Rehabilitation of Degraded Forests for Sustainable Wood Fuel Production and Climate Change Mitigation in the Forest-Savannah Transition Zone of Ghana.

(ITTO Wood fuel Project)

2015/16

Ex-ante assessment of potential impact of wood fuel plantations on environment and livelihoods

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Introduction

- In Ghana about 60 percent energy sources come from wood fuels (Energy Commission, 2010).

- About 14 million m^3 of wood are consumed for energy production (FAO 2010)

- 69% of all urban households in Ghana use charcoal for cooking and heating
  - annual per capita consumption is around 180 kg.
  - Total annual consumption is about 700,000 tons, 30% of which is consumed in the capital, Accra.

- Overdependence on wood fuel to double consumption levels to twice as much as yield by 2016 if no action is taken to conserve the wood fuel and increase yield.(**Lurimuah Stephen 2011)**

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Introduction

- Charcoal production, estimated at 1,771,080.00   is concentrated in the forest transition zones.
  - Most of the wood comes from savanna trees, from logging residues (FAO, 2013)

- It is estimated that in Ghana, 91% of round wood produced is used as fuel wood and for charcoal.

- Meanwhile   Forests in the transition zone of Ghana are important source for fuel wood conversion to charcoal mostly transported to the major urban cities and towns in the southern sector.

- The trade however is faced with declining choice species
  - Thus producers rely more and more on other less choice species for conversion to charcoal and other wood fuels. (Lurimuah Stephen 2011)

Background of study component

- A pilot project to integrate trees for fuel wood production into farming systems was initiated under the ITTO fuel wood project.

- Socio-economic survey identified preferred fuel wood and other tree species for planting

- Farmers were identified trained and provided with seedling for plantation development.

  - About 30 farmers in 7 communities located in Nkoranza North and Kintampo North districts of the transition Zone of Ghana

Goal of study

- The overall goal of the project is to ensure reversal of fuel wood depletion and promote plantations and sustainable management of fuel wood resources to improve livelihoods of local communities.

Broad objective of study

- Conduct Ex-ante assessment of potential impact of wood fuel plantations on **environment and livelihoods**

Specific objectives of this study

- 1. Determine socio-economic and environmental baseline of farmers and communities.

- Determine farmers' expectations and assess potential impacts of tree planting on livelihoods and environment.

- 2. identify sustainability indicators for tree plantations in participating communities.

Materials and methods- targets

Community name	Enrollment status			Total
	Yes, and have planted trees	Yes, but not planted	Not enrolled	
Dromankuma	0	1	0	1
Dromankese	3	5	0	8
Nkranka	4	0	0	4
Bonomanso	0	0	2	2
Atta kura	3	0	1	4
Babato kuma	1	0	0	1
Sorenaase	1	0	0	1
Total Number	12	6	3	21

Table 1: Target communities and Status of participation by respondents (Kintampo North & Nkoranza North)

Materials and methods- Data collection

- 21 respondents among the registered farmers (numbering about 44) were interviewed…

    - with semi-structured questionnaire.
    - Field observations were carried out to observe tree seedlings planted by participants.
    - Focus group and key informant interactions

Results

- Objective 1:
- Determine socio-economic and **environmental** baseline of farmers and communities

Households and livelihood status

- Males constitute 86% of respondents
- Average household size was 7 with a maximum of 14.
- Households travel an average of 1.45 km to reach their farms and other land-use types
- The average food-crop lands is 1.24 km.
- Most respondents (87%) did not belong to any livelihood association.
- Only one respondent claimed to have had assistance from a government source over the past 5 years.
- All the respondents said there was no assistance from any non-government source over the period.

At least 87% of respondents cultivate yams cassava and maize as the main source of income and food . Groundnuts are cultivated by 40% and cashew by 33% of respondents

Table 2a: **The primary occupation of respondents (farming)**	
Crops cultivated by respondents	% of Respondents
maize	93
cassava	87
yams	87
ground nuts	40
cashew	33
Vegetables: (garden eggs, Okra, green pepper, tomatoes)	13
Others: (tobacco, sweet potatoes, Beans)	7

Table 2b: First most important crop sold

Important crops	Frequency	Percent
Maize	9	42.9
cassava	3	14.3
Yam	2	9.5
Groundnut	2	9.5
garden eggs	1	4.8
Cashew	2	9.5
Tomatoes	1	4.8
fish	1	4.8

Table 2c: Ranking of first three most important income sources

Income sources	n	% of respondents (N=21)
Maize	19	90.5%
Cassava	11	52.4%
Groundnut	11	52.4%
Yam	7	33.3%
Vegetables and others	11	≤14.3%

Household expenditure

Food and education expenditure accounted for about 46% of farmers' incomes (Table 3)

Investment in farming inputs and farm development accounted on average for 9% of the income with medical expenses taking up 8%.

Most participants expect some form of financial and technical assistance to sustain the tree plantations

Table 3: **Proportion of income spent on various livelihood pathways**		
Expenditure pathways	Maximum	Income (%)
Food items	70	23..33
School fee	50	23.33
Farm inputs and improvement	40	12.33
Housing development	20	9.20
Medical care	30	8.00
Hygiene products	30	6.80
Debt servicing	20	5.33
Cloth	10	5.00
Savings	10	2.66
Agro and food processing/ milling	10	2.00
Livestock care and veterinary services	10	1.33
Funeral	5	0.67

Land ownership and land use.

Farmers have a an average of **1.7** hectares under cash crops, **2.8** under food crops and **2.5** under fallow land holding types. (Table 4).

From the indications, food crop and fallow lands are the mainstay for farmers followed by cash crop lands. Thus if trees are to compete for land farmers expect cash and technical assistance to invest in trees for future monetary value.

Table 4: mean size of land-use types held by respondents (hectare) and access to type (%)					
land-uses	Minimum	Maximum	Sum	Mean	Access to land (%)
Food crop	.41	20.25	42.73	2.85	100
Fallow land	.00	12.15	38.07	2.54	56
Cash crop	.41	4.05	26.33	1.76	89
Tree farms	.00	2.03	5.67	.38	33

Assets to improve livelihoods

The most important livelihood enhancing assets however, mentioned by respondents were ; radio, bicycle and a motor bike if one could afford them.

Table 5a: Proportion of respondents and land-use access

Land type	% of respondents
Food crops	100
Cash crops	89
fallow	56
Tree farming	33

Table 5b: Most important assets	
Assets	**% of Respondents**
Radio	42.9
Bicycle	35.7%
Moto bike	21.4%
Total	100.0%

Results

- Objective 2- Determine farmers' expectations and assess potential impacts of tree planting on **livelihoods** and **environment.**

Status of participation:

- Fifty-seven percent (57%) of respondents had planted trees after registering (Table 6)

- For those who have not enrolled their main reason was lack of information about the project.

- At the general discussions respondents showed interest in planting trees if provided with training , seedlings, and assistance in planting and nurturing plants .

Table 6: Enrollment status of respondents and tree planting activity.

Status	Frequency	Percent
Registered and have planted trees	12	57.1
Registered but not planted	6	28.6
Not enrolled	3	14.3
Total	21	100.0

Perception of benefits from current tree planting activities

- Most respondents expect to obtain lumber (78%) for sale and income or purely for income (67%).

- About 22% of respondents expect to obtain fuel wood (also for conversion to charcoal for sale) and some for domestic use mostly as fuel wood (Table 7)

- Environmental considerations ; soil improvement , fire protection and climate change were also important to respondents
  - due to increasing education and awareness creation

- Forty percent (40%) of the respondents felt that planting trees would benefit their children in future .
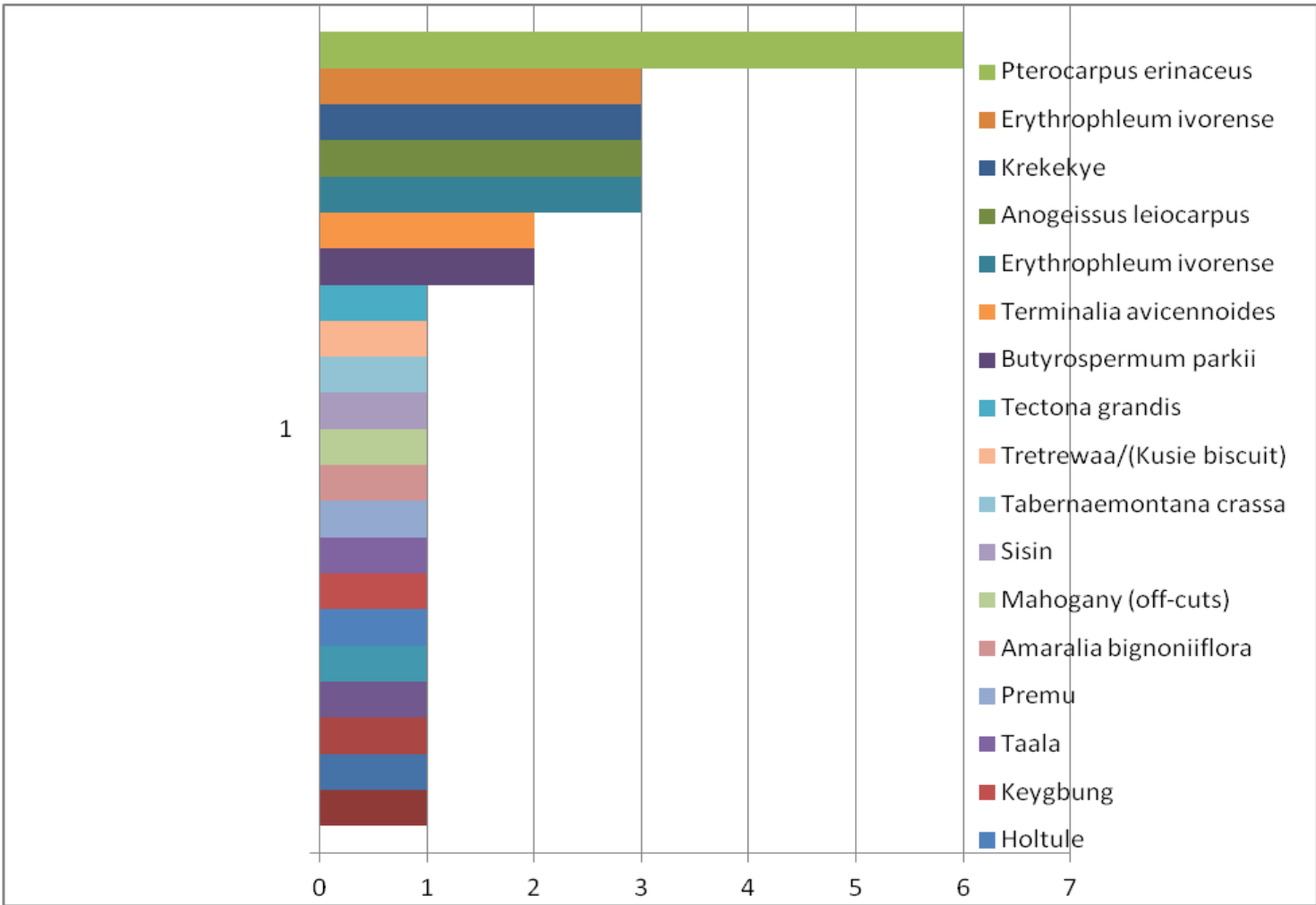
Figure 1: Most important charcoal tree species harvested by communities

Five most important tree species preferred by the respondents were *Khaya spp* (Mahogany) and *Triplochiton scleroxylon* (Wawa) were mentioned for their
multipurpose values

Cassia was mentioned for its fuel wood and charcoal conversion value.

Comparing these to the list of tree species In figure 1 there is indication of a shift in fuel wood species preference. Species with multi-purpose character may be the preferred.

Table 5. Five most important tree species preferred by respondents			
	Responses		Percent of Cases
	N	Percent	
Mahogany	20	46.5	95.2%
Cassia	10	23.3%	47.6%
Wawa	7	16.3%	33.3%
Ofram	5	11.6%	23.8%
Redwood	1	2.3%	4.8%

Table 7: What participants expect from planting trees

Frequencies: tree grower expectations	% Responses
Income (sale of wood, charcoal and lumber)	73
Environmental benefits	46
Intergenerational or future benefit	40
Lumber for home construction	33
Fire protection	7

Results

- Objective 3- Identify sustainability indicators among farmers in tree planting communities.

Tree plantation and Sustainability

Respondents mentioned a number of challenges they perceive as a result of engaging in tree farming under the project. These relate to financing the clearing of land and tending the trees after planting.

They made suggestions for improving the tree planting activity in the communities.

Farmers need training in tree farming followed by financial assistance and provision of farm inputs such as wellington boots cutlasses and mattocks for digging (Table 8).

Table 8: How to improve tree growing			
	Responses		Percent of
	N	Percent	Cases
Training	14	40.0	100.0%
Financial assistance	11	31.4%	78.6%
Farm inputs	10	28.6%	71.4%

Observations

- Most respondents cultivate yams cassava and maize as the main source of income and food

- Means of transportation is important for farmers

- Expenditure on non- farm items takes a larger proportion of [farmers; incomes.

- Trees preferred by farmers for planting differ from choice charcoal /fuel wood species.

Observations

- Fallow land for future cropping is a bit less than land currently under food production. Cash crop land is also less at 1.75 hectare average.
  - Thus tree planting will probably face challenges of land scarcity if the right amounts of incentive and profit motivation are not available.

- Farmers are willing to plant trees if land is available and if given the necessary education, and assistance

- Income is the most motivating factor for tree planting. Thus the temporal considerations in terms of land use and land value are important to ensure sustainability

Observations

- Tree planting will probably face challenges of land scarcity if the right amounts of incentive and profit motivation are not available.

- In the short term trees were not indicated as sources of income or 'assets' by farmers.