FARMERS PERCEPTION OF OPPORTUNITIES PREFERENCES AND OBSTACLES OF GROWING MULTIPURPOSE TREES ON FARMLAND IN KOGI STATE

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Abstract

A survey was conducted on the present condition of farmlands in Kogi State. Farmers' knowledge and experience of tree growing, their preferences and perceptions, and obstacles to planting in fifteen villages that form a cross-section of the state geo-political zones. Fifteen household heads were interviewed in each of the fifteen villages. Thus 150 households from the fifteen villages were randomly selected for the study. 150 copies of structured questionnaires were administered to elicit response from the respondents. The survey revealed that almost every farmland contains a combination of different tree species. Farmers generally prefer to grow fruit trees because they can provide income, timber, fuel and fodder for their livestocks. 40% of the respondents are involved in growing of fruit trees for food while 30% grow trees for lumber, 12% and 10% grow trees for fuelwood and environmental protection respectively. Kogi State farmers are aware of the value of multipurpose trees and want to plant more if given the opportunity. Lack of land, technical know – how, inputs, time and labour are major constraints preventing more tree planting. The design of an agroforestry programme to awaken and strengthen extension services and provide seedlings and supports to farmers in Kogi State are recommended.

Keywords: Multipurpose trees, farmer's perception, preference and obstacles

Introduction

In many developing countries of the world deforestation, soil fertility loss, growing scarcity of tree products and environmental degredation have created serious problems for rural land – use. The majority of rural dwellers in the tropics are small farmers or landless people faced with many physical and socio – economic constraints that prevent them from overcoming daily struggle for subsistence (Burley and Von Carlowitz, 1984). Although these physical and socio-economic factors vary from one region to another, several common characteristics can be identified.

In many regions, physical factors pose a degree of environmental risks to which the farmers must adapt. Example include erratic rainfall and drought in arid and semi – arid areas. These physical constraints are frequently compounded by a lack of infrastructure in many rural areas. As a result, farmers are not well integrated into the market economy. Thus, small farmers and landless persons generally have limited access to outside inputs and technology, and must rely on locally available resources to meet a wide range of subsistence and cash need.

Because agriculture is still based on traditional practices of low productivity, farmers are unable to produce surplus which can be stockpiled as insurance against environmental risk. Any outside intervention to increase farm inputs must fit into this framework. That is, technologies must be of low input, low risk and produce high retains if poor farmers are to benefit.

Agroforestry has been defined in several ways (Nair, 1999). The International centre for Research in Agroforestry (ICRAF) in Kenya has defined agroforestry as a collective name for land-use systems and technologies in which woody perennials (trees, shrub, palms, bamboos etc) are deliberately combined in the same land management unit with agricultural crops and/or animals, either in form of spatial arrangement of temporal sequence. There are normally both ecological and economic interaction between the woody and non–woody components in agroforestry (Sanchez, 1995).

Agroforestry practices come in many forms but fall into two groups those that are sequential such as fallows, and those that are simultaneous, such as alley cropping. According to Nair (2003) eighteen different agroforestry practices have been recognized, although each has an infinite number of variations. Thus at the moment, agroforestry is viewed as a set of stand - alone technologies that together form various land – use systems in which trees are sequentially or simultaneously integrated with crops and/or livestock. In agroforestry research, practices are often applied after diagnosis and design, participatory research or characterization studies, as appropriate, depending on the social economic and environmental problems in an area. Agroforestry is generally practiced with the household and imposes cost of

various kinds. There are many factors which determine the need and possibilities for tree growing. Farmers have historically protected, planted and managed trees on their lands in order to maintain supplies of products no longer available from natural forest. Also, trees may be retained to maintain soil productivity or are grown on sites unsuitable for food crops.

The advantages or disadvantages of multipurpose tree growing are also determined by economic factors such as the availability of land, labour and capital, subsistence needs and market opportunities. Tree growing is also influenced by cultural factors e.g. land tenure attitude towards communal forest management and status symbol. This paper therefore explores the socio – economic conditions in which multi-purpose trees growing can benefit farmers in Kogi State highlighting the linkages between trees and the farm economy, the factors involved in farmer decisions for or against multipurpose tree growing and the impact of tree cash crops on farmer's welfare.

Agroforestry: Concept and Definition

Agroforestry has great technical and economic potential to address the production and sustainability problem of small scale farmers and other land users in developing countries. Farmers have undoubtedly been practicing agroforestry through millennia – long before researchers began investigating traditional practices and designing new ones. Agroforestry may be relatively new in terms of scientific experiments and formal development project, but rural societies have been developing different forms of it for centuries (Wilken, 2007).

Agroforestry is the improved version of the traditional bush fallow system. Lundgren and Raintree (2003) defined agroforestry as a collective name for land use system and technologies where woody perennials are deliberately used on the same management unit as agricultural crop and or animals in the same form of spartial arrangement or temporal sequence. Agroforestry can be applied at different scales in a landscape. The smallest scale is the individual farm, where trees might be grown around homestead or as boundary markers. There are thousands of agroforestry system, traditional and modern but have only about nineteen (19) technologies. These are

i. Shifting Cultivation
ii. Improved tree fallow
iii. Taungya system
iv. Trees on cropland
v. Plantation crop combination
vi. Multi-storey home garden
vii. Hedgerow intercropping (alley cropping)

viii. Boundary planting
ix. Tree biomass transfer (mulching)
x. Windbreak and shelterbelts
xi. Trees on rangeland or pasture
xii. Trees on erosion (control structures)
xiii. Plantation crops with pastures
xiv. Living fences
xv. Fodder bank
xvi. Woodlot with multipurpose management
xvii. Reclamation forestry leading to multipurpose use
xviii. Entomoforestry (trees with insects)
xix. Aquaforestry (trees with fisheries)
Source: Young (1989)

The aim and rational of agroforestry systems and technologies is to optimize positive interactions between components (tree / shrub and crop / animals) and between these components and the physical environment. Multipurpose tree is a tree that clearly constitute an essential component of an agroforestry system or other multipurpose land use systems. Regardless of the number of its potential or actual use, a multipurpose tree has to have the capacity to provide in its specific function(s) in the system a substantial and recognizable contribution to the sustainability of yields, to the increase of outputs and / or the reduction of input and to the ecological stability of this system. Only a tree that is kept and maintained or introduced into an agroforestry system especially for one or more of these purpose qualifies as a multipurpose tree.

Agroforestry techniques have been credited with ability to control soil erosion and restore fertility more cheaply and more efficiently under the tropical environment (Okigbo, 2003). For a land use system to be classified as an agroforestry system, it must involve a deliberate retention or use of woody perennials. Deliberate use of trees may if properly integrated in land use systems enhance both the productivity and sustainability of land. Fagbenro and Kio (1990) attributed the relevance of agroforestry to the distinctive features and functions of trees. Raintree (2011) listed the characteristics of an ideal multipurpose trees as follows; high nitrogen – fixing, capacity fast growth, ability to restore fertility and suppress weed in a shorter time than natural bush fallow ability to control soil erosion, ease of establishment, ease of eradication tolerance to drought etc. Fast growing Nitrogen – fixing multipurpose trees are of particular interest to agroforesters because of the central role they play in agricultural production (Young, 1989).

Contribution of multipurpose trees to household food security

Food security is a fundamental problem facing the world today. Over 800 million people still suffer from malnutrition. Sustainable food production depends on a favourable and stable environment. At local, as well as regional and global level, multipurpose trees may have profound influence on the environment. In many rural areas forests and farm trees provide critical support to agricultural production by maintaining and improving soil conditions and also maintaining hydrological systems. Multipurpose trees contribute directly to food security by providing fruits, nuts, and other edible foods. These contribute to people's diets in almost all rural areas by adding diversity and flavouring as well as providing essential minerals to the human diet.

Within settled agriculture, the most widespread direct contribution of multipurpose trees to food production is through food producing trees on farm and fallow land and around the home. The extent of this contribution varies widely. Often multipurpose food trees are selectively left in farm and fallow areas while other fruit trees are planted outside the house.

Management of home garden are prominent features of traditional farming systems, especially in region of high population density and decreasing availability of crop and lands. With growing population pressure, the proportion of land under home garden has been increasing. In some cases up to 70% of cultivated land areas (Stoler, 1998).

Home gardens are defined as a land – use practices involving deliberate management of multipurpose trees and shrubs in intimate association with annual and perennial agricultural crops and livestock within the household compounds, the whole crop – tree – animal unit being intensively managed by family labour (Fernandes and Nair, 2006).

Food production is the primary function of most home gardens and much of what is produced consumed by the household. When the multipurpose trees and other food producing components are added together, home gardens can supply a substantial fraction of a family's food needs. It is estimated, for example that Javanese homegardens provides more than 40% of the total calorific intake of farming communities in some areas (Terra, 1994, Stoler,1998).

Another important feature of home garden is their ability to produce food throughout the year with relatively low labour inputs crops with different production cycles and rhythms are combined to provide a year round supply of foods. Any marketable surplus helps provide a source of income between harvests of other agricultural crops and a safeguard against crop failure. Home gardens produce sustainable yields in an economically efficient, economically sound and biologically sustainable way.

Materials and Methods

Population: The population for the study consisted of all farmers in the study area. These included the literates and the illiterates.

The sample for the study consist of ten villages from the three ecological zones (East, Central and West) in Kogi State. One hundred and fifty farmers were randomly selected from the three zones as detailed are showed below:

GEO-POLITICAL ZONE	VILLAGES	QUESTIONNAIRE ADMINISTERED	
Eastern Part	Dekina	15	
	Idah		15
	Olamaboro		15
	Bassa		15
Central Part	Ajaokuta		15
	Kogi		15
	Ogori/Mangogo	15	
Western Part	Kabba		15
	Yagba West		15
	Lokoja	15	
	Total		150

Instrument

A structured questionnaire was used. The items were developed from the review of relevant literature.

i. General background information
ii. Forest and tree use practices
iii. Land use pattern
iv. Farmer preferred species, perception and constraints

the mode of collecting information with the 150 copies of the questionnaire was by personal contacts and discussion with the villagers/farmers who constituted the primary source of information.

Methods of Data Analysis

Descriptive statistical method was used after sorting and collating the data to know the preferred species, their uses and reasons for their preference.

Results and Discussion

Detailed below are the analysis of 150 respondents

Table 1: Age range of farmers in relation to their growing of MPTS

Age range (years)	**Total no of respondent**	**%**	**Frequency of those that grow MPTS**	**%**	**Frequency of those that do not grow MPTS**	**%**
0 – 25	10	6.7	4	2.7	6	4.0
26 – 35	38	25.3	30	20.0	8	5.3
36 – 45	42	28.0	28	18.7	14	9.3
46 – 55	30	20.0	25	16.7	5	3.3
56 – 65	15	10.0	13	8.7	2	1.3
66 – above	14	10.0	10	6.7	5	3.3
	150	100	110	73.5	40	26.5

The result of the survey in table 1 show that 28% of the farmers interviewed are within the range of 36 – 45 years. Only 10% of the farmers are 65 years and above. 20% of the farmers within the age of 46 – 55 years plants and maintain MPTS.

Table 2: Marital Status of those that grow MPTS

Marital Status	**No of respondent**	**%**	**Frequency of those that grow MPTS**	**%**	**Frequency of those that do not grow MPTS**	**%**
Married	95	63.3	85	56.7	10	6.7
Single	29	19.3	10	6.7	19	12.7
Divorced/ Widowed	26	17.3	15	10.0	11	7.3
	150	99.9	110	73.4	40	26.7

Table II above shows the response of farmers growing MPTS. Out of 150 respondents 56.7% married farmers plant MPTS and 6.7% are single while 15% are divorced or widowed.

Table 3: Education status of respondent in relation to growing MPTS

Academic Qualification	**Total no of respondent**	**%**	**Frequency of farmer that grow MPTS**	**%**	**Frequency of farmer that do not grow MPTS**	**%**
Illiterate	50	33.3	40	26.7	10	6.7
Literate with no formal education	20	13.3	14	9.3	6	4.0
Primary school Certificate	40	26.7	32	21.3	8	5.3
Secondary school Certificate	23	15.3	20	13.3	3	2.0
Vocational	15	10.0	13	8.7	2	1.3
Higher Institution	02	1.3	1	0.7	1	0.7
	150	99.9	120	80.0	30	20.0

The data on the educational status of respondent in relation to their altitude towards growing of MPTS is presented in table 3. It was found that

33.3% of the respondent are illiterate, 26.6% are with primary education, few of them 13.3% are literate with no formal education and 10.0% had vocational education while 1.3% had above higher education.

Table 4: Some multipurpose trees prepared and used by farmers

Botanical Name	**Local Name**	**Uses**
Citrus senensis	Alemu/Osan	Edible fruit, medicinal
Chrysophylum albidum	Eya / Agbalumo	Edible fruit, lumber
Melicia excelsa	Iroko	Lumber, cultural, fuelwood, medicinal
Mangifera indica	Mango	Edible fruit, medicinal
Khaya ivorensis	Oganwo	Lumber, medicinal
Alstonia bonnie	Ahun	Lumber, fuelwood,
Anacardium occidentale	Kashew	medicinal
Steculia Africana	Aye	Edible fruit, medicinal
Parkia biglobosa	Ugba/Iru	Lumber, handicraft
Annogeissus leiocarpus	Orin dudu	Staking
Azadiracta indica	Neem	Edible fruit, medicinal,
Irvingia gabonensis	Oro	fuelwood, lumber, staking
Triplochiton scleroxylon	Oli-uloko/Arere	Medicinal, fuelwood
Afzelia Africana	Okpehe / Apa	Protection
Butyros permum	Emi	Edible fruit, lumber
paradoxum	Ugba/Iya	Lumber, handicraft
Danielia oliveri	Ejiji/Orinla	Edible parasite, lumber,
Vitex doniana	Obiakechi/Orogbo	handiscraft
Garcinia kola	Guava	Lumber, medicinal,
Psidium guajava	Ofun	handicraft
Mansonia altissima		Edible fruit, medicinal
		Edible fruit, medicinal
		Edible fruit, protection, medicinal
		Lumber, pole, handicraft

Table 5: Constraint to growing of multipurpose tree as identified by household heads

Constraints	**No of respondents**	**%**
Death of land	30	20.0
Lack of time/labour	11	7.3
Lack of technical know how	17	11.3
Lack of inputs	66	44.0
Lack of decision maker	26	17.3
	150	100

Source: Field Survey

Analysis of the finding in relation to the data collected from the farmer interviewed

From the study, it is vivid that farmers generally plant and maintain trees in their farmlands and homesteads to meet household fruit, timber, fuel

and environmental requirements. The assessment showed that there are more educated farmers within the study area (Table 3). This will be of greater advantage in the understanding of new farming methods and innovation and their adoption.

The survey showed that the active and productive farmers are within the age range of 25 – 55 years. This runs contrary to the believe that only the aged remained on the farm table 1. Tree planting was limited to married farmers (Table 2). Couples and children play a significant role in tree planting. Males usually plant and tend trees far away from the residence, while females plant tree closer to dwellings. Tree care is generally the responsibility of all family members.

Farmers' Perception and Preferences

The predominance of citrus, mango, cashew, guava and other fruit trees in nearly all homestead and farmland throughout the state indicates a preference for fruit trees. Most farmers, however also tend few timber species in their farmland. When farmers were asked about their preferences their reply often differ from the techno – fix – solution of outsider. Farmers indicated that fruit trees were their first preference (40%), followed by timber trees (30%), fuelwood trees (12%) and ornamental trees (10%) none of the farmers specifically mentioned fodder tree species but difficulties in feeding goat, sheep and cattle were mentioned by some respondents. However poorer small farmers who cannot afford cooking gas or stove usually give top preference to fuelwood species. Women were usually responsible for collecting fuel. Most of the respondent stated that fuelwood and timber were in short supply, with the situation worse than it was 10 – 20 years ago. Some other farmers also prefer growing fuelwood because increasing market value has made it more profitable.

Timber can be obtained from many fruit trees but certain timber species are preferred. Higher market value and increased income potentials are the main reasons for preferring timber species. Although it takes longer period for a timber species to mature, farmers view timber trees as long – term investment. Before they reach maturity, the branches timber trees are often cut or fall naturally and used as fuelwood. Timber trees thus constitute a form of family insurance, with occasional bonus of fuelwood. Although every farmer wants to plant timber species, this is possible for those with large homestead/farmland areas who can wait for long – term returns.

The tree species that provides fruits like orange, citrus, sinensis, cashew, mango and Irvingia gabonensis are perceived as multipurpose trees because they provide fruits for eating and for the market, their green leaves can be used as fodder for goat, their dried leaves and twigs can be used as

fuel, their branches can be cut as fuel and trees themselves can be used as timber.

Most farmers mentioned several constraints to tree growing and they were asked to rank these (Table 5).

1. Lack of Land - This obstacle was assigned the highest rank by 20% (Table 5). This problem is faced mainly by farmers who are tenants and landless.
2. Lack of inputs like good quality seedlings and other incentives.
3. Lack of technical know – how - This involves the knowledge about what should be planted and how it should be planted.
4. Lack of decision makers - This situation is common on farms cultivated by farmers who have rented the land from land owners.
5. Lack of time and labour - These two factors of production coincide and conflict with the period of planting trees.
6. Repeated failure - This has to do with lack of enough protection for the planted tree crop.
7. Seedling destruction - This is caused by human beings, animals and diseases.

Conclusion and Recommendations

The study has assessed the present condition of farmland in Kogi State and farmer's knowledge about growing trees. The study also focused on farmer's preferences and perceptions of both the opportunities for and constraint to tree planting. It was found that farmers in the study area retain and plant numerous species of trees and shrubs on their farmlands in close association with agricultural crops for various uses such as food, timber, staking, fuelwood and medicinal purposes.

All farmers are willing to plant fruit trees species around the house so that they could harvest the fruit anytime. They also reasoned that proximity of the fruit trees to the house minimizes the theft of fruits, which are reported as a major problem in the three zones. Fruit trees near the home also serve as windbreak and provide shade for people and animals. The other reason why farmers are not likely to plant trees on their farms is that some are landless and cannot plant trees on hired lands.

Farmers are also eager to improve their farmland tree growth and should be provided with good quality seedling of the most desired species either free or at a reasonable rate.

Seedlings should be delivered to their villages or within walking distance, fast growing species are best because farmers have little land to spare and cannot wait for the long-term returns, subsides and loans should be provided for planting, fencing and other costs, some agro-technologies that could be employed to improve productivity in Kogi State include the

establishment of windbreak and shelterbelt, the planting of disperse trees on farmland and the use of trees and shrubs in pasture. The sustainability of farmland forest resources in Kogi State is threatened by soil degradation, drought and drastic over cutting without proper replacement, this calls for immediate action to ameliorate the overstretch environment.

References:

Burley, J. and Von Carlowitz, P. (1984). Multipurpose tree germplasm . ICRAF, Nairobi, 318pp.

Fagbenro, J.A and Kio, P.R.O. (1990). The potential of agroforestry system for soil conservation and fertility maintenance. Invited paper for the national workshop on soil management in Nigeria.Insitute of Agricultural research and training, moore Plantation, Ibadan, Nigeria. 79pp.

Fernades, E.C.M and Nair, P.K. (2006). An introduction of the structure and fuction of some tropical home gardens, Agricultural system 21, 179-310.

Lundgren, B.O and Raintree, J.B (2003). Substained Agroforestry, ICRAF reprint No 3. Reprint from Agricultural Research for Development Potential and Challenges in Asia. 98pp.

Nair, P.K.R. (1999). Agroforestry systems in the tropics, Dordrenchi Netherlands, Kluwer Academic Publishers. 23pp.

Nair, P.K.R. (2003). An introduction to Agroforestry, Dordrenchi Netherlands, Kluwer Academic Publishers. 27pp.

Okigbo, N.B. (2003). Plants and Agroforestry in land use systems of West Africa, In: Huxley, P.A (ed) Plant Research and Agroforestry, ICRAF, Nairobi , PP 25 – 41.

Raintree, J.B. (2011). Resources of agroforestry diagnosis and design draft for comment. Working paper No. 7, Nairobi ICRAF, 394pp.

Sanchez, P.A. (1995). Science in Agroforestry. Agroforestry Systems 30: 5 – 55.

Stoler, A. (1998). Garden use and household consumption pattern in Javanese village. Unpublished Ph.D Thesis, Department of Anthropology, Columbia University, New York. 145pp.

Terra, G.T.A. (1994). Mixed – garden Horticulture in Java, Malaysian Journal of Tropical Geography 4. 33 – 43.

Wilken, G.C. (2007). Integrating forest and small scale farm systems in middle America, Agro ecosystems 13:291-301.

Young, A. (1989). The potential of agroforestry for soil conservation, Part 11 maintenance of soil fertility, ICRAF working paper NO 43: 252 -273.