stakeholders. The tobacco companies and their agents may try to campaign against bamboo production using weak points like period of maturity (3-5years), but the fact remains that tobacco farmers are in serious search for livelihood alternatives to tobacco farming. The research team is prepared to counter such diversions through the trainings/ workshops planned as part of this research project. The research project is banking on the support of small-holder tobacco farmers for the success of the project.

6.0 Dissemination of Results/ Outputs

Several outputs expected can be summarized as:-

- Ranking of local livelihood strategies among the tobacco and non-tobacco farmers.
- Create awareness on the cultural, socio-economic and environmental impacts associated with tobacco production.
- Obtain information on bamboo market structure and performance in the region.
- Development of new and sustainable partnerships with various stakeholders in order to reduce tobacco production, rural poverty and environmental degradation.
- Development of Community Action plans to reduce tobacco production through livelihood diversification.
- Research capacity building through trainings and publication of results.
- Development of policy documents based on diversified and sustainable livelihood portfolios.

As outlined above, trainings on livelihood diversification by tobacco farmers on traditional food and cash crops (i.e. cassava, sweet potatoes, groundnuts, maize, beans, sorghum, finger millet, onions, tomatoes, pepper and kales (*Sukumawiki*)) and specifically bamboo growing, harvesting, use and marketing will be undertaken at the community level using *barazas* (chief's meetings), seminars, group discussions and field demonstrations. This will be communicated through local languages (Dholuo, Suba, Kuria). Quarterly reports and policy briefs will be sent to relevant stakeholders and to RITC for further dissemination through their website. Hard copies of *Policy Briefs* will be published and distributed. The policy makers will be convinced to read them since they will be part of the research process, and because they will participate in key project meetings during the data collection exercises. Two (2) papers will also be published in peer-reviewed international journals on every objective of the study (i.e. 2 papers in Year I, 3 Papers in Year II and 3 Papers in Year III). This amounts to eight (8) publications in 3 years.

7.0 Monitoring and Evaluation

Monitoring of the research project will be a continuous process throughout the project period. Progress reports will be submitted to IDRC and Maseno University every six months. Evaluation of the project will be required at the end of the every year to ensure that the project direction or vision is maintained in the long term. The evaluation will be done both internally by the research team and externally by IDRC. The key indicators for first year include: the number of households interviewed, the ranking of household livelihood strategies, number and status of bamboo experimental farms, number of PRA meetings, number and quality of trainings held, etc. The second year evaluation indicators include, the bamboo performance

monitoring reports, status of bamboo experimental farms, the attitudes of farmers towards the project, the bamboo market information, number of policy briefs, papers for publication, number and quality of trainings, etc. At the end of the third year, the policy briefs, papers for publication, number and quality of trainings and CAPs developed will form the key evaluation indicators. The farmers, researchers and other stakeholders will form the source of information for the evaluation team(s). Annual evaluation/ progress reports will be submitted to IDRC, Maseno University and other relevant stakeholders. Comments from the evaluation reports will be used to improve further the performance of the research project.

8.0 Collaboration

Maseno University is the research institution leading in this project. To realize tangible outcomes from this study, collaboration/partnerships has not only been established with the farmers, but also with other stakeholders. The research team has already developed direct research links with the Ministry of Agriculture, the World Agroforestry Center (ICRAF) which is currently promoting the cultivation of bamboo in some degraded areas to control water pollution, relevant NGOs e.g. (Social Needs Network and Community Livelihoods Development Forum-COLIDEF), Kenya Forestry Research Institute (KEFRI). All these are being consulted for information and participation during the project data collection meetings/ data validation workshops/ seminars. NGOs and other organizations against tobacco farming are being utilized in mobilization of farmers to attend workshops/ training field days, etc. These links have been useful especially in farmers' selection and their mobilization to accept the experiment and adoption of new alternative livelihood strategies. It will also be ethical to share information during the project period among the collaborators and relevant stakeholders.

The research team has also developed linkages with the International Network for Bamboo and Rattan (INBAR) in conducting of short farmer/ student trainings. INBAR is also assisting in the area of literature on Bamboo production, processing, marketing and utilization.

9.0 Timetable

Expected duration of the research project is three (3) years (**1st April 2006-31st March 2009**). The activities to be carried out and those being carried out have already been outlined in detail under the Activities/Methodology section of this proposal. Below is summary of proposed timetable of principal phased activities:-

KEY ACTIVITY/PHASE	PERIOD		
	April 2006- March 2007	April 2007- March 2008	April 2008- March 2009
<ul style="list-style-type: none"> To study the household livelihood strategies used by tobacco and non-tobacco farmers in the South Nyanza region 			
<ul style="list-style-type: none"> Setting up of field experimentation of Bamboo in the 4 Districts 			
<ul style="list-style-type: none"> Monitoring and evaluation of the performance of the bamboo plantings 			
<ul style="list-style-type: none"> Assessment of marketing dynamics on bamboo products as a feedback to investment in the tobacco industry in Lake Victoria Basin and Kenya in general. 			
<ul style="list-style-type: none"> Development of four (i.e. one for each district) Community Action Plans (CAPs) 			

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