

# A Review Farm Forestry Evolution for the Last 100 Years in Kenya: A Look at Some Key Phases and Driving Factors

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## Abstract

The study reviews the evolution of tree growing in Kenya from pre-colonial through colonial to the present day in order to understand some factors that have influenced such developments. The study is based on desktop literatures reviews of various studies done in the country over the years and the authors' experiences. The study indicates that forest resources management during pre-colonial period were based on individual communities' traditional structures that ensured that its members had abundant supplies of land and resources to support their socioeconomic activities. Forestlands were viewed as reserves for future agricultural expansion depending on community population growth and settlement patterns. In 1895 the country was declared British Protectorate that heralded the entry of colonial settlers that drastically changed land ownership through displacement and concentration of indigenous populations. Improved health services led to drastic population growths that further shrunk available productive land and forest resources to levels that could not adequately accommodate traditional land uses. The resultant was serious land degradation in Africa reserves that prompted the Colonial Government to initiate agricultural and land use transformations that included afforestation in highly populated for environmental conservation, boundary marking and supply of tree products. Another parallel development was forest reservation and expansion of public plantation by Forest Department that involved planting of fast growing exotic species such as Eucalyptus, Pines and Cypress among others that diffused to neighbouring farms, missionary centres, schools and emerging elite Africans for amenity and social status. The emergence of *Acacia mearnsii* as a cash crop for African farmers in Central and western Kenya in 1930s was another development that enhanced adoption of tree growing on farms in the country. After independence in 1963 more policies and strategies to promote tree growing on former settler farms and African reserves for environmental conservation and subsistence needs implemented. The last chapter of the farm forestry evolution was the commercialization of farm forestry operations due increased demand for various forest products beyond the capacity of public forests. The key markets niches mostly for firewood in tea processing, transmission poles manufacturing, charcoal and sawnwood for rural and urban markets were lucrative enough to motivate millions of smallholder farmers to expand their farm forestry investments. The markets based incentives to meet the growing demand for various products has transformed farm forestry in Kenya into multibillion sector enterprises that competes with public and private plantations products in local markets. The lessons learnt in Kenya case is the multiple factors that have shaped farm forestry development over the last 100 years and the critical role played by market related factors that enabled smallholder tree growers to enter into lucrative short rotation wood product markets.

**Keywords:** Farm forestry evolution, phases, driving factors

## 1.0 Introduction

Like in most developing countries, private and common property land resources in Kenya coexist. In medium and high potential areas where population density is high private land is mostly devoted to crop production and the diminishing common lands constitute the prime source of extractive natural resources such as firewood, charcoal, poles, fodder, fruits and medicinal products mostly for domestic use. However, land alienation; break down of traditional resource control systems, population increase, and encouragement of privatization of land in Kenya has increased pressure on common resources. Scarcity and lack of sustainable traditional resource control structures has forced households to shift from laborious extractive activities to planting and management of trees on private farms. Despite shifts in forest resources management from natural vegetation extraction to intensive tree planting most empirical studies in the tropics still focus their attention on deforestation and management of common resources (Angelsen et al 1999). Cross country studies link deforestation to several factors such as inefficient management of common resources due to imperfect controls by communities (Baland and Platteau, 1996, Lopez, 1997), higher agricultural prices (Barbier and Burgess, 1996, Panayotou and Sungsuwan, 1994), construction of access roads (Chomitz and Gray, 1995) and tenure insecurity (Deacon, 1995). Population growth resulting in greater demand for agricultural land and forest products is supported by most cross-countries empirical studies (Deacon, 1995). However increased rural wages and off-farm employment was found to reduce the pressure on forest clearance (Barbier and Burgess, 1996).

The socioeconomic and environmental impacts of deforestation on rural household in developing countries include firewood scarcity, environmental degradation, declining agricultural productivity and other basic needs of poor residents in the rural and urban areas. Several strategies emerged in 1970's and 1980's to stimulate tree growing on farms as a remedial measure. Most projects focused their attention to narrow deforestation issues mostly supply of firewood, environmental degradation and soil fertility. These approaches did not take into account farmer's other overriding socioeconomic objectives in farm forestry land use decisions thus resulting in divergence between project objectives and outcome on farms. Most tree planting project objectives were for firewood self-sufficiency whereas the outcomes were production of poles for markets and construction (Arnold, 1997). This showed that farmer's problems were not firewood only but income and construction materials were as well important. Experience from India highlights the consequences of failure to appreciate the role of incomes and market forces in farm forestry development. The most social forestry projects promoted in India in 1980s ignored income needs and the role of the markets in sustainable development of farm forestry but the unexpected high participation of farmers in roundwood markets led to the collapse of local roundwood markets (Saxena, 1997). This shows that though basic material needs cannot be ignored, the role of markets and income objectives in motivation of farmers into expanding tree planting and management intensity is of critical importance.

## 1.2 Evolution of Farm Forestry in Kenya

Farm forestry is defined as the practice of growing trees on privately owned agricultural land, for household use and surplus for sale (F A O, 1989). Some archival reports by early European explorers, missionaries, administrators, agricultural and forest officers provide some valuable information on forestry resource stocks, ownership and management practices in pre-colonial Kenya. The communities found in present day Kenya differed considerably in their land use patterns depending on their historical background, land use preferences, traditional customs and culture and ecological influence (Cheboiwo, 1991). Trees were an essential part of the community's resources and tree tenure was recognized depending on species, locality and main usage within the community and between men and women (Burrow, 1989; Ogendo, 1987; Rocheleau, 1987). Pre-colonial land use was therefore directly related to subsistence requirements of the community members as expanding populations needed more food therefore forests and grasslands were cleared to create more agricultural land supplies. Therefore forests were sources of reliable land supplies that kept new members of the community productively employed and thus contribute to the community's economy.

It is evident that under traditional African land use systems, cultivated land area was directly related to food demand of the cultivator and his family and hence depended on population density of the specific community. Similarly, for pastoral communities the land was directly related to grazing resources demand by its members. For example among the Kikuyu of central highlands some parcels of forests were preserved for production of construction wood, fuel and sacred sites for religious ceremonies whereas bushes were preserved for sheep and goats to browse (Leakey, 1935). Members of the community established claim to land by clearing the forest for cultivation (Maher, 1938). Among the predominantly pastoral Kalenjin the land occupied by the community members was the property of the tribe as a whole and the trees that grows naturally upon it (Kosgei, 1981). Land use and common property resources such as forests and trees were under the control of the village elders or higher authority depending on geographical extend. In the highly populous Luhya communities of western Kenya that comprise the current Kakamega and Vihiga counties most of the land was under cultivation and hardly any space for forest reserve existed and allocation powers was bestowed on a *Liguru*, a traditional leader and council of elders (Thomson, 1885).

However, early explorers and colonial administrators reported existence of large areas suitable for white settlements in Kenya which were uninhabited or under-utilized (Johnstone, 1901). British farmers were encouraged to migrate and settle in these favourable agricultural lands in Kenya. To facilitate settlement several land and labour related ordinances were enacted from 1900 to improve the security of land and supply of cheap labour. The 1902 Kenya Crown Land Ordinance provided for the alienation of land on 99 years lease, which was increased, to 999 by another Ordinance in 1915. The Resident Native Labour Act of 1919 required all Africans resident on European farms to contribute three months labour to the settlers (Mosely, 1983; Knapp, 1974). By December 1914 about two million hectares had been alienated into several classes such as white settlement areas, native reserves, nature reserves, native purchase area, game and forest reserves, crown land and native trustlands. The land alienation and colonial administrative structures greatly weakened traditional African land allocation and control systems based on elders and community participation. The European settlers and African farmers cleared more bushland at a faster rate to increase the agricultural land to meet increased food requirement and surplus for sale. Pastoralists were concentrated in dwindling land sizes that led to overgrazing and vegetation degradations in African reserves. In 1930's the colonial government expanded rural infrastructure to improve transportation of agricultural produce through construction of a railway line into the grain growing areas of White Highlands.

Along with the alienation of land, improved health services, elimination of tribal wars, reduced effects of famine and introduction of new crops deliberately or forcefully transformed the traditional African subsistence

agriculture into surplus commercial farming for such crops as maize, cotton and black wattle. Several traditional land use systems could not adjust adequately to cope with the changes and gave way to serious soil erosion problems due to over-grazing and fragmentation of cultivable land in the tribal reserves. The resulting economic stagnation in the African Reserves during the 1940's was so serious that only a complete transformation of the traditional land use systems was advocated in the African Land Development Project (ALDEV 1946-56) and Swynnerton Plan (1954). To reverse the land degradations privatization of communal lands, consolidation of fragmented lands and planting of tree along boundaries to imprint land ownership was promoted. The idea of planting trees to enclose and lay claim to land for example started among the Kalenjin between 1930 and 1940 and African Courts in 1945 gave legal sanctions to such land enclosures (Kosgei, 1981). In South Kavirondo currently Vihiga and Kakamegacounties tree planting campaigns through provision of seedlings mostly *Eucalyptus ssp* to counter forest resource scarcity received good response (Humphrey, 1947). The forestry component in the African Land Development Programme, (ALDEV 1946-56) in the African reserves and Trustlands included the establishment of tree nurseries and provision of extension support services. In Nyanza Province, two government supported tree nurseries were started in Maseno and Kodera in the 1950s under ALDEV Project, though individual tree nurseries existed by 1935 (Cheboiwo, 1993). Missionaries, local white administrators and settler farmers introduced exotic tree planting in missions, schools, administrative centres and farmlands for amenity and utility purposes. Forest Department experimentation and plantation programmes spread the growing of Pines, Cypress, Grevillea and many other exotic species. Forest Department nurseries raising these species for planting in public forests filtered into neighbouring private farms for ornamental and provision of forestry products. Local farmers, colonial chiefs and educated Africans adopted tree planting for various purposes such as amenity, land claims, social status and utility purposes (Cheboiwo, 1993).

Tree planting as a commercial venture started with the introduction of *Acacia mearnsii* (Black Wattle) into Kenya by Reverend Stuart Watt who planted the black wattle in Ngelani Machakos in 1880's from where it spread to other parts of the country. By 1920's it was widely grown by both African and Europeans farmers because of its low labour requirement and high demand for its bark for production of tannin by factories located Njoro, Limuru, Thika and Eldoret. It became an important cash crop for the African farmers in Central Kenya by 1937 and establishment rates and management intensity coincided with price peak periods of tannin extracts of 1921, 1929, 1935 and 1948. During these periods Muranga in Central Kenya tripled its area under black wattle from 18,000 to 60,000 hectares (Deweese, 1991). In Embu District of Central Kenya its popularity among African farmers between 1933 and 1937 saw recorded seed issued rise from 9 bags to 35 bags per year and land under the crop expanded by 1,800 hectares (Maher, 1938). This was because of increased bark prices, improved extension services and lack of alternative cash crops for African farmers. Over-time black wattle growing extended westwards mostly into expanse Uasin Gishu plateau in the Rift Valley when more valuable crops such as tea and coffee replaced it in Central Kenya (Deweese, 1997). *Acacia mearnsii* has established itself as an important land use in Uasin Gishu plateau whose profitability has been enhanced through inter-cropping with maize and wheat at early stages of establishment and silvo-pastoralism at later stage (Cheboiwo and Ongugo, 1989).

### 1.3 Current Farm Forestry activities

The Kenya Forest Policy of 1968, in addition to lengthy coverage of public forest management and training of forestry professionals, recommended acceleration of rural tree planting activities. Rural Afforestation and Extension Services Division (RAES) was started in 1971 to facilitate its implementation through training of farmers, establishment of tree nurseries countrywide and deployment of extension staff to offer technical services to rural farmers.

By 1990, through RAES and Local Afforestation Programmes (LAP), there were about 370 Local Chiefs Nurseries (LCN) out of 850 administrative locations in the country (GOK, 1989). Most of them have since collapsed due to competition from efficiently operated private commercial nurseries to be found across the country and urban areas. However, by 1989 tree seedling production was over 100 million seedlings per annum reflecting an equivalent area of between 53,000 and 84,000 hectares (Odera, 1989). This excludes farmers' backyard nurseries that were reported to be important sources of seedlings (Van Gelder and Kerkhof, 1984; Cheboiwo, 1993). Several NGO's in collaboration with government agencies and farmers have expanded tree-planting activities in the country. Private nurseries both in rural and urban areas and recently seed collection and vending have over-time flourished as an important business for farmers and commercial operators thus making the activities more market and need driven. By 1994, the Kenya Forestry Master Plan (KFMP, 1994) estimated that total volume of planted trees of various species by farmers equalled that of closed-canopy indigenous forests and government forest plantations combined.

Forestry resource management on farms has evolved through several stages in Kenya in the 100 years in terms of planting patterns, species mix, density, utilization and marketing which has been shaped by local biophysical, institutional and socioeconomic conditions through some definable common stages (Arnold, 1997). These stages evolved from common resource extraction to planting in compound, boundary and windbreaks, inter-

cropping and lately intensive mono-cropping in form of woodlots for commercial purposes. These factors have also shaped some regional dominance of some species in the country, for example *Gravillea robusta* and *Cupressus lusitanica* in Central; *Casuarina equisetifolia* in Coastal strip and *Acacia mearnsii* and *Eucalyptus spin* Western Kenya. However, most farmers in Kenya grow mixture of these species in their agricultural land. The trees are grown for various purposes such as fencing, timber, posts, fodder, food, poles, fuelwood and bark. Farm forestry also provide vital environmental goods and services to the households and society such as wind breaks/shelter belts, water catchment protection, shade, soil conservation, boundaries markers and enhancement of scenery. The widespread of tree planting and conservation on farms by 1980's was significant, for example a survey by Kenya Woodfuel Development Project (KWDP) in three highly populated districts, indicate that woody biomass occupy 21.9% of land area in Kakamega, 20.0% in Kisii and 20.8% in Murang'a (KWDP, 1985). Kenya Forestry Master Plan Project (KFMP, 1994) reports that trees on farms and settlements in the high and medium potential ecological zones contain an average of 9.3 m<sup>3</sup>/ha and is projected to grow to 27m<sup>3</sup>/ha by 2020 without adversely affecting agricultural production. KFMP (1994) further predict expansion of annual roundwood production from farms from 11.5 m<sup>3</sup> in 1995 to 22.2 million m<sup>3</sup> by 2020 and its share of national output to increase from 65% to 80% and demand for wood products is expected to grow from 15.1 m<sup>3</sup> in 1995 to 30.7 million m<sup>3</sup>. Farm and private forestry is projected to grow from 690,000 ha in 1994 to 830,000 hectares by 2020. This will be approximately 10% of the total prime agricultural land in the country (KFMP, 1994). Various farm forestry products such as firewood, polewood, sawnwood, sawlogs, charcoal are consumed or marketed by households is estimated to have generated up to USD 170 million in the year 2000 and predicted to expand to USD 372 million by 2020.

The success has been due to government and NGO's farm forestry promotion strategies that ranged from direct packages such as subsidies in provision seedlings of to farmers, promotion of private nurseries and seed vending and provision of technical and research services. The tree planting culture among farmers and their ownership of more than 10 million hectares in medium and high potential areas that are favourable to tree planting are cited as others key factors (Simmons, 1998). For a long time apart from *Acacia mearnsii* growing on commercial scale farm forestry in the country has evolved with more focus on meeting the basic household and environmental good and services with minimal attention to supply of industrial roundwood until late 1990s. However, beginning mid 1990s several factors have influenced commercialization of farm forestry operations in the country. These include the continued annual population increase at 2.8%, rapid urbanization, increased construction activities and growth of wood based industries that have multiplied the demand for various forest products (GOK, 2011). To meet the demand for various forestry products the forestry sector had few options outside public forests such as imports from neighbouring countries and sourcing materials from local private/farm forests. However, roundwood is a bulky commodity therefore transport costs will tend to rapidly increase exponentially with distance from the production and processing sites that makes import an expensive affair for low value end consumers in rural areas but affordable to high end urban consumers. Thus farm forestry became a choice for wood supplies for various rural based enterprises such as furniture making, public/private institutions and wood based industries that instant secure markets to rural investors in woodlot development. Some key industries include transmission poles treatment plants that expanded from 4 in 2004 to 48 by 2015 and over 65 tea processing factors that shifted from furnace oil to use of firewood in tea curing processes. These developments provided a market niche that farm forestry investors have dominated and potential supplementary suppliers of roundwood for industrial processors and other markets alongside public forests.

#### 1.4 Conclusion

The history of farm forestry in Kenya was shaped by various colonial and post-colonial factors mostly related to land scarcity, population density and markets based incentives. The study indicate that there are some necessary conditions for farm forestry to thrive as a subsistence land use and as a business enterprises. These factors include population density, climatic conditions and access to lucrative market niches for surplus products especially for short rotation tree crops. Therefore policy and legislative framework have to take into account these factors in order to facilitate vibrant farm forestry development in developing countries like Kenya.

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