

INTERNATIONAL TROPICAL TIMBER ORGANIZATION (ITTO)

REDUCING DEFORESTATION AND FOREST DEGRADATION AND ENHANCING ENVIRONMENTAL SERVICES IN TROPICAL FORESTS (REDDES)

SMALL PROJECT DOCUMENT

TITLE	REHABILITATION OF DEGRADED FORESTS FOR SUSTAINABLE WOOD FUEL PRODUCTION AND CLIMATE CHANGE MITIGATION IN THE FOREST-SAVANNA TRANSITION ZONE OF GHANA
SERIAL NUMBER	RED-SPD 077/12 Rev.1 (F)
SUBMITTED BY	GOVERNMENT OF GHANA
ORIGINAL LANGUAGE	ENGLISH

SUMMARY

The project aims at contributing to reduction in rural poverty and improved income and employment while reducing deforestation and degradation and contributing to carbon sequestration in the forest savanna transition zone of Ghana. This will be achieved through sensitizing and building the capacity of commercial charcoal and firewood producers in the transition zone to plant and/or manage wood fuel plantations sustainably. Participatory approaches will be employed at all stages of the project to ensure that stakeholder needs are adequately incorporated in the choice and design of plantation regimes. Management plans will also be produced to guide communities for efficient utilization of wood fuel resources. The government of Ghana will benefit through improved resource base and sectoral information for policy decisions. Other benefits to be derived include building up of the capacity of resource managers to support forest communities to sustainably utilize and manage wood fuel resources and to reduce pressure on the natural forest estate. The project will be implemented mainly by Ghanaian agencies and experts.

EXECUTING AGENCY	COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH- FORESTRY RESEARCH INSTITUTE OF GHANA (FORIG)
COOPERATING AGENCIES	FORESTRY COMMISSION OF GHANA, ENERGY\ COMMISSION OF GHANA, LOCAL COMMUNITIES AND INDUSTRIAL WOOD FUEL PRODUCERS
DURATION	24 MONTHS
APPROXIMATE STARTING DATE	TO BE DETERMINED

BUDGET AND PROPOSED SOURCES OF FINANCE	Source	Contribution in US\$	Local Currency Equivalent
	ITTO	121,662.00	
	Gov't of Ghana	47,697.50	
	TOTAL	169,359.50	

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LIST OF ABBREVIATIONS AND ACRONYMS

CBO	Community-Based Organizations
CDM	Clean Development Mechanism
FORIG	Forestry Research Institute of Ghana
FRA	Forest Resources Assessment
FSTZ	Forest–Savannah Transition zone
GHG	Green House Gas
IPCC	Intergovernmental Panel on Climate Change
ITTO	International Timber Tropical Organization
LPG	Liquefied Petroleum Gas
MARV	Measurement, Assessment, Reporting and Verification
MP	Project Monitoring Protocol
NGO	Non-Governmental Organization
PES	Payment For Environment Services
REDD+	Reduced Emission from Deforestation and Forest Degradation-Plus
REDDES	Reducing Deforestation and Forest Degradation and Enhancing Environmental Services
R-PP	Readiness Preparation Proposal
SFM	Sustainable Forest Management
SZ	Savanna Zone
TPD	Thematic Program Document

PART 1 PROJECT CONTEXT

1.1 Origin and Justification

The most important product derived from forests and woodland is wood fuel, which accounts for over 85% of the total energy consumption of West African countries and provides most household energy needs. The Intergovernmental Panel on Climate Change (IPCC) fourth assessment report on mitigation of climate change puts wood fuel as the only source of fuel for one third of the world's population with a demand expected to double in the next 50 years (IPCC, 2007). The IPCC report continues to estimate the world wide harvesting of wood as 60% industrial round wood and the remaining 40% as wood fuel, primarily charcoal and firewood. Though wood fuel is the most common form of biomass, they are currently not easily accessible because the natural forest is degrading at a faster rate. In Ghana wood fuel consumption increased from about 18.4 million m³ in 1990 to about 33 million m³ in 2006, largely in response to population growth. The Ghana Energy Commission estimates that wood fuel consumption in Ghana is as twice as large as other energy sources, including electricity and petroleum and over 90% of rural households depend on wood fuel for cooking. LPG use in Ghana on the other hand accounts for only 4–6% of the residential sector and is only concentrated in the urban areas, mostly among the middle and higher income groups in society.

A recent study on forest dependency in the transition zone of Ghana also indicates that the most exploited product from natural forest is woody biomass mainly for charcoal production and firewood for sale in high demand urban areas (Obiri *et al.* 2010). Commercial charcoal production in the transition zone is a major livelihood activity. Thus this zone is the major source of supply for charcoal to urban areas in Ghana and for export to Europe. The over reliance on woody biomass as household and industrial energy generally in the country, has contributed significantly to the accelerating rate of natural forest depletion particularly in the forest-savanna transition zone. It is estimated that, between 1990 and 2010, Ghana lost almost 34 percent of its forest cover, representing about 2.5 million hectares (FRA, 2010). This corresponds to an annual deforestation rate of approximately 2%. Although, national land use policies acknowledge the sustainability and effective utilization of wood resources, there have not been any concerted efforts to develop and manage forest resources especially for wood fuel purposes. The government of Ghana has become increasingly concerned about the need to preserve the country's wood and forest resources. It is anticipated that, better management of wood fuel supply particularly, from the natural forest or through woodlots and plantation establishment would contribute extensively to natural forest conservation and carbon sequestration. This small project will help to achieve the objectives of preserving the natural wood fuel resources in the country. While there have been many communities involved in charcoal production and marketing, these communities and their activities are not organized making their activities unsustainable and less profitable as a livelihood option.

Moreover, the current technologies used in charcoal production coupled with the limited range of suitable known species for wood fuel has compounded the problem of over harvesting of traditional species such as *Anogeissus leiocarpus*, *Milicia excelsa*, *Nesogordonia papaverifera*, *Piptadeniastrum africanum* and mahogany (*Khaya spp.*) that are also prime economic hardwood timber species. These species are preferred for charcoal because of their slow burning properties. However, there are other fast growing species with high calorific values that can easily be planted in short rotation systems to produce appreciable woody biomass for charcoal and firewood that have not been experimented.

The innovation of this project is that the target communities and individual entrepreneurs would be organized into cooperatives to establish smallholder tree plantation for wood fuel production on experimental/trial basis. This would serve as demonstration plots for future up-scaling to ultimately ease the burden on the existing natural forest, and make it possible for the target local communities establish a sustainable raw material base for commercial operations to satisfy both domestic and export market demands. Equally a management system would be provided for wood fuel exploitation in the country. In addition, the method of producing charcoal would be improved through the adoption of an improved carbonization technology. Comprehensive data on biomass-derived fuels to be produced from this project will help:

- (a) Determine the wood fuel needs of the forest-savanna transition zone, of the country
- (b) Identify the principal problems affecting the formulation and adoption of appropriate wood fuel policies;
- and (c) develop more sustainable source of wood fuel supply as a major component of forest development.

The continuous use of wood fuel from a more sustainable source will not only have a positive impact on the environment, but will also contribute towards improving food supply and generating employment and income in the country thus enhancing the livelihood of forest dependent communities while conserving the natural forest and biodiversity. The aim of estimating baseline potential soil carbon accumulation and stock in the wood fuel plantation trial/test plots to be established will contribute to addressing the knowledge gap in the search for reliable information about carbon sequestration in forest soils. This Small project is therefore derived from the primary objective of promoting and ensuring sound management as well as expansion of the country's natural forest for sustainable supply of wood fuel and carbon sequestration efforts in the country.

1.2 Relevance

1.2.1 Conformity with ITTO's objectives and priorities

The project is in accordance with Article 1 of the International Tropical Timber Agreement, 2006, in particular the objective of:

- Encouraging members to support and develop tropical timber reforestation, as well as rehabilitation and restoration of degraded forest land, with due regard for the interests of local communities dependent on forest resources;
- Encouraging members to develop national policies aimed at sustainable utilization and conservation of timber producing forests, and maintaining ecological balance, in the context of the tropical timber trade;
- Encouraging members to recognize the role of forest dependent indigenous and local communities in achieving sustainable forest management and develop strategies to enhance the capacity of these communities to sustainably manage tropical timber producing forests

It is also in accordance with REDDES programme objectives and in particular the general objective of reducing deforestation and forest degradation and enhancing environmental services through the sustainable management of tropical forests, forest restoration, afforestation, reforestation and other related activities. More specifically under demonstration activities:

(a) Restoration of degraded forests and rehabilitation of degraded forest lands

(c) Sustainable forest management planning and implementation activities within the context of multiple use and environmental services (e.g. reduced impact logging, silvicultural measures, etc.)

(d) Participatory approaches involving indigenous and other local groups in planning and implementing forest management including benefit sharing from compensation schemes for forest environmental services.

(g) Other measures to reduce emissions from deforestation and forest degradation and to enhance environmental services from tropical forests (e.g. development of alternative livelihoods schemes, agroforestry systems, etc.)

Table 1: Project conformity with Deliverables in REDDES TPD Chapter 4 table 1:

REDDES Deliverable	How project will achieve REDDES deliverable (Project Conformity with deliverable)
Increase in the area of restored/rehabilitated degraded forest in the Programme impact areas	The project will seek to contribute to the restoration of the forest savannah transition zone of Ghana through piloting of community wood fuel plantation establishment and conservation initiative.
Area of tropical forests under SFM; area of restored and rehabilitated tropical forests and forest lands.	The project seeks to increase the resource base with highly demanded wood fuel species for charcoal and firewood production. This will contribute to sustainable forest management in the forest savannah transition zone of Ghana.
Potential for income generation activities realized from forest-related environmental services and other outputs in Programme impact areas	Through this project, rural community livelihood income will be enhanced while new opportunities are generated through a reliable and sustainable resource base for wood fuel production, carbon stocks production and use of more efficient kilns in charcoal production
Improved family income in communities directly involved in the PES initiatives	Participating communities will be sensitized on the potential benefit that can be derived from payment of environmental services by way of carbon sequestration potential of the established wood fuel plantations. This will in the long term improve family income of communities.
Reduced deforestation in the Programme impact area	Deforestation in the forest savannah transition zone will be reduced through the establishment of plantations of highly productive wood fuel tree species using enrichment or re-planting or natural regeneration of degraded sites. Local communities will also be trained in tree plantation development and tree propagation techniques.
Clear demonstration using biodiversity surveys or other ecosystem assessment tools to monitor changes in biological and physical characteristics of forests	The project will seek to undertake inventory of existing wood fuel species and annual assessment of tree growth and productivity of other integrated crops by way of monitoring the changes in both biological and physical characteristics of the forest.
Evidence of inclusion of views from various interested parties in forest management plans and payment for environmental services.	The project will use participatory approach by involving all stakeholders (communities, private, commercial wood energy producers, technical experts, and institutions in governance, notably the Energy Commission, Forestry Commission and the District Assembly) on options for sustainable development and utilization of wood fuel resource as well as the potential benefits of other derived environmental services
Effective networking among various stakeholders	The project will identify all relevant stakeholders and undertake a participatory screening activity to decide on priority options for the establishment of the wood fuel plantations. Through the organization of stakeholder workshops, a network of all stakeholders in the wood energy sector will be formed for effective management of the country's forest resources for improved livelihood.

Table 2: Project Monitoring Protocol (MP) in accordance with REDDES MP indicating project results:

Project General Objective: To promote smallholder and commercial tree plantations that can ensure sustainable resource base for charcoal, firewood and other wood energy production and marketing to sustain livelihoods, enhance sustainable forest management and carbon sequestration in Ghana.				
Specific objective	Output	Output indicator	Target value	Means of verification
To initiate a process for establishing in collaboration with local communities and entrepreneurs demonstration plantations through reforestation of degraded lands for wood fuel production and enhancement of above and below ground carbon stock in the forest savanna transition zone of Ghana	1. Baseline information involving characterization and quantification of wood fuel production-to-consumption pattern and stocks of wood fuel species produced	1. Baseline socio-economic study report on the state of wood fuel supply, processing and marketing, climate change vulnerability, strategies for coping with declining wood resources and implications for their sustainable development to reduce and avoid further degradation 2. Baseline inventory report of wood fuel species stocks	5 wood fuel producing communities in the Kintampo North District	Baseline working document or report for project
	2. Demonstration/test plots on wood fuel plantations established on degraded lands	1. List of priority wood fuel development strategies 2. Smallholder commercial/community wood fuel plantation and resource conservation initiatives for rehabilitation of degraded wood/forestlands 3. Wood fuel plantation establishment manual	Trial plots in 5 wood fuel producing communities in the Kintampo North district involving 20 wood fuel producing households including women per community Trial plots with at least 3 large scale charcoal producing entrepreneurs/ exporters	Pilot wood fuel nurseries Pilot/trial wood fuel plantations/plots in communities and on private lands
	3. Scientific information on wood fuel plantation management, biomass production potential, carbon production potential, economic viability, energy characteristics of species, and potential impact on environment and livelihoods produced	1. Wood fuel plantation biomass production potential assessment report 2. Carbon production potential assessment of wood fuel plantations for climate change mitigation and adaptation and implications for trade on the carbon market 3. Silvicultural management regimes for wood fuel plantations 4. Energy characteristics, carbonization and charcoal yield potential determined for priority species used in wood fuel plantation establishment 5. Assessment of profitability of wood fuel plantation options planted 6. Social, economic and environmental impact assessment of wood fuel plantation for estimating livelihood and environmental implications	Technical reports 4 Journal papers	Technical reports on studies (Biomass and carbon production potential assessment etc.) Journal articles Technical notes
	4. Stakeholders engaged to discuss and plan for sustainable wood fuel resources development and management	1. Initiate district and national policy meetings for stakeholder discussions on sustainable wood fuel resource development plan 2. Public awareness creation of state of wood fuel production system, effect on livelihoods and environment; implication with climate change trends and options for sustainable development of wood resources for livelihood sustenance and climate change mitigation and adaptation	<ul style="list-style-type: none"> • 1 District workshop • 1 National stakeholder policy round table workshop 	Stakeholder workshops reports Draft wood fuel development manual Media reports Policy brief

1.2.2 Relevance to the submitting country's policies

1.2.2.1 Ghana Energy Sector Policies on Wood Fuel

The project is relevant to Ghana's energy sector policies on wood fuel which seeks to promote and ensure sound management and expansion of the country's natural forest for sustainable supply of wood fuel.

The policy strategies includes

- Support for Non-Governmental Organizations (NGOs) and Community-Based Organizations (CBOs) to create awareness for the development and management of suitable wood fuel species.
- Identification and provision of incentives (financial and non-financial) for the development of woodlots in savannah and transitional zones under international funding protocols such as the Desertification Fund and Clean Development Mechanism (CDM) Fund

It also encourages the collaboration between the District Assemblies and Traditional Authorities to educate and release land to prospective individuals (especially women) and groups for wood fuel woodlots and plantation establishment.

1.2.2.2 Ghana Sectoral Policies on Forest and Wildlife

The objectives of this project are in conformity with the overall goal of Ghana's New Forest and Wildlife Policy and the Forestry Department master programme (1996). This is to conserve and sustainably develop the nation's forest and wildlife resources while maintaining environmental quality and perpetual flow of benefits to all segments of society. Specifically, the priority objectives of the Forest and Wildlife Policy include:

- Manage and enhance Ghana's permanent forest estate for conservation of biological diversity and sustainable production of domestic and commercial produce; and
- Promote research-based and technology-led forestry and wildlife management, utilization and development to ensure resource availability, socio-economic growth and environmental stability.

Strategies outlined in the Forestry and Wildlife Policy and supported by the proposed project are:

- Emphasis will be placed on reforestation initiatives towards restoring a significant proportion of the country's original forest cover;
- The dedication of various land categories with potential for nature protection and production of timber and other products;
- Revision of resource management standard and techniques for preparation, detailed prescriptions and plans to guide the sustainable management of forest reserves;
- Promotion of resource development programmes aimed at reforesting suitable harvested sites;
- Regulation of utilization and trade in highly valued and endangered species in order to eliminate the threat of extinction, encourage regeneration and ensure future supplies.

1.2.2.3 Key programs on Climate Change in Ghana

According to Ghana's REDD+ Readiness Preparation Proposal (R-PP) development, the creation of an expert working group on charcoal and fuelwood production will seek to establish an authoritative knowledge base on charcoal and fuelwood, which is able to discriminate between different production systems, and which takes into account livelihoods dimensions and alternatives (or their lack). It will aim to provide recommendations for potential pilot projects for substitute fuels and means of production. This small project will also contribute to existing interventions and recommendations for REDD+ in Ghana.

Other ongoing activities on forest and mitigation to climate change include ITTO-Supported Projects on:

Reducing Emissions from Deforestation and Forest Degradation through Collaborative Management with Local Communities which seek to contribute to sustainable management and conservation of Ankasa Conservation area to improve the provision of environmental services and reduce GHG emissions. The project specifically developed and implemented participatory, good governance and management system for

the Ankasa conservation area, determine the financial value of the environmental services as well as methods for measurement, assessment, reporting and verification (MARV) for forest carbon

Capacity building for CDM forestry in the framework of SFM emphasizing community forests and poverty alleviation in Ghana seeks to develop the capacity for CDM forestry in Ghana via a community rehabilitation of Ghana's degraded forests targeted at poverty alleviation in conjunction with sustainable forest management (SFM). Specifically the project aims at improving capacity for CDM forestry in Ghana via a community forest targeted at poverty alleviation in conjunction with SFM.

1.3 Target Area

1.3.1 Geographic location

Background: The project will be undertaken in the Kintampo North District in the Forest-Savannah Transition zone of Ghana where commercial charcoal and firewood production is a culture and a dominant economic livelihood activity. Kintampo North/Municipal is one of the 22 districts in the Brong Ahafo Region of Ghana and lies between latitudes 8°45'N and 7°45'N and Longitudes 1°20'W and 2°1'E. The municipal covers a land area of about 5,108 square kilometres covering an area of about 12.9% of the total land area of the Brong Ahafo region with Kintampo as the municipal capital. The municipal shares boundaries with five districts in the Country: Central Gonja District to the North, Bole District to the West, East Gonja District to the North-East (all in the Northern Region), Kintampo South District to the South and Pru District to the South- East (all in the Brong Ahafo Region).

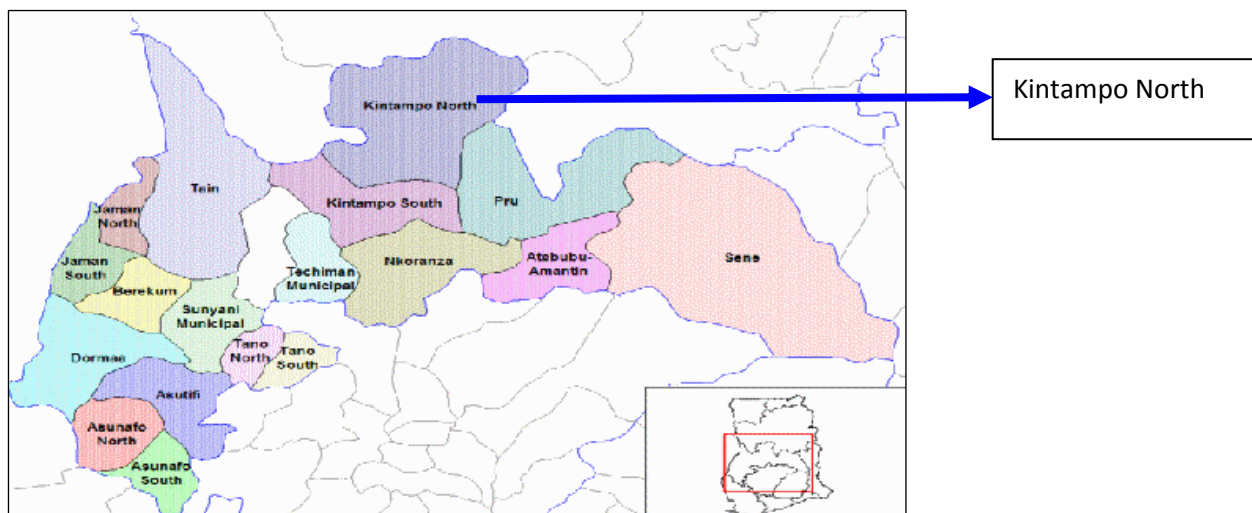


Figure 1: Map of Ghana showing the study area in the Kintampo North District in Brong Ahafo Region

Vegetation and Climate: The district comes under the interior wooded savanna or tree savanna. However, owing to its transitional nature, the area does not totally exhibit typical savanna conditions. The savanna is heavily wooded, though most of the trees are not as tall and large as those in the most deciduous forest. Few and scattered trees such as the Mahogany, Acacia, and the Sheanut trees, which have adapted to this environment are found in the vegetation zone. Grass grows in tussocks and can reach a height of about 3 meters.

The Municipality experiences the Wet-semi equatorial type of climate due largely to the fact that the district is in the transitional Zone between the two major climatic regions in Ghana. The mean annual rainfall is between 1,400mm-1,800mm and occurs in two seasons; from May to July and from September to October with the minor season (May – July) sometimes being obscured. However, because of the transitional nature

of the area, the distinction between the two peaks is often not so marked. The mean monthly temperature ranging from 30°C in March to 24°C in August with mean annual temperatures between 26.5°C and 27.2°C. Relative humidity varies from 90%-95% in the rainy season to 75% - 80% in the dry season. The climate of the district has the tendency to change and be inclined more to the drier tropical continental conditions or to the wet semi-equatorial conditions.

1.3.2 Socio-economic and cultural contexts

The total population of the district is 96,358 comprising 49,137 females (50.9%) and 47,401 male (49.1%) with a growth rate of 2.6% and a population density of 18.86 persons per square kilometre. Agriculture is the major economic activity of the people of Kintampo North Municipal. About 71.1% of the population is engaged in agriculture and its related activities with the remaining 28.9% being distributed among commerce, industry and services. The level of agricultural productivity is considered low despite the effort of farmers due to frequent bush-fires, high cost of inputs, inadequate extension services, prevalence of pests and diseases, in access to credit and poor market prices and market facilities.

The ethnic composition of the district is heterogeneous with the Mos and Nkoranzas being the indigenous custodians of the land. Migrant northern tribes form the other dominant group with other tribes being the Akan tribes, Ewes, Gas among others. Christians are 62.2% of the total population and the Muslim Community are 29.6% with Traditional religion being practiced by 8.2% of the population. Traditionally, Kintampo is under two traditional paramount chiefs (the Nkoranza and the Mo traditional Councils). Both the extended and nuclear family system is practiced in the Municipality. While the Nkoranzas practice matrilineal system of inheritance, the Mos on the other hand practice patrilineal system.

1.3.3 Environmental contexts

Charcoal burning provides an important livelihood income for many rural communities in the Kintampo district. It is the most important revenue raised by the District Assembly in rural areas but this livelihood activity is under threat due to unsustainable raw material based for production. With the indiscriminate felling of trees for charcoal production and the rampant wildfire and illegal chainsaw activities in the transitional zone, environmental degradation is considered to be very high in the district. This small project will minimize environmental effects of charcoal production on the environment and contribute to improve livelihood of communities within the Kintampo District of Ghana by initiating a process for restoration of the wood fuel resource base of the district.

1.4 Outcomes at Project Completion

On project completion the following key outcomes would have been attained:

1. 100 wood fuel dependent households (20 per community) and at least 3 large scale entrepreneurs with secured land titles in 5 communities in the Kintampo North District will be engaged to establish trials or test plots on wood fuel plantations. The project will not only be a platform for demonstration but as a model which has the potential of attracting private entrepreneurs to invest in woodlot plantations. It will also contribute to economic development of the transition zone while restoring the vast degraded areas with vegetation to avoid desertification. **Additionally, the projects anticipate a second phase which will seek to collaborate with additional communities in up scaling and establishing wood fuel plantations on a large scale in the forest savanna transition zone. The idea of up scaling is expected to ensure a sustainable supply of woodlot for fuel wood in the transition zone through plantations development while creating livelihood opportunities for forest dependent communities in the FSTZ.**
2. Result from the scientific studies will provide information required for supporting the development and management of wood fuel plantations for use by research, academia, policy makers and implementers in the wood energy sector and development agencies
3. Wood fuel resource management plan to be developed from stakeholder consultations will be a useful guide for sustainable development and management of wood fuel resources by communities, NGOs and governmental institutions responsible for wood fuel resources in the country
4. The project and initial results at the end of project will be publicized on rural radios in the FSTZ and in national print media. Directives will be provided for persons interested in the establishment of wood fuel plantations to contact the Executing Agency (FORIG) for technical support. **The execution agency (FORIG) will also collaborate with the governmental initiative on the savanna zone dubbed Savanna Accelerated Development Authority (SADA) to ensure uptake of project results**

(models). SADA is an independent agency mandated by Act 805 of 2010 to coordinate a comprehensive development agenda for the northern savanna ecological zone. With a vision to create a forested and green northern savanna ecological zone while reducing poverty by creating sustainable employment opportunities, the project results in the savanna transition zone, will serve as a useful tool in their quest to develop woodlot plantations as part of their program.

It is anticipated that in the long term the sustainability of the forest resource base for charcoal and other wood energy production will ensure improved rural livelihood through increased household income. Derived benefits from the shift from the exploitation of economic forest trees for charcoal production will contribute to decrease in deforestation and ensuring environmental sustainability in the savanna transition landscape.

PART 2 PROJECT RATIONALE AND OBJECTIVES

2.1 Stakeholder Analysis

Stakeholder group	Characteristics	Problems, needs, interest	potentials	Involvement in the project
Primary stakeholders				
Local Charcoal producers	Benefits from income from fuel wood resources for sustainable charcoal production. Benefits from capacity building in woodlot establishment	Degraded forest landscape, decrease in biodiversity richness, threatened livelihood	Local knowledge of indigenous trees for fuel wood production	Primary beneficiaries
Private Entrepreneurs	Potential investors in woodlots establishment Income from woodlots establishment	investment in wood energy sector	Can up-scaling/ implement project model on a commercial level	Secondary beneficiary of the Project model
Local Farmers	Benefits from capacity building in woodlot establishment and farm forestry technology	Higher dependency on remnant forest for household energy needs leading to fast degradation of the landscape	Local knowledge of indigenous trees for fuel wood production	Primary beneficiaries
Local community leaders (Traditional authorities)	Responsible for community development initiatives Represent communities in official decision-making processes	Lack of knowledge on the potentials of woodlots in addressing woodfuel energy needs of the community Sustainable livelihood options for communities	Influence in community Customary and legal rights	Actively involved with project planing at the community level
Secondary stakeholders				
Forestry Commission	Rights to administer forest regulation	Sustainable management of forest resources, enforce protection, controls and monitoring	Experienced with community tree planting initiatives. Authority and influence in farming communities Collaboration with other stakeholders	Co-partnering in establishment of demonstration plots in communities

Energy Commission	Government body responsible for issues on energy Policy regulations	Sustainable energy provision	Sectoral support on sustainable energy project initiatives	Link to local farming communities
District Assembly	Administrative management of the project districts areas	Represent communities in official administrative decision-making	Administrative support in community collaboration	Links to local farming communities
Tertiary stakeholder				
FORIG	Forestry Research Institution and provide scientific information and technical assistance for policy and management	Lack of fund for project implementation	Experienced in research studies and surveys, interested in restoration of degraded forest landscape	Main implementer of project

2.2 Problem Analysis

The key problem necessitating this project with its causes and effects is summarized in Figure 1. In Ghana like in other African countries, the high demand for wood fuel in the form of charcoal and firewood is ever growing. However, production is entirely dependent on wood resources from the natural forest. Thus the dwindling trend in the natural forest estate in recent times threatens sustainable availability and consumption of wood fuel. The Forest-savanna transition zone is one of the fragile vegetation zones of the country. Yet, the area is the hob for wood fuel for Ghana and neighbouring wood deficient countries as well as for export to mainly Europe. Extensive uncontrolled wood harvesting for firewood and charcoal production has contributed to a high deforestation rate in the transition zone. Furthermore, anthropogenic factors associated with unsustainable agricultural practices, poor natural resource management, wildfires and high population growth have severely degraded this area.

Satellite images showing Land use/Land cover changes in the years 1972, 1985 and 2000 indicate high levels of degradation in the Forest–Savannah Transition zone (FSTZ) and Savannah zone (SZ). Tachie-Obeng et al, 2009 shows that in the FSTZ, open forest and closed savanna woodland degraded by 85% and 36% at an annual rate of 1.0% and 0.7%. The woodland vegetation of the savanna zone declined drastically from 1,195 km² to 340 km² at an annual rate of 1.5% due mainly to extensive agriculture and bushfires. Scenarios of predictive maps in the studied zones showed that projected degradation of forests would lead to a total loss of 95% and 81% of the FSTZ and SZ by 2050 respectively under “business as usual”. Forest vulnerability maps projected for 2050 showed 33% and 45% highly vulnerable forest and woodland areas in FSTZ and SZ.

The FSTZ zone which of interest to this project is particularly characterised mostly by migrant farmers and indigenes of the area who for their main occupation predominantly cultivate yam and other food crops whiles exploiting the natural forest for charcoal and firewood for sale in the high demand areas of the country. Under the current land use practices, the long-term production potential of the forest resource base is threatened. Although the trend has continued for decades, lack of adequate information on the extent of wood extraction from our natural forest for the purpose of wood fuel production, has resulted in ineffective sound management strategies and policies to ensure sustainability. Following, Ghana Energy Commission’s 2010 energy supply and demand outlook for Ghana provided energy forecast for only electricity and petroleum (oil and natural gas), excluding wood fuel because of inadequate and reliable information (Ghana Energy Commission, 2010).

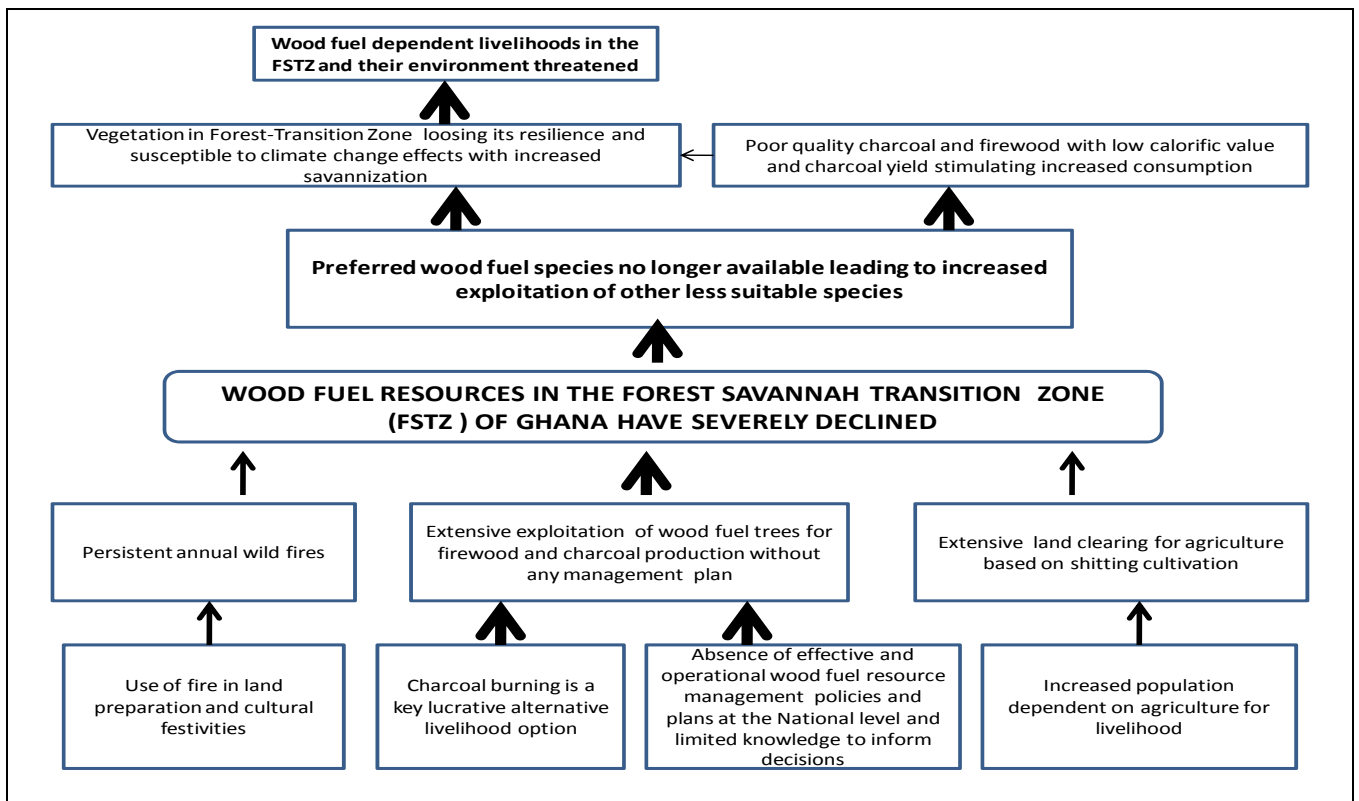


Figure 2: Key Problem, Causes and Effects (thicker arrows indicate main causes and effects)

The result of these lapses is the increased creaming of less suitable species for firewood and charcoal burning leading to poor quality products with low calorific values and charcoal yields with high volumes of charcoal dust due to brittleness of charcoal produced. This ultimately leads to increased consumption by consumers in high demand areas with a cascading effect of increased exploitation of tree resources subjecting the FSTZ environment and livelihoods to threats from climate change. Moreover, there is limited information on the carbon stock potential in various land use systems in Ghana especially woodlot plantations for energy production. A more comprehensive and practical approach is therefore needed to address the issues of deforestation associated with the extensive wood resource creaming for wood fuel production in the transition zone to sustain livelihoods and ensure forest conservation while tapping its potential for carbon sequestration.



Plate A



Plate B



Plate C

- A: A truck of poles for charcoal in the FSTZ
 B: A truck load of charcoal for urban market centres
 C: Pile of charcoal dust on the market

2.3 Objectives

2.3.1 Development objective and impact indicators

To contribute to the sustained socio-economic development of forest dependent communities and reduction in forest degradation in the forest savanna transition zone of Ghana through the promotion of smallholder and commercial tree plantations that can ensure sustainable resource base for charcoal and other wood energy production and marketing and carbon sequestration

The impact Indicators:

- The availability of sustained forest resource base for wood energy production particularly charcoal and firewood
- Improved standard of living through raised rural livelihood income
- Reduction in dependency on remnant natural forest in the forest savanna transition

2.3.2 Specific objective and outcome indicators

To initiate a process for establishing wood fuel plantations in collaboration with local communities and entrepreneurs through reforestation of degraded lands in the forest savanna transition zone of Ghana for sustainable charcoal/wood energy production and enhancement of **above and below ground carbon stock**

The outcome indicators

- 100 charcoal producers, local farmers and entrepreneurs from 20 households in 5 selected charcoal producing communities will be trained in nursery management and wood lot establishment
- Demonstration plots of highly productive wood fuel species will be established in all 5 selected communities

PART 3 DESCRIPTION OF PROJECT INTERVENTIONS

3.1 Outputs

- Output 1** Baseline information involving characterization and quantification of wood fuel production-to-consumption pattern, climate change vulnerability of wood fuel livelihoods and inventory of stocks of wood fuel species produced
- Output 2** Demonstration/test plots of highly productive wood fuel species established on degraded lands with smallholder and large scale charcoal producers
- Output 3** Scientific information on wood fuel plantation management, biomass and carbon production potential, economic viability, energy characteristics of species, and potential impact on environment and livelihoods produced
- Output 4** Stakeholders engaged to discuss and plan for sustainable wood fuel resources development and management

3.2 Activities and Inputs

Output 1: Baseline information involving characterization and quantification of wood fuel production-to-consumption pattern, climate change vulnerability of wood fuel communities and stocks of wood fuel species produced

- Activity 1.1** Organization of start-up workshops involving all project team members and key stakeholders and the media or press
- Activity 1.2** Socio-economic studies to understand the wood fuel production-to consumption systems and identify constraints and opportunities associated with the sector and vulnerability of wood fuel dependent livelihoods to climate change effects
- Activity 1.3** Value chain analyses to establish trends and magnitude of utilization and flow of wood fuel resources
- Activity 1.4** Inventory of wood fuel species with experts and communities to aid in their characterization for choice of appropriate species for wood fuel plantation establishment

Output 2: Demonstration/test plots of highly productive wood fuel species established on degraded lands with smallholder and large scale charcoal producers

- Activity 2.1** Dialogue meetings with communities and private commercial wood fuel producers to raise awareness and seek their voluntary participation in the establishment of wood fuel demonstration/test plots
- Activity 2.2** Participatory screening of options for sustainable development and management of wood fuel resources with communities, private commercial charcoal producers and technical experts
- Activity 2.3** Preparatory meetings to discuss and enroll interested volunteer wood fuel farmers or experimenters as well as planning sessions to clarify project requirements, farmer and project team roles and mode of establishment and maintenance of wood fuel test plots

- Activity 2.4* Acquisition of planting materials and propagation studies on priority wood fuel species
- Activity 2.5* Training of local communities in tree nursery establishment and management including propagation techniques, seedling care and transplanting. Tree species will be determined by results from baseline studies and preferred options by communities and experts
- Activity 2.6* Inspect and assess the suitability of degraded lands including farmlands owned by individual volunteer experimenters prepared for the establishment of wood fuel test/trial plots.
- Activity 2.7* Establishment of test/trial plots of highly productive wood fuel tree species using a combination of restoration techniques by enrichment or re-planting or natural regeneration of degraded sites.
- Activity 2.8* Monitor and evaluate initial tree growth on test plots and productivity of other integrated crops periodically

Output 3: Scientific information on wood fuel plantation management, biomass and carbon production potential, economic viability, energy characteristics of species, and potential impact on environment and livelihoods produced

- Activity 3.1* Silvicultural characteristics and management regimes of species planted in wood fuel test/trial plots
- Activity 3.2* Initial analysis of biomass production potential of the wood fuel plantation test/trial plots
- Activity 3.3* Initial analysis of carbon sequestration potential of the wood fuel plantations test/trial plots
- Activity 3.4* Studies on energy characteristics of wood fuel tree species on test plots
- Activity 3.5* Studies on carbonization and charcoal yield potential of wood fuel species on test plots
- Activity 3.6* Economic assessment of wood fuel plantations to establish their viability in the long term
- Activity 3.7* Initiate studies in how communities and individuals establishing wood fuel plantation can be organized for PES schemes
- Activity 3.8* Publish and disseminate the results of the studies through journal papers and technical reports

Output 4 Stakeholders engaged to discuss and plan for sustainable wood fuel resources development and management

- Activity 4.1* Stakeholder and institutional analyses to identify stakeholders, institutions and arrangements/governance mechanisms for utilization and management of wood fuel resources
- Activity 4.2* District level meetings for stakeholder discussions on sustainable wood fuel resource development plan

- Activity 4.3** National level round table discussion to draft wood fuel resource development plans based on thorough understating of the sector, the resource situation and trials with wood fuel plantation trial developers
- Activity 4.4** Policy workshop of all stakeholders in the wood energy sector to discuss the plans and seek inputs for refinement
- Activity 4.5** Design and production of the plans in a well illustrated manual in English and appropriate local languages
- Activity 4.6** Distribution of the manual to wood fuel dependent communities; Ministries of Energy, Environment, Science and Technology, Lands and Natural Resources, Local government and Rural Development; Energy and Forestry Commissions; District Assemblies to be used as a guide for sustainable wood fuel resource development and management
- Activity 4.7** Develop a policy brief to inform policy discussions on wood fuel sector
- Activity 4.8** Print and electronic media popularization of initial results and wood fuel plantation development concept at local and national scales

3.3 Strategic Approach and Methods

The project will adopt a multidisciplinary team approach for execution. The entire process will be participatory/interactive involving all relevant stakeholders at the scoping, implementation and evaluation stages of the project as follows:

1. Baseline studies

- Participatory and quantitative methodology for characterization and value chain analysis of the wood fuel sector
- Wood fuel tree resource inventories with communities will involve using 1 hectare size quadrats to determine species abundance/richness and description of characteristics of dominant and key species
- Assessing vulnerability of wood fuel dependent livelihoods/communities to climate change effects using socio-economic indicators and wood fuel species availability and use trends

2. Preparatory stakeholder dialogue meetings

- Local and district level workshops of communities and technical experts in the wood energy sector will be organized to thoroughly discuss and screen options for sustainable wood fuel resource development.

3. Experimentation

- Prioritized wood fuel development options will be planted on demonstrations plots to be managed by volunteer experimenters on their privately owned lands
- Scientists and other technical experts will assist experimenters with technical knowledge to plant and manage their test plots using appropriate rotation strategies and planting (block, strip, mixed, boundary) patterns. They will also support with material incentives including quality fast growing planting materials to enhance survival and growth. Wood fuel species used, although will be determined by stakeholders will comprise a mix of both indigenous and well researched and tested exotics species that can easily be managed by both smallholder and larger scale experimenters. Consideration will be given to fire tolerant and nitrogen fixing species and also planting regimes that will ensure compatible agri-silvicultural or tree-agricultural crop mixes in temporal and/or spatial sequences.

4. Monitoring and evaluation of test plots

A monthly monitoring schedule will be followed after establishment of the trial plots and necessary technical backstopping provided to maintain test plots. During this period data will be collected for the following analyses:

- Tree performance i.e. survival and growth (vegetative, stem and girth) for estimating biomass production potential of trial wood fuel species
- Carbon dynamics and vegetation carbon cycle modeling approaches will be employed for initial carbon stock assessment.
- Silvicultural management regimes

At the end of the project, the experimented wood fuel plots will be jointly evaluated with all stakeholders to discuss pertinent issues for advancing sustainable wood fuel plantation development in the country.

5. Laboratory chemical analysis of wood fuel species on test plots using standard tests

- Determination of calorific value
- Life cycle analysis of charcoal
- Carbonization methods and charcoal yield

6. Potential cost and benefits of wood fuel plantations

- Ex-ante economic analyses of the options experimented to assess viability using the Cost Benefit methodology

7. Potential impact on livelihoods and environment

- Determine social, economic and environmental impacts on local livelihoods of wood fuel plantations
- Gender analyses framework which takes into account access and control profiles and social and economic inequity will be used for gender mainstreaming

8. Planning for sustainability through stakeholder forums and publicity

- Local, district and national level workshops of stakeholders in the wood energy, environment and forest sectors will be organized to thoroughly discuss, design and draft a plan for wood fuel resource development and management
- The media will be invited to publicize the process and concept at the initial, mid-term and end of project

3.4 Work plan

OUTPUT/ACTIVITIES	RESPONSIBLE Party	Year 1 (Quarter)				Year 2 (Quarter)			
		1	2	3	4	1	2	3	4
Output 1: Baseline information on wood fuel production-consumption, climate change vulnerability and species stocks produced									
Activity 1.1: Organization of start-up workshop	Project leader	■							
Activity 1.2: Wood fuel production-consumption and climate change vulnerability study	Socio-economist	■							
Activity 1.3: Wood fuel value chain study	Socio-economist	■							
Activity 1.4: Inventory of wood fuel tree species	Ecologist	■							
Output 2: Demonstration/test plots on wood fuel plantations established with suitable wood fuel species on degraded lands with smallholder and large scale charcoal producers									
Activity 2.1: Initial dialogue meetings with communities and private commercial wood fuel producers	Socio-economist	■	■						
Activity 2.2: Participatory screening of options for wood fuel plantation development with all stakeholders	Socio-economist	■	■						
Activity 2.3: Preparatory and planning meetings with volunteer wood fuel farmers or experimenters	Socio-economist	■	■						
Activity 2.4: Acquisition of planting materials and propagation studies on priority wood fuel tree species	Tree breeder	■	■						
Activity 2.5: Training local communities in tree nursery establishment and management	Nursery expert	■	■						
Activity 2.6: Assessment and preparation of fields for establishment of wood fuel trials	Silviculturist	■	■						
Activity 2.7: Establishment of demonstration plots of highly productive wood fuel tree species	Silviculturist	■	■	■					
Activity 2.8: Periodic monitoring and assessment of wood fuel trial plots	Silviculturist	■	■	■	■				
Output 3: Scientific information on wood fuel plantation management, biomass and carbon production potential, economic viability, energy characteristics of species, and potential impact on environment and livelihoods produced									
Activity 3.1: Determination of silvicultural prescriptions for management of wood fuel species in wood fuel test/trial plots	Silviculturist					■	■	■	■
Activity 3.2: Assessment of biomass production potential of the wood fuel species on test/trial plots	Ecologist					■	■	■	■
Activity 3.3: Assessment of carbon sequestration potential of the fuel plantations	Ecologist					■	■	■	■
Activity 3.4: Studies on energy characteristics of wood fuel tree species planted in test plots	Wood chemist					■	■	■	■
Activity 3.5: Studies on carbonization and charcoal yield potential of wood fuel species on test plots	Wood chemist					■	■	■	■
Activity 3.6: Economic assessment of wood fuel plantations to establish their viability in the long term	Socio-Economist					■	■	■	■
Activity 3.7: Initiate studies on wood fuel community organization for PES schemes	Socio-Economist							■	■
Activity 3.8: Publish and disseminate the results of initial studies	Project leader								
Output 4: Stakeholders engaged to discuss and plan for sustainable wood fuel resources development and management									
Activity 4.1: Stakeholder and institutional analyses to identify stakeholders, institutions and governance mechanisms for utilization and management of wood fuel resources	Policy expert					■			
Activity 4.2: District level meetings for stakeholder discussions on sustainable wood fuel resource development plan	Policy expert					■			
Activity 4.3: National level round table discussion to draft wood fuel resource development plans b developers	Policy expert					■			
Activity 4.4: Design and production of the plans in a well illustrated manual in English and appropriate local languages	Policy expert					■	■		
Activity 4.5: Distribution of the manual to wood fuel dependent communities and other wood fuel sector stakeholder	Policy expert						■	■	
Activity 4.6: Develop a policy brief to inform policy discussions on wood fuel sector	Policy expert							■	■
Activity 4.7: Print and electronic media popularization of initial results and wood fuel plantation concept	Project leader	■		■				■	■
Activity 4.8: Half yearly and final project reports	Project leader	■	■	■	■			■	■

3.5 Budget

3.5.1 Budget by Activity

Outputs/ Activities	Description	Budget component	Quantity		Units	Unit cost US\$	Total cost US\$	ITO		Executing Agency
			Year 1	Year 2				Year 1	Year 2	
Output 1	Baseline information on wood fuel production-consumption, climate change vulnerability and species stocks produced									
A1.1	Inception workshop for stakeholders									
	1 day meeting of 20 participants	31	20		Participant day	100	2000	2000		
A1.2 & A1.3	Wood fuel production-consumption, value chain and climate change vulnerability study (5 community surveys, 100 persons per survey)									
	Researchers (4)	11	16		Person Month	100	1600	1600		
	Technicians (2)	11	8		Person Month	75	600	600		
	Driver	33	5		person Days	50	250	250		
	Transport (Vehicle rental)	33	5		Days	80	400	400		
	Fuel and lubricants	54	50		Gallons	10	500	500		
A1.4	Inventory of wood fuel tree species and ethnobotany information with communities (5 community surveys, 4 transects quadrat samples per survey)									
	Researchers (4)	11	16		Person Month	100	1600	1600		
	Technicians (2)	11	8		Person Month	75	600	600		
	Driver	33	5		Person Days	50	250	250		
	GPS	43	1		unit	1000	1000	1000		
	Height & DBH measurement equipment	44	1		unit	600	600	600		
	Transport (Vehicle rental)	33	5		Days	80	400	400		
	Fuel and lubricants	54	50		Gallons	10	500	500		
A2	Output 2: Demonstration/test plots on wood fuel plantations established with suitable wood fuel species on degraded lands with smallholder and large scale charcoal producers									

A2.1	Initial dialogue meetings with communities and private commercial wood fuel producers (20 households or entrepreneurs in 5 communities)	31	100		Persons	15	1500	1500		
A2.2	Participatory screening of options for wood fuel plantation development with all stakeholders (20 households or entrepreneurs in 5 communities)	31	100		Persons	20	2000	2000		
A2.3	Preparatory and planning meetings with volunteer wood fuel farmers or experimenters (20 households or entrepreneurs in 5 communities)	31	100		Persons	15	1500	1500		
	Researchers (4) (A2.1, A2.2 & A2.3)	11	16		Person Month	100	1600	1600		
	Technicians (2)	11	8		Person Month	75	600	600		
	Driver (A2.1, A2.2 & A2.3)	33	5		Person Days	50	250	250		
	Transport (Vehicle rental) (A2.1, A2.2 & A2.3)	33	5		Days	80	400	400		
	Fuel and lubricants	54	50	50	Gallons	10	1000	500	500	
	Digital camera	42	1			500	500	500		
A2.4	Acquisition of planting materials and propagation studies on priority wood fuel tree species	21	50		Bags seeds	60	3000	3000		
A2.5	Training local for 5 communities in tree nursery establishment and management	21	100		Person Days	20	4000	2000	2000	
	Nursery supplies	53			Assorted (poly sheets, poly pots, soil, boots, watering cans, etc.)		5500	3500	2000	
A2.6	Assessment and preparation of fields for establishment of wood fuel trials	21	100		Person Days	15	2000	1500	500	
A2.7	Establishment of demonstration plots of highly productive wood fuel tree species	21	100		Person Days	15	2000	1500	500	
A2.8	Activity 2.8: Periodic monitoring and assessment of 100 wood fuel trial plots by national experts comprising researchers and technicians	33	70	70	Person Days	100	14000	7000	7000	
	Driver	33	10	10	Person Days	50	1000	500	500	
	Transport (Vehicle rental)	33	10	10	Days	80	1600	800	800	
	Fuel and lubricants	54	800	800		10	16000	8000	8000	
A3	Output 3: Scientific information on wood fuel plantation management, biomass and carbon production potential, economic viability, energy characteristics of species, and potential impact on environment and livelihoods produced									

A3.1	Determination of silvicultural prescriptions for management of wood fuel species in wood fuel test/trial plots (silviculturist)	11		6	Person Months	100	600		600
A3.2	Assessment of biomass production potential of the wood fuel species on test/trial plots	11		6	Person Months	100	600		600
A3.3	Assessment of carbon sequestration potential of the fuel plantations	11		6	Person Months	100	600		600
A3.4	Studies on energy characteristics of wood fuel tree species planted in test plots	11		6	Person Months	100	600		600
A3.5	Studies on carbonization and charcoal yield potential of wood fuel species on test plots	11	3	3	Person Months	100	600	300	300
	Laboratory supplies	52			Assorted		1500	1000	500
A3.6	Economic assessment of wood fuel plantations to establish their viability in the long term	11		6	Person Months	100	600		600
A3.7	Initiate studies on wood fuel community organization for PES schemes	11		5	Person Months	100	500		500
	Technicians (2) (supporting A3.1-A3.7)	11		24	Person Months	75	1800		1800
	Driver (supporting A3.1-A3.7) (much of the data will be collected during the routine M & E)	33		5		50	250		250
	Transport (support A3.1-A3.7) (much of the data will be collected during the routine M & E)	33	10	10.5		80	1640	800	840
	Fuel and lubricants (for A3.1-A3.7)	54	50	70		10	1200	500	700
A3.8	Publish and disseminate the results of initial studies (project leader)	11		2	Person Months	150	300		300
	Computer & printer	41	1		Units	1800	1800	1800	
	Office supplies (Stationery, etc.)	51					1050	550	500
A4	Output 4:Stakeholders engaged to discuss and plan for sustainable wood fuel resources development and management								
A4.1	Stakeholder and institutional analyses to identify stakeholder, institutions and governance mechanisms for utilization and management of wood fuel resources	11		3	Person Months	100	300		300
A4.2	District level meetings for stakeholder discussions on sustainable wood fuel resource development plan	31	30		Person Days	30	900	900	
	Transport	33	2		Days	80	160	160	
	Fuel and lubricants	54	30		Gallons	10	300	300	
A4.3	National level round table discussion to draft wood fuel resource development plans b developers	31		30	person Days	100	3000		3000
A4.4	Design and production of the plans in a well illustrated manual in English and appropriate local languages	61			Designer & Publisher fee	1500	1500		1500

A4.5	Distribution of the manual to wood fuel dependent communities and other wood fuel sector stakeholder	11		2	Person Months	100	200		200	
A4.6	Develop a policy brief to inform policy discussions on wood fuel sector	11		2	Person Months	100	200		200	
A4.7	Print and electronic media popularization of initial results and wood fuel plantation concept	61			Air time, print space		1500	500	1000	
	Transport	33		5	Days	80	400		400	
	Fuel and lubricants (Field visits with media men)	54		50	Gallons	10	500		500	
A4.8	Half yearly and final project reports and coordination (project leader)	11	12	10	Person Months	150	3300	1800	1500	
A4.9	Audit Cost	62	1	1		1500	3000	1500	1500	
Total							97650			

3.5.2 ITTO Yearly budget

Category	Description	Total	Year 1	Year 2
10	Project personnel			
11	National Experts			
	11.1 Project Leader	3600.00	1800.00	1800.00
	11.2 Researchers (4)	9600.00	4800.00	4800.00
	11.3 Technicians (2)	3600.00	1800.00	1800.00
12	Administrative Personnel			
	12.1 Accountant			
	12.2 Auditor			
13	Consultants			
14	Fellowship and training			
19	Component Total	16800.00	8400.00	8400.00
20	Sub-contract			
21	Seeds collection	3000.00	3000.00	
22	Nursery establishment and management	4000.00	2000.00	2000.00
23	Pegging and planting	4000.00	3000.00	1000.00
29	Component Total	11000.00	8000.00	3000.00
30	Duty travel			
31	Daily Subsistence Allowance (DSA)			
	31.1 Inception workshop (20 participants)	2000.00	2000.00	
	31.2 Community preparatory meetings/workshops (100 people)	2000.00	2000.00	
	31.3 District consultative stakeholder workshop (30 participants)	900.00	900.00	
	31.4 National consultative stakeholder workshop (30 participants)	3000.00		3000.00
32	International travel			
33	Local transport costs			
	33.1 Driver (1)	2000.00	1250.00	750.00
	33.2 National experts (7) routine project monitoring and evaluation	14000.00	7000.00	7000.00
	33.3 Vehicle rental charges	8000.00	4000.00	4000.00
39	Component Total	31900.00	17150.00	14750.00
40	Capital items			
41	Computer and printer	1800.00	1800.00	
42	Digital camera	500.00	500.00	
43	I GPS equipment	1000.00	1000.00	
44	Height & DBH measurement equipment	600.00	600.00	
45	Land			
49	Component Total	3900.00	3900.00	
50	Consumable Items			
51	Office supplies	1050.00	550.00	500.00
52	Laboratory supplies	1500.00	1000.00	500.00
53	Nursery supplies	5500.00	3500.00	2000.00
54	Fuel and Lubricants	20000.00	10300.00	9700.00
59	Component Total	28050.00	15350.00	12700.00
60	Miscellaneous			
61	Information, media and publications	3000.00	500.00	2500.00
62	Audit costs	3000.00	1500.00	1500.00
69	Component Total	6000.00	2000.00	4000.00
	SUBTOTAL	97650.00	54800.00	42850.00
70	National management costs/Executing agency management			
71	FORIG administrative cost 15%	0.00		
79	Component Total	0.00		
	SUBTOTAL	97650.00		
80	ITTO Project monitoring and Administration			
81	ITTO monitoring and review	15000.00		
82	ITTO Final Evaluation	0.00		
83	Program Support Costs (8%)	9012.00		
89	Component Total	24012.00		
	GRAND TOTAL	121,662.00		

3.5.3 Budget by Executing Agency

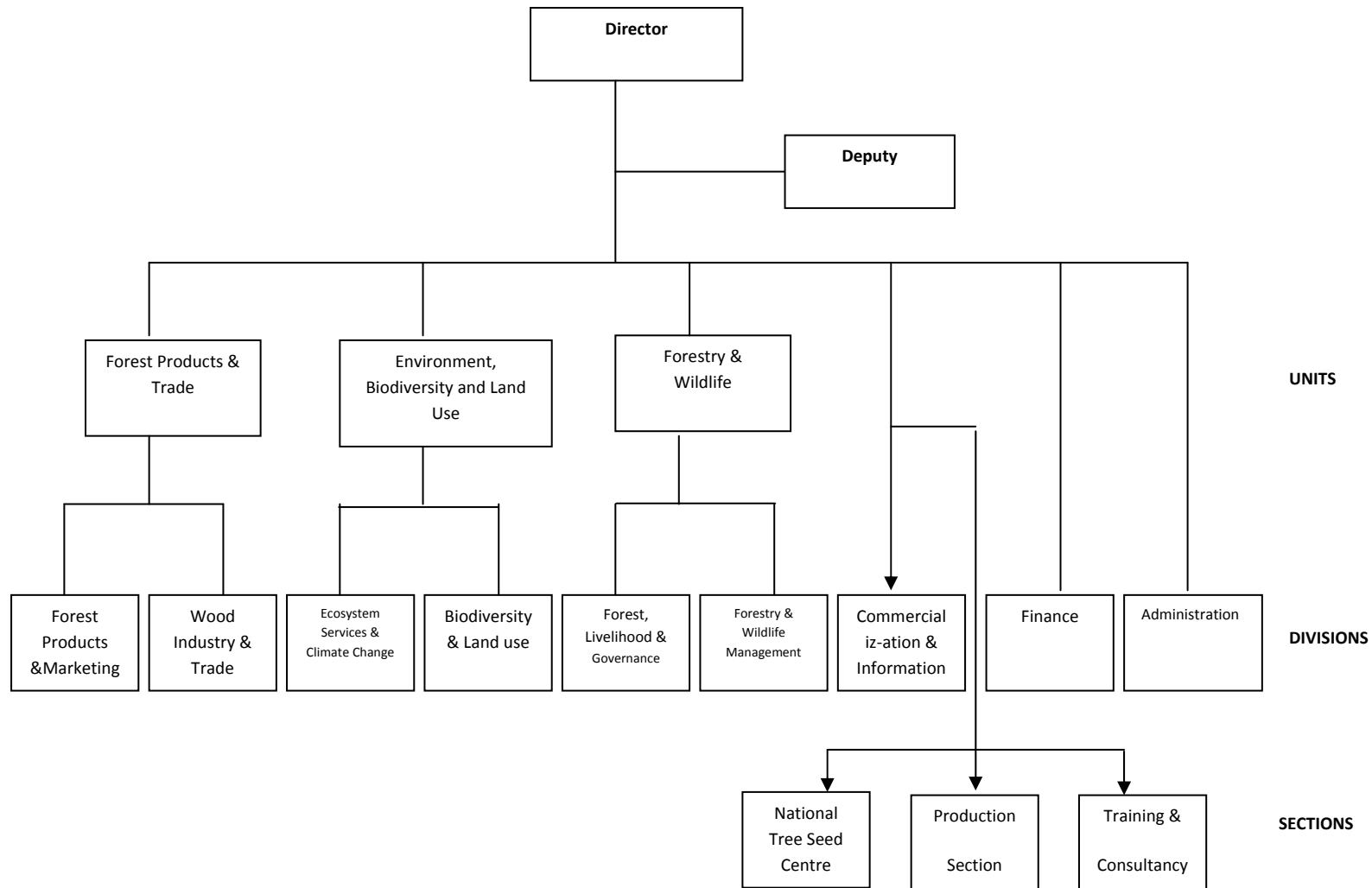
Category	Description	Total	Year 1	Year 2
10	Project personnel			
11	National Experts			
	11.1 Project Leader			
	11.2 Researchers (4)			
	11.3 Technicians (2)			
12	Administrative Personnel			
	12.1 Accountant		7,200	7,200
	12.2 Auditor		4,800	4,800
13	Consultants			
14	Fellowship and training			
19	Component Total	24000.00	12000.00	12000.00
20	Sub-contract			
21	Seeds collection			
22	Nursery establishment and management			
23	Pegging and planting			
29	Component Total			
30	Duty travel			
31	Daily Subsistence Allowance (DSA)			
	31.1 Inception workshop (20 participants)			
	31.2 Community preparatory meetings/workshops			
	31.3 District consultative stakeholder workshop (50 participants)			
	31.4 National consultative stakeholder workshop (50 participants)			
	31.5 Internal monitoring & evaluation			
32	International travel			
33	Local transport costs			
	33.1 Drivers (2)			
	33.2 National experts (8)			
	33.3 Vehicle hiring if vehicle purchase not allowed			
39	Component Total			
40	Capital items			
41	Computer and printer			
42	Digital camera			
43	I GPS equipment			
44	Height & DBH measurement equipment			
45	Land			
46	Vehicle 4x4 drive 1			
49	Component Total			
50	Consumable Items			
51	Office supplies			
52	Laboratory supplies	2500.00	2,000	500
53	Nursery supplies	3000.00	2,000	1,000
54	Fuel and Lubricants			
59	Component Total	5500.00	4000.00	1500.00
60	Miscellaneous			
61	Project committee meetings	4000.00	2000.00	2000.00
62	Information, media and publications			
63	Audit costs			
69	Component Total	4000.00	2000.00	2000.00
	SUBTOTAL	33500.00	18000.00	15500.00
70	National management costs/Executing agency management			
71	FORIG administrative cost 15%	14197.50		
79	Component Total	14,197.50		
	SUBTOTAL	47,697.50		

4.0 Implementation Arrangement

4.1 Executing agency and organizational structure

The project would be implemented by the Forestry Research Institute of Ghana

FORIG Organizational Chart



4.2 Small-project management

The Forestry Research Institute of Ghana which is the main implementation agency will be working in close collaboration with the Ghana Forestry Commission, Energy Commission and local communities. This will ensure greater co-operation between all the agencies involved with reforestation efforts. This arrangement will also ensure the smooth flow of information between all stakeholders and allow for effective dissemination of project recommendations.

4.3 Monitoring and reporting

The project will be subject to periodic technical monitoring in accordance with the policies and procedures laid down by ITTO. An Evaluation team comprising the Project Leader, Director of Forestry Research Institute of Ghana, representatives of ITTO and the local communities will be formed. A yearly evaluation will be carried out to assess the project's overall orientation and organization and determine whether the project is achieving its objectives. Monitoring reviews will be carried out by the staff of the project every quarter. The exercise will be designed to identify problems and identify possible solutions.

Annex 1 Profile of the executing agency

The mission of FORIG, Ghana's forestry research institute and the executing agency is to conduct use-focused research that generates scientific knowledge and appropriate technologies to enhance sustainable development, conservation, and efficient utilisation of Ghana's forest resources. FORIG also disseminates forestry information for the improvement of social, economic and environmental well being of the people of Ghana. FORIG has completed several ITTO assisted projects. The Institute's permanent offices and laboratories are located at Fumesua, near Kumasi. It has research centres at Bobiri and Amantia both in the Moist, Semi-Deciduous Forest Zone, Benso in the Wet Evergreen Zone, and Bolgatanga in the Savanna Zone. There are also research stations at Subri, Afram, Pra-Anum Area, Main Northern Grassland and BiaTano and Asenanyo. The laboratories of the Institute have a wide range of equipment for research and development. They include impregnation plants, seasoning kilns, wood testing machines, steam generators, microscopes, growth chamber and UV spectrophotometer.

Annex 2 Tasks and responsibilities of key experts provided by the executing agency

Their responsibilities will be:

- Dr. Victor Kwame Agyemang: Project Coordinator (Ecologist)
The responsibilities of the project leader include the general coordination of project implementation.
- Mrs. Elizabeth Asantewaa Obeng (Environmental resource economist)
She is mainly responsible for socio-economic scoping study and dialogue meetings at the community level. She is also responsible for stakeholder and institutional analyses, economic assessment of wood fuel plantations as well as for coordinating the activities relating to the baseline surveys.
- Mr. Akwasi Duah-Gyamfi (Ecologist)
He is responsible for liaising with local communities in the establishment of the forest plantations. In addition, he will be responsible for the inventory and biodiversity assessment aspects of the project.
- Mrs. Theresa Peprah (Tree breeder and nursery expert)
Responsible for establishment of nurseries for the test wood fuel plantation. She will also be responsible for training of local communities in the propagation of planting materials, plantation establishment techniques.
- Dr. Stephen Adu-Bredu (Tree physiologist/silviculturist)
Responsible for wood fuel plantation silviculture as well as analysis and assessment of biomass production and carbon sequestration potential of the wood fuel plantations on test/ trial plots.
- Nana Sarfo Agyeman Derkyi (Wood chemist)
Responsible for the studies on energy characteristics, carbonization and charcoal yield studies of priority wood fuel tree species in test/trial plots.
- Mr. Kwame Antwi Oduro (Forester/policy)
Responsible for review of policy, legislation and institutional framework regarding wood fuel development and management in Ghana. He will support the project leader in stakeholder workshop organization and development of manuals from proposed wood fuel resource development plan.

Annex 3: TOR of personnel and consultants funded by ITTO

No consultant will be engaged on this small project as such services are not needed for execution of the project

Annex 4: Recommendations of ITTO expert panel and resulting modifications

Thematic Programme

General Project Information

TP Acronym: REDDES

Project ID: RED-PPD 044/11

Project Type: ~~Pre-Project~~ ---- Revised as Small Project Proposal Based on Reviewers Comments

TITLE: REHABILITATION OF DEGRADED FORESTS FOR SUSTAINABLE ENERGY PRODUCTION, IMPROVED LIVELIHOODS AND CARBON STOCK IN THE FOREST-SAVANNA TRANSITION ZONE OF GHANA

Submitting Country: Ghana

Submitting Org: Government of Ghana

Executing Agency: FORIG

ITTO Budget: 149,955.30

Counterpart Budget: 33,500.00

Total: 183,455.30

Duration (months): 24

General Comments: Based on the concluding remarks of the reviewer, this proposal has been updated and revised as a SMALL PROJECT PROPOSAL. The objectives, activities, outputs and approach to the project implementation has according been revised as a Small Project Proposal

Project Content: Addressed Comments

Part			Heading	Comments raised	Approach to addressing comments
			List of Abbreviations and Acronyms	Lacking	Currently inserted
1.			PRE-PROJECT CONTEXT		
1.	1		Origin and justification		
1.	2		Relevance		
1.	2	1	Conformity with ITTO's objectives and priorities		
			Conformity with TP deliverables and association		
1.	2	2	Relevance to the submitting Country policies	This section could be improved with the ongoing activities in Ghana regarding forest and mitigation to climate change	Examples of ongoing climate change mitigation projects in Ghana have been incorporated to emphasis on the relevance of this project to Ghana Other sectoral policies on wood energy in the country have also being discussed under relevance of this project
2.			JUSTIFICATION OF PROJECT		
2.	1		Objectives		
2.	1	1	Development objective		
2.	1	2	Specific objectives	The specific objective 2 aims only at developing capacities. Do the proponents want to raise the capacity in these topics in order to have people who, in a next stage would be able to set the corresponding baselines and monitoring plans? If so, the activities should target the key group that will be involved in these activities in the future (including different stakeholders), and these should be clear in the design of the pre-proposal	The Small Project currently has one focused specific objective which seeks to put in context, the different dimensions of what the overall project seeks to do

2.	2		<i>Preliminary problem identification</i>	Should add problem identification on issues related carbon stock. Could be completed clarifying how ongoing activities in REDD+ in Ghana increase/reduce the problem	The problem identification section has highlighted the information gap that exist currently on estimating the carbon potential of different land use system in Ghana. This project will therefore seek to initiate the processes of estimating the carbon stock in woodlots plantations in Ghana
3.			PRE-PROJECT INTERVENTIONS		
3.	1		<i>Outputs</i>	Output 2 may not be appropriate for this pre-project	Based on the revision of the project as a small project, output 2 has also been revised accordingly with emphasis on demonstration plot
3.	2		<i>Activities, inputs and unit costs</i>	On activities: missing inputs and unit costs. Should be improved according to the comment to the specific objectives	Comments addressed and revised accordingly
3.	3		<i>Approaches and methods</i>	Methods and approaches related to quantification of ES and quantification of changes in carbon stocks in living biomass should be addressed here. Can be more systematically structured.	The approaches and methodology section has been rewritten and systematically structures to cover all methodologies that will be employed for the different components of the entire project. Carbon stock dynamics have been clearly emphasized.
3.	4		<i>Work Plan</i>	The chronogram seems to be unrealistic. Some of the studies seem to be too short in time (e.g. Act. 1.5, 1.6, 1.9). It is difficult to be sure without knowing the ToRs for such studies	Comments addressed by revising the work plan
3.	5		<i>Budget</i>	Budget covers only ITTO contribution (missing counterpart budget plan). Some activities seem to have a non-realistic budget (e.g. 2.7, 2.8 or 2.9). Unit costs and costing of non-ITTO funding source are missing. Need to have list of capital items.	Budget revised accordingly focusing on counterpart budget plan. The Budget format in the ITTO project formulation manual was adhered to in revising the budget section
4.			IMPLEMENTATION ARRANGEMENTS		

4.	1	<i>Executing Agency and organizational structure</i>		
4.	2	<i>Project Management</i>		
4.	3	<i>Monitoring and reporting</i>		
ANNEX 1		Profile of the Executing Agency		
ANNEX 2		Tasks and responsibilities of key experts provided		
ANNEX 3		ToRs of personnel, consultants and sub-contracts		
ANNEX 4		Recommendations of previous ITTO reviews and		

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