



Addressing Transboundary Concerns in the Volta River Basin and its Downstream Coastal Area

Restoring and protecting the river beds of the Black Volta and its tributaries through participative campaigns of reforestation

(Cote d'Ivoire – Ghana)

Project Number: 53885

Final report

March, 2009





First published in Ghana in 2009 By the UNEP-GEF Volta Project.

Copyright © 2009, United Nations Environment Programme

This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder provided acknowledgement of the source is made. UNEP would appreciate receiving a copy of any publication that uses this publication as a source.

No use of this publication may be made for resale or for any other commercial purpose without prior permission in writing from the United Nations Environment Programme.

UNEP-GEF Volta Project
Project Management Unit
No. E3 Leshie Crescent - Labone
c/o UNDP P.O. Box 1423
Accra Ghana
Phone: +233 21 764111
Fax: +233 21 772669
Mobile: +233 206309775
Website: www.gefvolta.iwlearn.org

DISCLAIMER:

The contents of this report do not necessarily reflect the views and policies of UNEP or the GEF. The designations employed and the presentations do not imply of any opinion whatsoever on the part of the UNEP, or of the GEF, or of any cooperating organization concerning the legal status of any country, territory, city or area, of its authorities, or of the delineation of its territories or boundaries.

The report was prepared by Mr. GOULA Bi Tie Albert (Côte d'Ivoire) and Mr. TACHIE – OBENG Emmanuel (Ghana)

For citation purposes this document may be cited as:

UNEP-GEF Volta Project, 2009. Restoring and protecting the river beds of the Black Volta and its tributaries through participative campaigns of reforestation (Cote d'Ivoire – Ghana)
UNEP/GEF/Volta/RR.4/2009

Table of contents

List of abbreviations and acronyms	iii	Deleted:
List of Tables	iv	
List of figures	iv	
1. Introduction	5	
1.1 Background	5	
1.2 Objectives of the studies and expected outcomes	5	
1.3 Methodology	6	
2. Physical, Social and Economic Environments	7	
2.1 Physical environment	7	
2.1.1 Location and administrative situation	7	
2.1.2 Relief and vegetation	8	
2.1.3 Geology, Soil and hydrogeology	8	
2.1.4 Climate	8	
2.1.5 Hydrology	10	
2.2 Social and economic characteristics	14	
2.2.1 Population	14	
2.2.2 Social and Economical activities	14	
2.2.3 Source of domestic energy	14	
2.2.4 Agriculture	15	
2.3 Climate change and climate variability	15	
2.3.1 Environmental impacts of Climate change and climate variability	15	
2.3.2 Impacts on water resources	17	
2.3.3 Impact on vegetation cover	17	
2.4 Other types of environmental degradation issues	19	
2.5 Summary of key water and environmental issues identified	20	Deleted:
3. Updating of project logframe, activities, work plan and budget	21	Deleted:
3.1 Project objectives and expected outcomes	21	Deleted:
3.2 Project activities and work plan	21	Deleted:
3.3 Selected project implementation sites	21	Deleted:
3.4 Project budget and funding considerations	24	Deleted:
3.4.1 Project budget	24	Deleted:
3.4.2 Co-Funding	24	Deleted:
4. Linkage to National/Regional Priorities and Programs	25	Deleted:
4.1 Linkage to National/Regional Priorities and Programs: Cote d'Ivoire	25	Deleted:
4.2 Linkage to National/Regional Priorities and Programs: Ghana	25	Deleted:
5. Project Management Structure	25	Deleted:
5.1 Institutional framework	25	Deleted:
5.1.1 Project Steering Committee (PSC)	26	Deleted:
5.1.2 Project Implementation Partners (PIP)	26	Deleted:
5.1.3 Implementing Agency and Hosting institution (HI)	28	Deleted:
5.1.4 Bilateral Steering Committee	29	Deleted:

5.1.5	Project Management Team	29	Deleted:
5.2	<i>Beneficiaries</i>	30	Deleted:
5.3	<i>Monitoring and Evaluation Process</i>	31	Deleted:
6.	Annexes	33	Deleted:
6.1	<i>Annex A: Bibliography</i>	34	Deleted:
6.2	<i>Annex B: Updated Logframe of the Demo Project # DP3</i>	35	Deleted:
6.3	<i>Annex C: Project Activities</i>	38	Deleted:
6.4	<i>Annex D: Project Budget</i>	40	Deleted:
6.5	<i>Annex C: Process and Stress reduction indicators</i>	44	Deleted:
6.5.1	Annex C1: Process indicators	44	Deleted:
6.5.2	Annex C2: Stress reduction indicators	44	Deleted:

List of abbreviations and acronyms

Abbreviation	Definition
CI	Côte d'Ivoire
CLS-TA	Customary Land Secretariat-Traditional Authority
DR	Direction régionale
DREF	Direction Régionale des Eaux et Forêts
DSRP	Document de stratégie de réduction de la pauvreté
ECOWAS	Economic Community of the West Africa States
EPA	Environmental Protection Agency (of Ghana)
EU	European Union
FSD-FC	Forest Service Division of Forestry Commission
FSL	Full Supply Level
GCLME	Guinea Current Large Marine Ecosystem
GEF	Global Environment Facility
GH	Ghana
GIWA	Global International Waters Assessment
LULC	Land-use Land-cover
MOFA	Ministry of Food and Agriculture
NCCE	National Commission on Civic Education
NEPAD	New Partnership for Africa Development
NFP	National Focal Point
NPD	National Project Director
PAPADEV	Partnership in Development
PDF	Plan directeur forestier de Côte d'Ivoire
PDF-B	Project Development Fund, level B
PEF	Périmètre d'exploitation forestière
PSF	Projet sectoriel forestier de Côte d'Ivoire
RD	Regional Direction
RNA	Recensement National Agricole
SAP	Strategic Action Programme
SODEFOR	Société pour le développement des exploitations forestières
TDA	Transboundary Diagnostic Analysis
UCC-Water	UNEP Collaborating Centre on Water and Environment
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VRBP	UNEP/GEF Volta River Basin Project (overall project or “core project”)

List of Tables

Table 1: Some characteristics of annual rainfall for the period 1970 – 2000.....	10
Table 2 : Characteristics of Black Volta major tributaries in transboundary basin.....	11
Table 3 : Economic activities of population in Zanzan region (RNA, 2001).....	14
Table 4: Distribution of the population according to the sources of domestic energy in Zanzan region	12
Table 5: Sources of domestic energy in Northern and Brong Ahafo regions of Ghana.....	12
Table 6: Crop Cultivated in the basin.....	15
Table 8: Members of local steering committee in Ghana.....	26
Table 9: Members of project implementation partners in Cote d'Ivoire.....	27
Table 10: List of the various reports to be produced by the demonstration project for monitoring and evaluation work plan	29

Deleted:

Deleted:

List of figures

Figure 1: Situation of Black Volta in Côte d'Ivoire (pink colour indicates the degradation areas)	7
Figure 2: Climate variation of sunshine, temperature, rainfall and relative humidity in Ghana	9
Figure 3: Variation of mean monthly rainfalls during the period 1940 – 2007 at Bondoukou and Bouna (Cote d'Ivoire)	9
Figure 4: Mean monthly variation of sunshine and temperature at Bondoukou (1968 – 1977) (Cote d'Ivoire)	10
Figure 5: Variation of monthly relative humidity at Bondoukou (Cote d'Ivoire)	10
Figure 6: Black Volta sub-watershed in Cote d'Ivoire with Tributaries Rivers	12
Figure 7: Variation of mean monthly stream flows at Bui station in 80s and 2000s in Ghana	12
Figure 8: Variation of mean monthly flow at hydrometric stations of Black Volta River in Cote d'Ivoire	13
Figure 9: Annual variation of rainfall and temperature at Bole over 1961-2005	16
Figure 10: Inter annual variation of rainfall and temperature at Bole station	16
Figure 11: Inter annual variation of rainfall at Bouna and Bondoukou stations	17
Figure 12: Evolution of annual flow module (Vonkoro) and annual rainfalls (Bouna)	18
Figure 13: Land use land cover from 1986 to 2000 on black Volta basin in Ghana	18
Figure 14: Case of sanding up in river, erosion, degradation and water coloration of Black Volta tributary	19
Figure 15: Location of hot spots in Ghana and Cote d'Ivoire	22
Figure 16: Project Management Structure in Ghana	30

Deleted:

Deleted:

Deleted:

1. Introduction

1.1 Background

- 1 The UNEP/GEF Volta River Basin Project for “Addressing Transboundary Concerns in the Volta River Basin and its Downstream Coastal Area” is a regional initiative of six riparian countries in the basin, including Benin, Burkina Faso, Cote d'Ivoire, Ghana, Mali and Togo. The project which has been designed to facilitate the integrated management, sustainable development and protection of natural resources of the Volta River Basin plan to achieve its objectives by addressing priority regional transboundary issues and problems as identified through a preliminary Transboundary Diagnostic Analysis (TDA) earlier conducted on the basin. The project is expected to promote a more sectorally-coordinated management approach, based on Integrated Water Resource Management (IWRM) principles, both at the national and the regional levels, with a strong emphasis on an expanded role for all stakeholders.
- 2 The long-term goal of the project is to enhance the ability of the countries to plan and manage the Volta catchment areas within the territories and its aquatic resources and ecosystems on a sustainable basis.
- 3 This Project has three main specific objectives identified by the root cause analysis carried out during the project preparation process and updated during the inception phase as follows:
 - Specific Objective n° 1: Build capacity, improve knowledge, enhance stakeholders involvement to support the effective management of the VRB;
 - Specific Objective n° 2: Develop river basin legal, regulatory and institutional frameworks and management instruments for addressing transboundary concerns in the Volta River Basin and its downstream coastal area.
 - Specific Objective n° 3: Demonstrate national and regional measures to combat transboundary environmental degradation in the Volta Basin
- 4 Under the main themes identified in the Preliminary TDA, the demonstration project 3: “Restoring and protecting the river beds of the Black Volta and its tributaries through participative campaigns of reforestation” has been selected to contribute to the Specific Objective 3. Meanwhile, the causes of soil and forest degradation in the Northern Region in Ghana and the North-Zanzan and the South- Zanzan in Cote d'Ivoire can be summarized as follows:
 - repeated slash and burn agriculture, bush fires, and excessive use of pesticides;
 - unsustainable use of firewood and increase in charcoal production, which are the main sources of domestic energy for the growing urban and rural populations;
 - increasing coefficient of runoff resulting in less recharge of groundwater and soil deposited along the channel;
 - erosion resulting in loss of fertility and sedimentation of water courses and reservoirs;
 - increase in mining activities, including sand mining.
- 5 It becomes more important to reduce this environmental degradation in Volta river basin.

1.2 Objectives of the studies and expected outcomes

- 6 This study was aimed at updating the project brief including baseline situation analysis, monitoring and evaluation plan. The expected outcomes are:
 - Baseline situation updated;
 - Stress indicators defined, including baseline data, monitoring plan and quantitative outcomes;
 - Project activities reviewed and updated;
 - Recommendations provided for the identification/selection of pilot plots and experimental sites.

1.3 Methodology

- 7 The following approach was followed in carrying out the assignments in the project area. A field visit was conducted between 16th and 21st of November 2008. This visit to the project area created opportunities for exchange of information within government authorities and other key stakeholders of the project. It also reinforced the analyses already conducted on the environmental problems of the zone in the initial report, taking into account recent development in the proposed project area, especially the construction of the hydroelectric dam at Bui in Ghana. Specifically, the operational approach of this study consist of :
- Collection and analysis of existing documents on environment, water resources, socio-economic, etc.;
 - Meeting with community leaders and other beneficiaries
 - Meeting with field operation team of the Bui Dam Authority
 - Identification of proposed hotspots with support from the community
 - Discussion of opportunities and challenges of the project activities;
 - Appraisal of possible support and participation of stakeholders to the project

2. Physical, Social and Economic Environments

2.1 Physical environment

2.1.1 Location and administrative situation

- 8 The Black Volta is located in the Guinea savanna zone of Ghana and Côte d'Ivoire transboundary basin (Figure 1). The Black Volta basin is situated to the Northeast of Cote d'Ivoire and Northwest of Ghana between the latitudes 8°02' and 9°41'N and the longitudes 2°01' and 3°25'W respectively.
- 9 The Black Volta basin covers two administrative departments of Zanzan region: Bondoukou and Bouna in Côte d'Ivoire. It is limited at the North by Burkina Faso, to the west by the region of Bandama valley, to the East by Ghana and to the South by the regions of the Mean-Comoe and the N'Zi-Comoe (Figure 1). In Ghana, the basin covers Tain, Bole, Sawla/Tuna/Kalba districts in Brong Ahafo and Northern regions respectively.

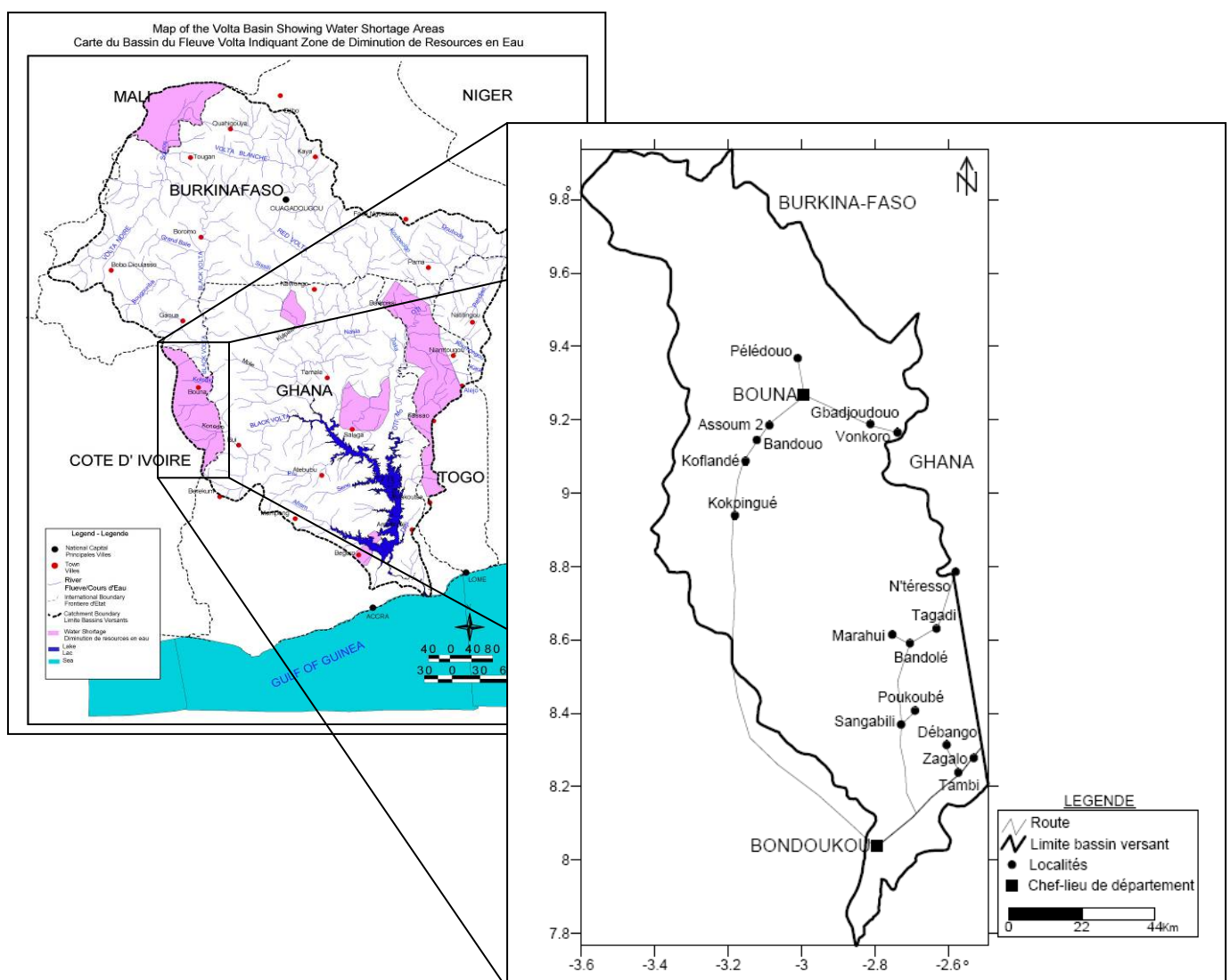


Figure 1: Situation of Black Volta in Côte d'Ivoire (pink colour indicates the degradation areas)

2.1.2 Relief and vegetation

- 10 The forest vegetation consists predominantly of sub-humid savannah, mainly tall grasses interspersed with fire resistant trees such as sheanut, dawadawa, teak, kapok and mango. Generally, the distribution of the vegetation within the basin is made up of 60% grass and 40% savannah woodland with stretch of forest along the river basin. The low vegetation cover, which is aggravated by increased deforestation for charcoal production and annual fires, also render the soil susceptible to various forms of erosion during the rainy season.
- 11 In Ghana, the Black Volta has considerable levels of relief varying from 150m-300m and increasing the south to the north. However, the Black Volta basin has relatively low relief in Cote d'Ivoire. It does not possess any high mountains with the exception of the massif of Bondoukou (725 m of altitude).

2.1.3 Geology, Soil and hydrogeology

- 12 The soil in the Ghana portion of the basin is predominated by light textured surface horizons with sandy loam. Mainly, the soils contain abundant coarse material either gravel or stone which adversely affect their physical properties, especially their water holding capacity. The soils are generally very fertile for agriculture. The fertile nature of the soils also favours the growth of grass and shrubs thus making the area favourable for the grazing of livestock. The geology is dominated by sand stones, shales, mudstones, limestones, phylites and schists with mineral depositions on granite formations. The basin composed of two major hydrogeologic provinces which are Precambrian crystalline igneous and metamorphic rocks and Palaeozoic consolidated sedimentary formations.
- 13 In Cote d'Ivoire, the basin belongs to the Precambrian bedrock. The main geological formations on this basin are: flyschs, schists, basic rocks, granites and migmatites. The hydrogeology context is characterized by fractured aquifers contained in granite and schists. This fractured area counts 325 mega fractures in various directions.

2.1.4 Climate

- 14 In Ghana, the annual rainfall over the Black Volta Basin varies about 1,150 mm in the north and 1,380 mm in the south. Temperature is high throughout the year ranging between 21°C and 35°C. The annual potential evapotranspiration of the basin ranges from 1,600 mm to 1,800 mm. In Cote d'Ivoire, the mean values of annual rainfall vary from 1061 mm (Bondoukou) to 993 mm (Bouna) indicating the decreasing from the south to the north.
- 15 The transboundary basin of Ghana and Cote d'Ivoire is influenced by a climatic regime known as attenuated equatorial regime of transition with four seasons as follows:
 - Long dry season: November - March;
 - Major rainy season: April – June;
 - Intermediary rainy season: July – August
 - Minor rainy season: September – October.
- 16 The historical data of weather stations at Bondoukou, Bouna, Nassian, Tehini and Tanda in Cote d'Ivoire as well as Bole in Ghana show similarities in temperature, length of sunshine hours and relative humidity as shown in figures 2 and 3 below.
- 17 The length of sunshine is important during the first four months of the year (Figures 2 and 4) with more than 200 hours for each month. This raises the temperatures level to high values of between 32 and 35°C. The lowest length of sunshine is observed in the months of July and August during the year, at a period of the months corresponding to the small dry season.
- 18 The maximum level of the relative humidity is reached during June, July and August with values exceeding 90% (Figure 5). These values decrease considerably during December, January and February.

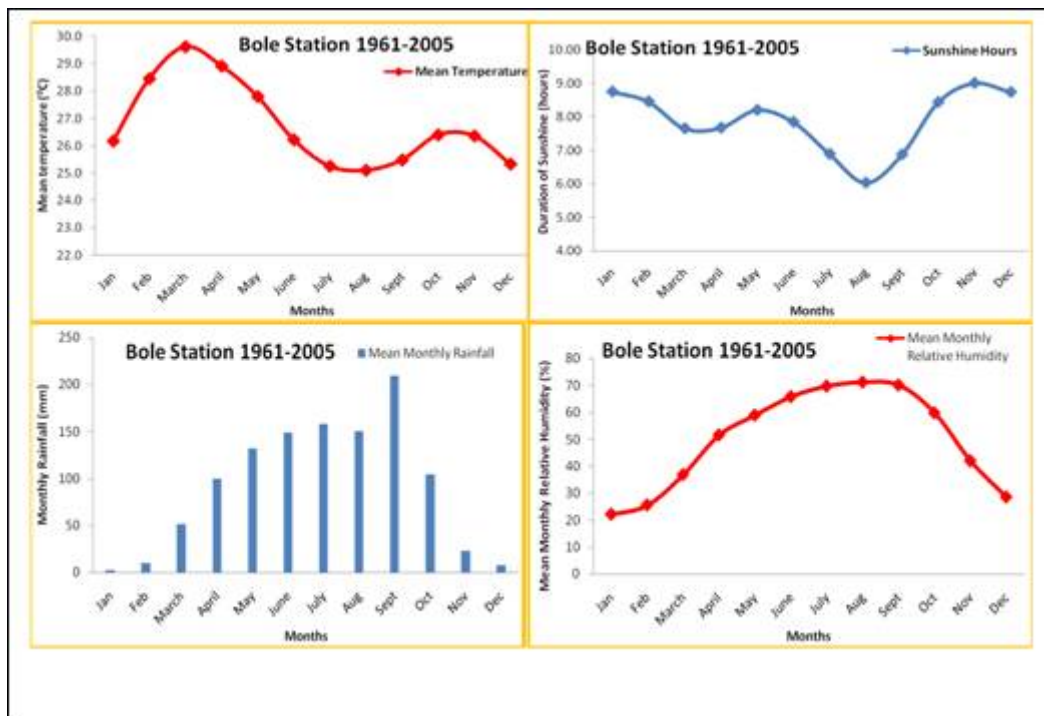


Figure 2: Climate variation of sunshine, temperature, rainfall and relative humidity in Ghana

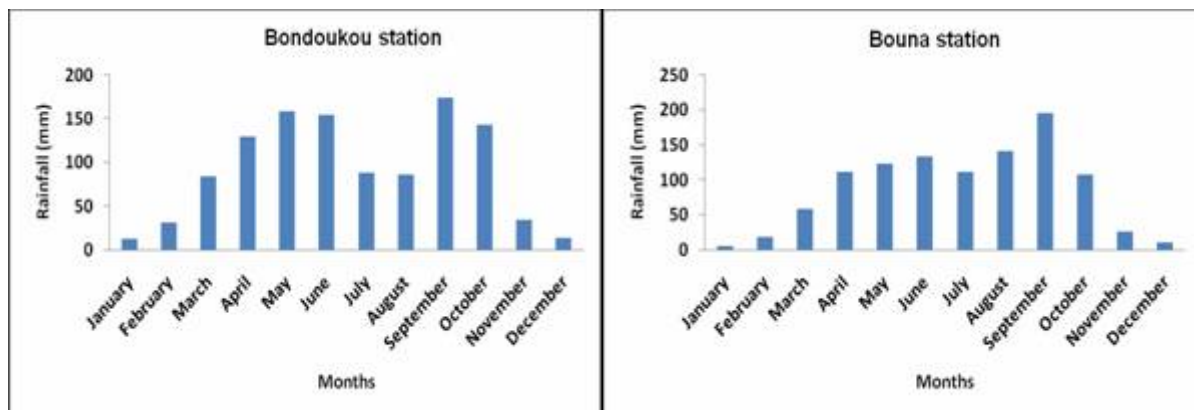


Figure 3: Variation of mean monthly rainfalls during the period 1940 – 2007 at Bondoukou and Bouna (Cote d'Ivoire)

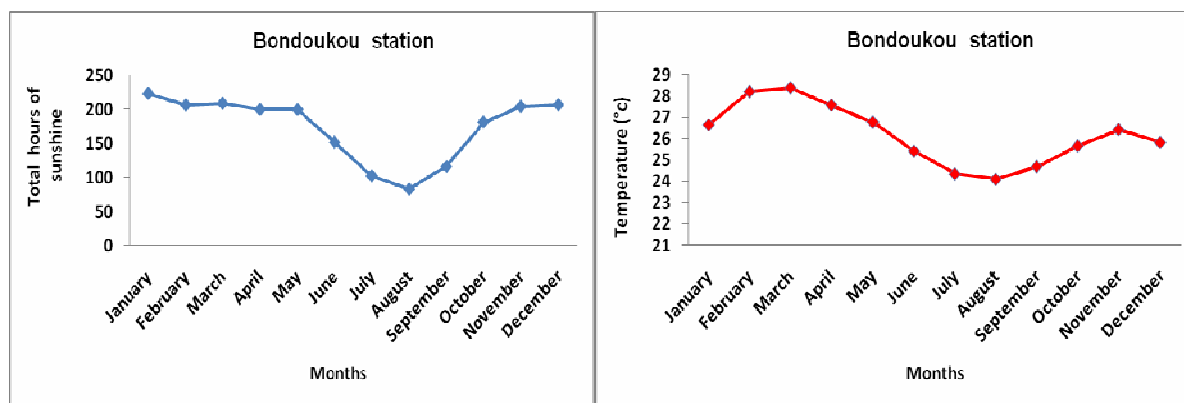


Figure 4: Mean monthly variation of sunshine and temperature at Bondoukou (1968 – 1977) (Cote d’Ivoire)

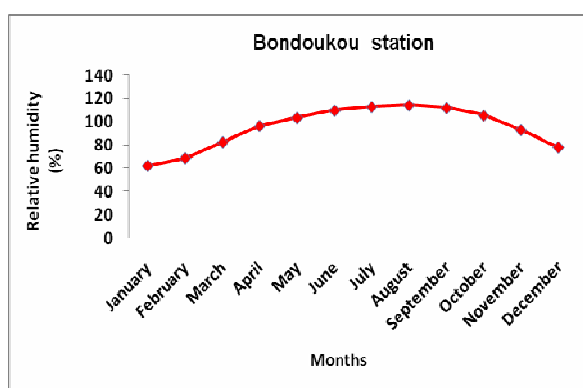


Figure 5: Variation of monthly relative humidity at Bondoukou (Cote d’Ivoire)

Table 1: Some characteristics of annual rainfall for the period 1970 – 2000

Annual rain (mm)	Raingauge (1970-2000)				
	Bondoukou	Bouna	Nassian	Tanda	Tehini
Minimum	749,8	715	630	678	826
Means	1061	993	950	1005	1038
Maximum	1445	1330	1227	1301	1233

2.1.5 Hydrology

- 19 In Ghana, the Black Volta basin covers a total area of 33,302 km². The main tributaries within the proposed experimental area of the Black Volta are Benchi, Chuko, Laboni, Gbalon, Pale and Kamba and their characteristics are as shown in table 2 below. The basin has an average runoff coefficient (RC) of 4.9%, mean annual flow of 218.97 m³/s and annual run off of about 243m³/s. The basin includes portions of the Upper West, Northern and Brong Ahafo regions. Ghana.
- 20 In Cote d’Ivoire, the Black Volta constitutes with its major triburaries (Fako, Kohodio, Bineda, Kolodio and Koulda) the main river of the region of Zanzan (Figure 6). Its area is 13 110 km² with 718 km as perimeter (Table 2).
- 21 The stream flow of the basin in Ghana and Cote d’Ivoire introduces unique flood from August to October followed by a fast exhaustion in November and December. This is the long dry season which coincides with a low period of low flow between January to May where the flow falls to a very weak value as shown in Figures 7 and 8.

Table 2 : Characteristics of Black Volta major tributaries in transboundary basin

Cote d'Ivoire				Ghana		
Name of tributary	Area (Km ²)	Perimeter (Km)	Length (Km)	Name of tributary	Area (Km ²)	Length (Km)
Fako	3,178	78 ,66	28,3	Benchi	1,445	101.7
Kohodio	2,856	250,5	88,2	Chuko	1,668	90.0
Bineda	2,130	236,9	99,0	Laboni	3,266	161.7
Kolodio	1,537	174,3	69,8	Gbalon	1,489	58.3
Koulda	1,487	201,1	88,9	Pale	1,028	56.7
				Kamba	1,303	63.3

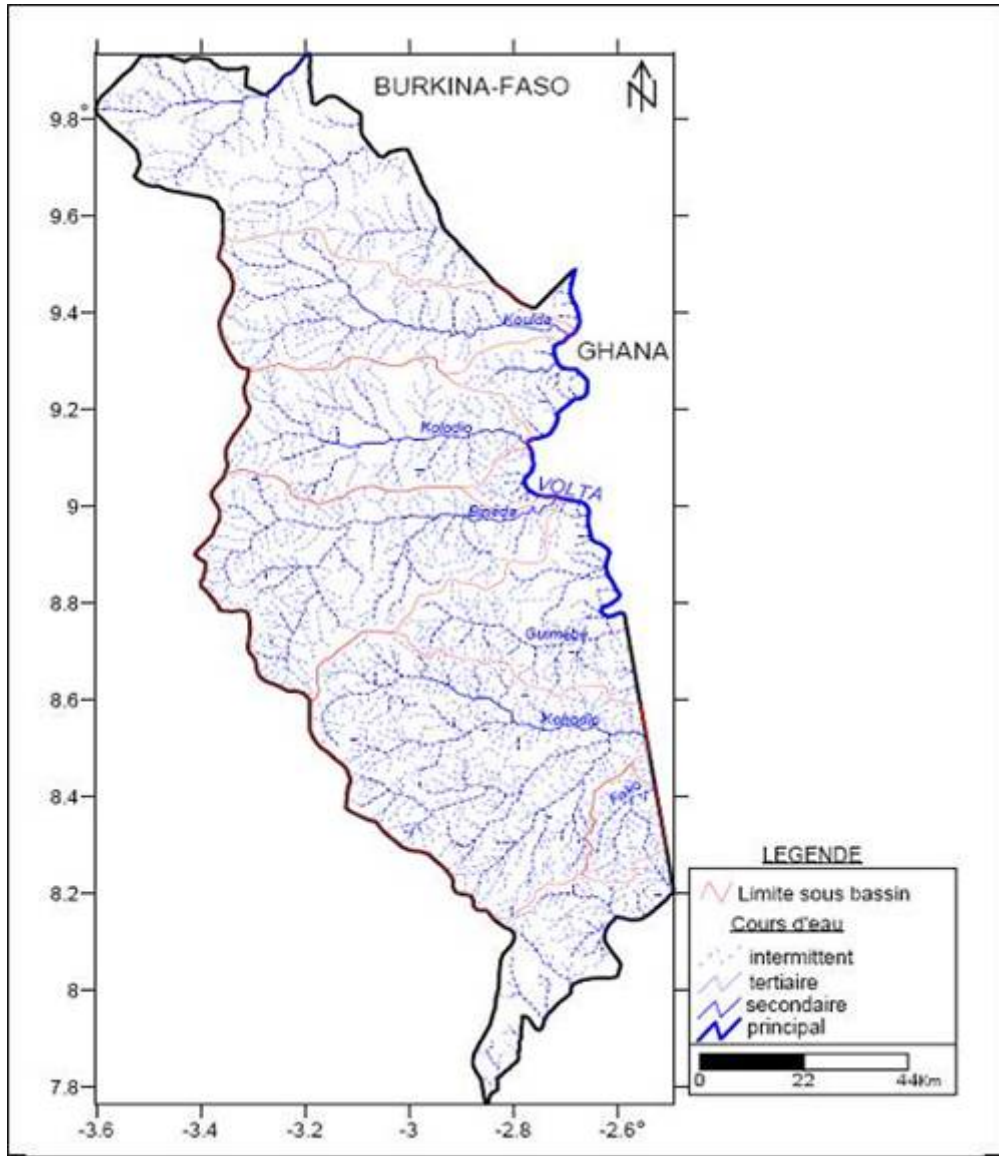


Figure 6: Black Volta sub-watershed in Cote d'Ivoire with Tributaries Rivers

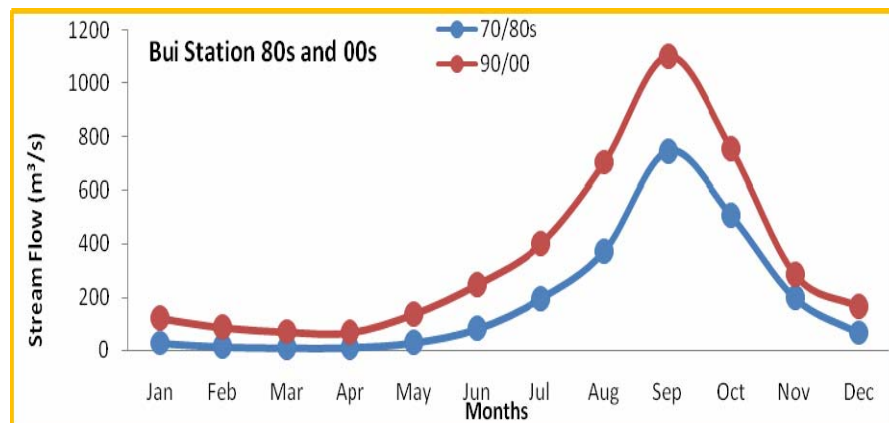


Figure 7: Variation of mean monthly stream flows at Bui station in 80s and 2000s in Ghana

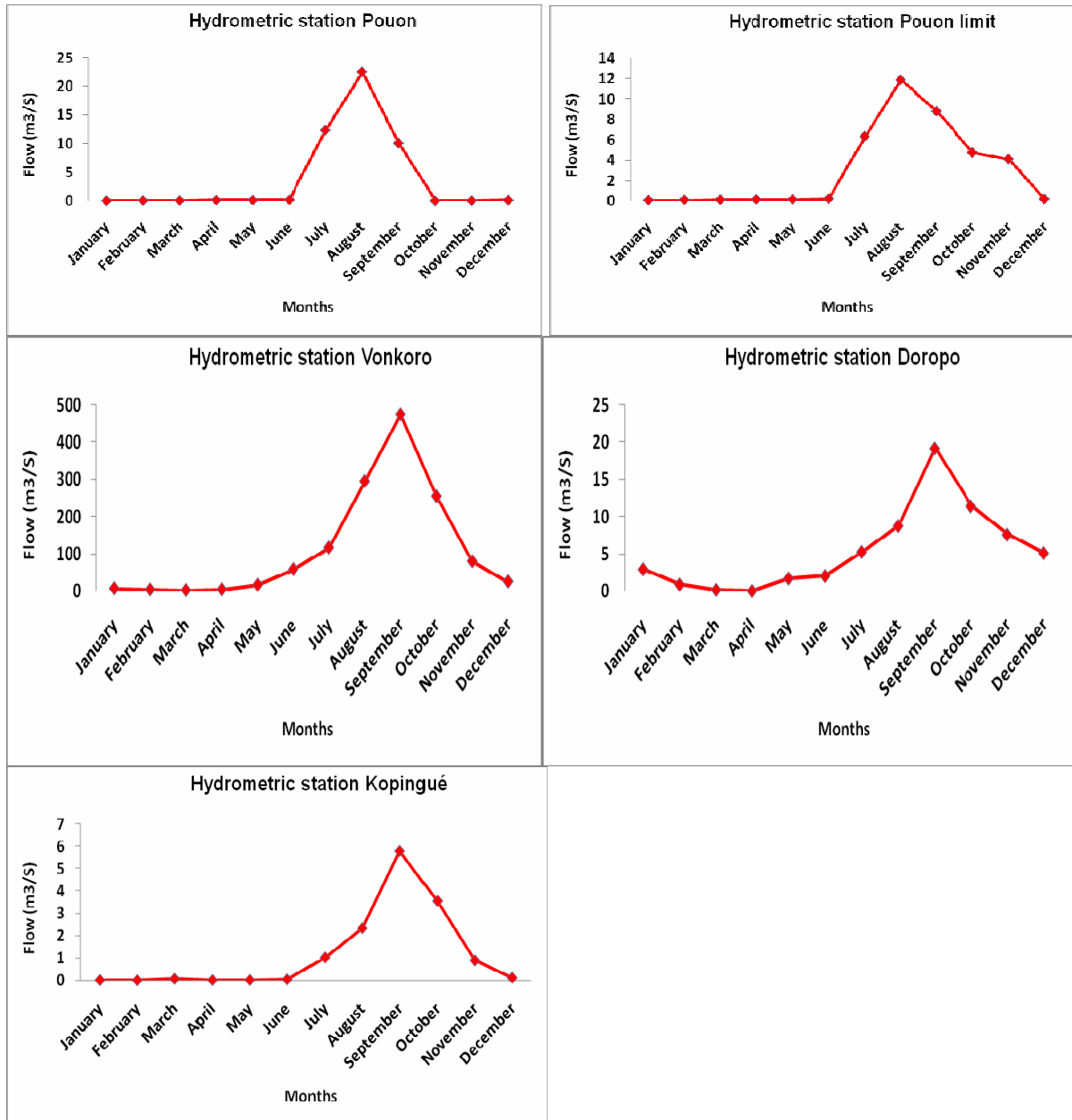


Figure 8: Variation of mean monthly flow at hydrometric stations of Black Volta River in Cote d'Ivoire

2.2 Social and economic characteristics

2.2.1 Population

22 The population within the basin is sparse with a density of about 14 persons per square km in Cote d'Ivoire and 26 persons per square km in Ghana. The department of Bouna recorded 178,769 inhabitants and density of 8 people per km² (INS, 1999). Koulango and Lobi constitute the two biggest communities of Bouna with 20% and 70% total population respectively. The Malinke and the other populations represent 10%. The department of Bondoukou also recorded 293, 416 inhabitants with a density of 29 km² (INS, 1999). Koulango is mostly inhabited by foreigners.

2.2.2 Social and Economical activities

23 Agriculture, including forestry and fishing constitutes the main economic activity of the population (Table 3) which employs more than 80% labour force and provides livelihood. Workers in the administration sector occupy less than 1% of the agricultural population. Transportation, trade and handicraft occupy more than 4.5%. In Ghana, small scale agro-processing activities mostly engaged in by women is shea butter extraction, palm and kernel oil making are also prominent. Other cottage industries include smock, basket and mat weaving.

Table 3 : Economic activities of population in Zanzan region (RNA, 2001)

Department	Industrial and crop agriculture	Craft industry, Transport and trade	Administration	Stock farming: cattle and pig	Others
Bondoukou	79721	4753	736	4246	89456
Bouna	55579	3967	682	13572	73800

2.2.3 Source of domestic energy

24 Firewood is the main source of domestic energy (90.44% of the household energy). The use of charcoal closely follows that of firewood at a level of 5.27% (Table 4). The department of Bondoukou is the first user of firewood in the region with 30 666 households. Charcoal is the source of energy mostly used by households of the department of Bouna. In Ghana, about 95% of the entire rural household use wood as their cooking fuel. Heavy dependence on firewood and the felling of large quantities of trees for charcoal, coupled with the transitional nature of the ecozone has rendered it susceptible to high incidence of deforestation with grave environmental consequences.

Table 4: Distribution of the population according to the sources of domestic energy in Zanzan region

Departments	Population (Inhbt)			
	Firewood	Charcoal	Butane Gaz	Others
BONDOUKOU	30666	1528	184	1716
BOUNA	17288	2664	124	2801
TANDA	29687	332	110	443
Total	77641	4524	481	4961
%	90,44	5,27	0,49	4,90

Table 5: Sources of domestic energy in Northern and Brong Ahafo regions of Ghana

Region	Firewood	Charcoal	LPG
Northern and Brong Ahafo	83%	12%	5%

2.2.4 Agriculture

- 25 The population of farmers in the region of the Zanzan is about 490 463, representing 58% of the total population. At Bondoukou department, cashew, cassava and yam represent respectively 42%, 35% and 15% of cultivated crops (Tables 5 & 6). Cashew, yam, millet and maize constitute respectively 42%, 19%, 14% and 11% of the 47,748 ha cultivated areas in the department of Bouna.
- 26 In Ghana, crop production in the Brong Ahafo and Northern regions of the Black Volta basin contribute 37.5% of yam, 11.3% of cassava, 17.2% of maize and 28.7% of rice with respect to the national totals. Cashew cultivation is currently becoming prominent in the basin. The fishing population along the banks of the river is also increasing with adverse implications for the integrity of the environment as a whole.

Table 6: Crop Cultivated in the basin

Culture	Cote d'Ivoire (Bauna)		Ghana	
	Area (ha)	%	Area (ha)	%
Cashew	20,113	36.7	*	*
Yam	9,161	16.7	15,183	37.5
Millet	6,695	12.2	*	*
Maize	5,392	9.8	1,729	17.2
Cassava	886	1.6	923	11.3
Rice	319	0.6	7,139	28.7
Cotton	175	0.3	*	*
Mango	40	0.1	*	*
Other crops	4,967	9.1	*	*

SRID, MOFA 2000 *data not available

2.3 Climate change and climate variability

- 27 In general, precipitations have decreased in the whole basin since 1970 (Figures 9, 10, 11). This decrease is due to the climatic variability and has some consequences on water resources and biodiversity. From the figure 9 below, there is a general shift of rainfall and number of rain days anomalies from positive (+) to negative (-) from 1960s to 2005. A rather sharp decline was observed in number of rain days anomaly compared to rainfall anomaly. Shifts in both rainfall and number of rain day's anomalies became most prominent from early 70s with consequent effects on forest and water resources.

2.3.1 Environmental impacts of Climate change and climate variability

- 28 The forest and water resources of the basin play a significant role in the socio-economic development of the people. The above mentioned human-induced activities have adverse effect on the soil texture, water resources and the environment in particular. Water quality degradation remains one of the major problems of the basin. Surface water resources are shared throughout the basin, making the degradation of water quality a strongly trans-boundary problem. According to the local communities, mining of alluvial gold from upstream, land clearing along the banks of the Black Volta and the use of chemicals for fishing remain major effluents into the river. These have adversely affected the bacteriological quality of drinking water and fishing, and in effect lowered dissolved oxygen in the river and increased suspension solids making the water more turbid.

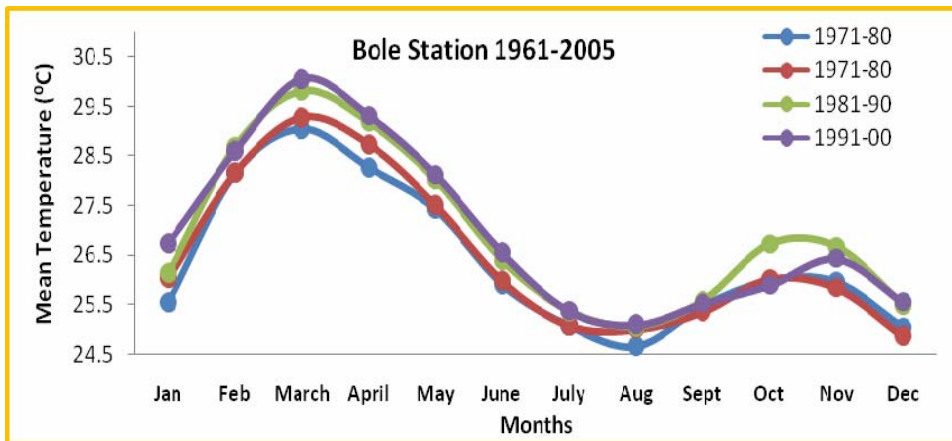


Figure 9: Annual variation of rainfall and temperature at Bole over 1961-2005

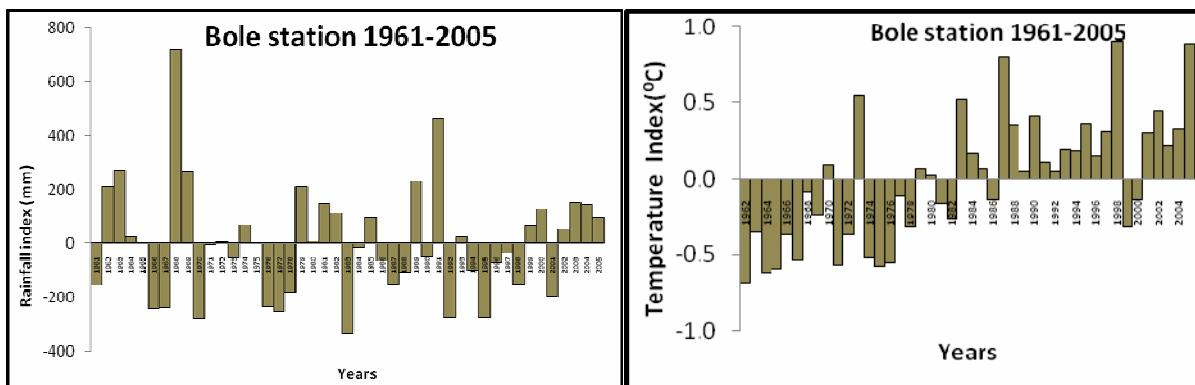


Figure 10: Inter annual variation of rainfall and temperature at Bole station

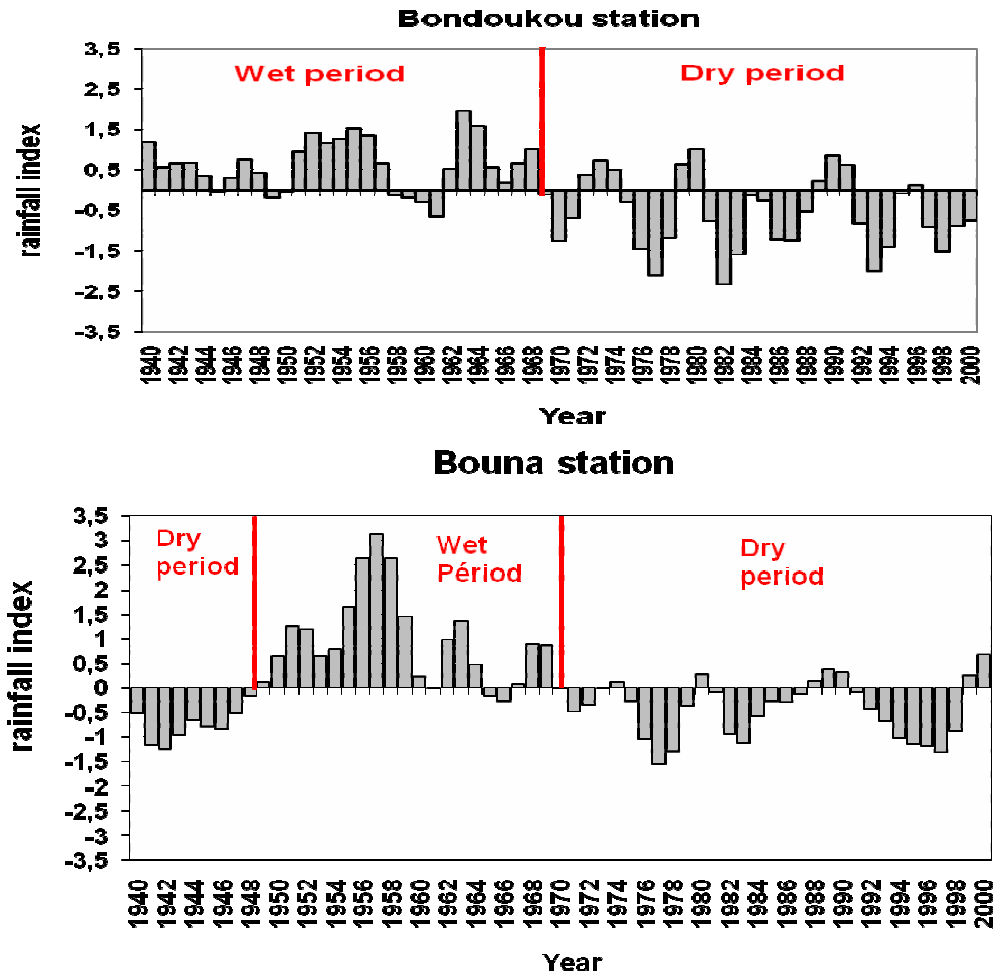


Figure 11: Inter annual variation of rainfall at Bouna and Bondoukou stations

2.3.2 Impacts on water resources

- 29 Surface Water: We observe (Figure 12) that the climate fluctuations affect the river flow through increased runoff, soil loss, erosion and river's sedimentation.
- 30 Ground water: There are no piezometric data on the region, hence the inability to provide opinion on real impacts of climate variability on ground water. The fractured geological structure of the site favours the evaporation (Potential Evapo-transpiration: 1400 mm) leading to drying up of wells during dry periods). This situation was observed in the whole region and accentuated during the dry season since 1970. At Vonkoro hydrometric station, drying up ratio globally decreases since 1980 with an exceptional maximum value in 1990 (0.07/j). Ground water is largely influenced by atmospheric conditions (rainfall, evapo-transpiration) and the geological formations fractured

2.3.3 Impact on vegetation cover

- 31 In Cote d'Ivoire, we note a clean evolution of the deterioration of the different types of leafy canopy on the basin. To the level of the plant, the high savanna was the most affected. Indeed, it ranges from 64.14% to 3.95% in 14 years, with an average of 2.3% per year. The yearly loss corresponds to about 14300 ha of raised savannas that are converted probably into shrubby savannas or farmlands. The shrubby savanna ranges from 19.40% in 1986 to 38,70% in 2000 with an increase of 19.3%. The cultures pass from 4.43% to 15.07% with an increase of 10.64% (Figure 13). These results show that the dynamic of the soil profile is very active in this part of the

country. The effects of the climate change and variability (rainfall decrease, temperature increase) are largely responsible of this situation.

- 32 In Ghana, land degradation is therefore one of the priority issues in the basin. Poverty level is about 45% in the hotspot communities with most of the farmers engaging in charcoal production as a supplement to their farming activities. About 80% of the charcoal produced in the basin is supplied to the urban centres for additional income. The natural vegetation in most parts of the district especially around the settlements has disappeared. What is seen today has resulted from the interference by man and animals through cultivation, grazing and exploitation of firewood. Beyond the major settlements, grass is periodically burnt down especially during the dry season to clear the land of much of the vegetation.
- 33 The 2000 land use land cover maps show a decrease of the forest ecosystem from 58.8 percent in 1985 to 55.9 percent in 2000 with increase in land cultivation by 13.5 per cent.

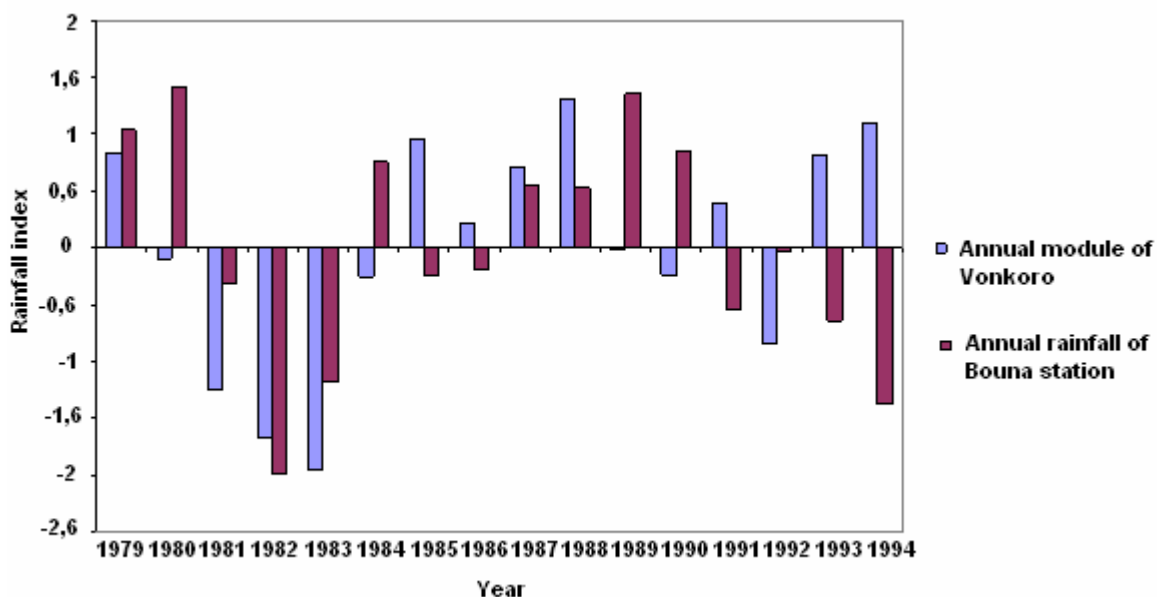


Figure 12: Evolution of annual flow module (Vonkoro) and annual rainfalls (Bouna)

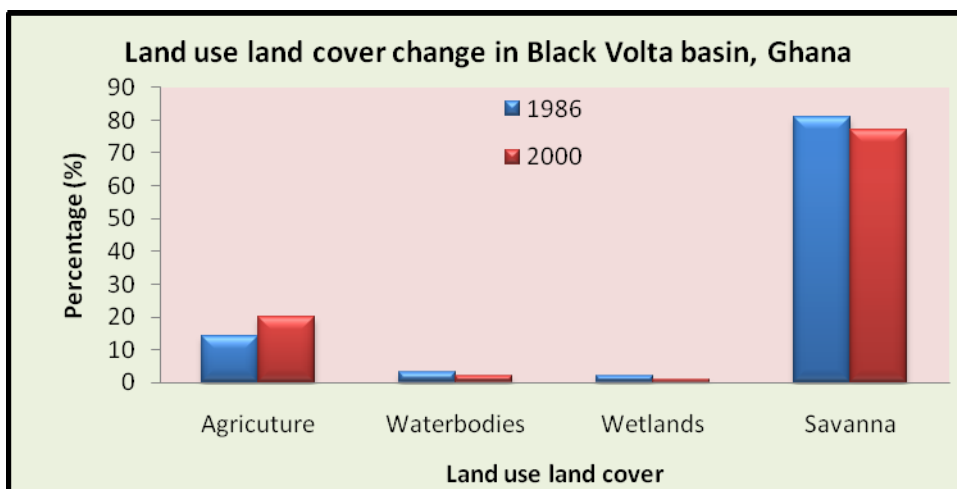


Figure 13: Land use land cover from 1986 to 2000 on black Volta basin in Ghana

2.4 Other types of environmental degradation issues

34 Other types of environmental degradation in the study area are:

- **Erosion and water quality degradation:** The sediments transported by runoff degrade the quality of surface water and give the river a reddish coloration (Figure 11). Current estimates in the Black Volta basin shows that about 23 310 km² of the basin is susceptible to slight-to-moderate sheet erosion; 19 042 km² severe sheet-to-galley erosion; and 23 330 km² very severe sheet and gully erosion. The erosion has affected soil fertility and productivity of crops. Sediments are usually drained through major tributaries during heavy rain falls. The soils found within the basin are deficient in nitrogen and phosphorus, probably due to low organic matter. Few areas have rocky soils, which have low water holding capacities and are therefore limited for agriculture. Most of the soils are degraded with 15.8 t ha⁻¹ soil organic carbon stocks within the top 20cm compare to 27.8 t ha⁻¹ in the forest/savannah zone. It is expected that baseline information will be defined and collected during the inception of the project. Major environmental impacts of water quality degradation were enumerated as loss of biodiversity and fisheries.
- **Reduction in fishing activities:** The climate perturbations greatly affected the aquatic ecosystem. It entailed a reduction of the fishing activity on many Black Volta River and its tributaries.
- **Increasing Sand build-up and erosion:** The different tributaries of Black Volta are affected by sand build-up and silting. This situation is caused by the deposit of sediments during erosion and landslides (Figure 14). The main consequence is the reduction of flow in the river channel.
- **Development of mining activity:** The mining sector is in full development in some zones of the basin (e.g. Boromba at the Cote d'Ivoire - Ghana border in Bondoukou department). The exploitation of the mining pits in the area causes the deterioration of the water tables.



Figure 14: Case of sanding up in river, erosion, degradation and water coloration of Black Volta tributary

2.5 Summary of key water and environmental issues identified

35 The problems can be summarized as follows:

- High demand for wood and felling of large quantities of trees for charcoal/fuelwood for domestic and commercial use;
- Soil degradation, massive erosion, siltation of major tributaries and drying up of water channels;
- The effects of climate change and climate variability on environment (water resources, forest, land use) which modify human activities;
- The degradation of forest and aquatic ecosystems by slash and burn agriculture, bush fires, and excessive use of pesticides contributes to the loss of biodiversity in the area;
- Development of mining activities at the border of the two countries near Bondoukou and upstream of study area in Ghana.

3. Updating of project logframe, activities, work plan and budget

3.1 Project objectives and expected outcomes

36 The overall objective of the demonstration project is to ensure sustainability of water resources in the Black Volta River basin through participative promotion of reforestation that could be replicated across the Volta River Basin.

- The project's specific objectives are to:
 - Reinforce the capacity of stakeholders involved in forest and water resources management issues;
 - Restore and protect pilot plots of land along river channels through experimental and demonstrative actions
- The expected outcomes by year 2 are:
 - Sediments yield into selected river tributaries are reduced by 15-20%;
 - Water retention in the forest area are increased by about 20-25%;
 - Forest landscapes of the pilot plots targeted by the project are restored and protected;
 - Land area surfaces burned by bush fires in selected areas are reduced between 40-50% ;
 - Standing trees use for charcoal production are reduced by between 40-50%
 - Capacity of local stakeholders and national institutions in charge of forest and water resources management strengthened

3.2 Project activities and work plan

37 The main activities required to reach these expected outcomes are summarized as follow:

- reinforce the capacity of stakeholders involved in forest and water resources management issues:
 - Establish the project management team, monitoring systems and organize meetings at national and bilateral levels;
 - Identify training needs, train and organise training sessions on sustainable forestry and water resources management for national institutions and NGOs
 - Develop awareness and campaigns materials and organise awareness sessions on forest and water resources protection and management;
 - Train charcoal producer groups on efficient charcoal production
 - Monitor hydrological parameters of selected tributaries about sediments yield;
 - Organise awareness campaigns for the establishment of local committees for bush fire control.
- Restore and protect pilot plots of land along river channels through experimental and demonstrative actions:
 - Remove sediments by dredging identified spots of river beds and restore river embankment along the tributaries;
 - Reforest degraded forested areas river bank with fuel wood and develop plans for their management
 - Construct firewalls/green belts around the reforested plot of land;
 - Select two localities per country as experimental sites to monitor hydrology and forestry parameters;

38 The activities of the project are planned for two years and the annex C presents the details.

3.3 Selected project implementation sites

39 Experts from the two countries have confirmed major environmental problems at both sides of the border as described in part 2 and summarized in table 7 below. However, selection of final pilot sites will be done in agreement with land-owners, following traditional and customary laws of the

affected communities. The involvement of local and national institution representatives will be necessary to facilitate this negotiation.

- 40 In Cote d'Ivoire, within the framework of the demonstration project it is appropriate to choose the Bondoukou and the Bouna department as the target areas. The social-political crisis in Cote d'Ivoire is now easing-off, allowing access to Bouna areas. The main tributaries in the two departments are to be selected as the site for demo project. The Bouna department in the North is now accessible for effective project monitoring.
- 41 In Ghana, the tentative selection of the hotspots communities for the demonstration project was greatly influenced by the construction of the Bui dam. The community areas near sites to be selected shall consist of Ntereso, Insunia, Chache, Senyeri and Saru all in Bole and Sawla/Tuna/Kalba districts in the Northern Region as shown in figure15 below. Tributaries that are closer to these sites would be targeted for restoration.
- 42 According to the environmental and social impact of the Bui dam project, the current selected areas around Ntereso, Insunia, Chache, Senyeri and Saru may not be inundated by the dam, and hence the project could be carried out successfully. According to the Bui Dam Authority, an estimated 440 km² representing 21% of the total areas of Bui national park will become a permanent lake and could affect the Brong Ahafo region of the sites originally proposed.
- 43 The table 7 and figure 15 below shows the identified hotspots areas in Côte d'Ivoire and Ghana and the ecological considerations related to each of them.

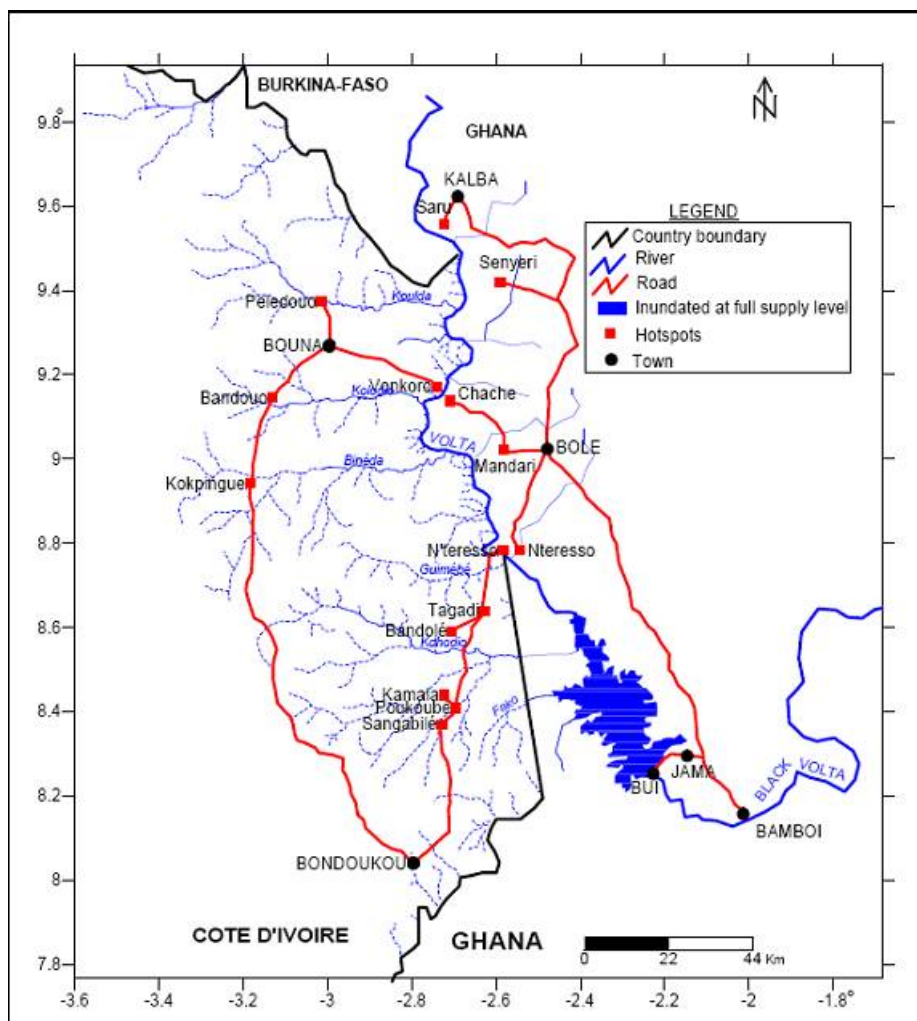


Figure 15: Location of hot spots in Ghana and Cote d'Ivoire

Table 7: Problems with management of natural resources in relation to identified hotspots

Problems	Community Areas (Hot spots)		Main causes
	Côte d'Ivoire	Ghana	
<ul style="list-style-type: none"> • Degradation of the forest • Increase of the run-off from rain water • Reduction of the seepage • Silting-up of water courses • Reduction of the yields of the agricultural productivities • Degradation of the water quality • Degradation of ecological habitats (in particular hippopotamus) and loss of biodiversity • Reduction of surface water and groundwater • Increase in demand for fuel wood • Loss of vegetation cover • Increased soil erosion • Siltation of waterways • Reduced water infiltration into soils 	<p>Zanzan Region, District of Bondoukou</p> <p>Sangabilé (Kohodio) Kamala (Kohodio) Poukoubé (Kohodio) Bandole (Kohodio) Tagadi – N'teresso (Guimebe)</p> <p>Bouna</p> <p>Peledouo (Koulda) Bandouo (Kolodio) Kokpingue (Bineda) Vonkoro (Volta Noire)</p>	<p>Bole and Sawla/Tuna/Kalba District in Northern Region</p> <p>Ntereso Insunia Chache Senyeri Saru</p>	<ul style="list-style-type: none"> • Clearing of forests for farming activities • Pollution of the river and its tributaries by pesticides and due to mining of alluvial gold • Destruction of the plant cover by forest fires • Destruction of habitats along the water courses of the basin • Increased evaporation and drying-out of the soil • Poverty of the riparian populations • Encroachment of farming into the catchment area along the river bank • Felling of large quantities of fuel wood, charcoal burning and illegal chain saw operations • Wildfire destruction of flora and fauna • Destruction of biodiversity hotspots along the basin • Increased livestock population

3.4 Project budget and funding considerations

3.4.1 Project budget

44 The budget of the project has been increased to 265 000 \$US with adjustment across different components (annex D). Reasons for modifications of the budget are based on the need to :

- Have autonomous administrative offices for Ghana and Côte d'Ivoire, each headed by a Project Manager, in view of the transportation and movement constraint at the terrain;
- The adjustment to the cost of some components to take into account the economic situation and the decrease of the USD value compare to the PDF-B phase.

3.4.2 Co-Funding

45 The co-funding will be contributed through:

- the participation of national institutions of the two countries consisting of in-kind support of technical staff from the decentralised departments,
- the wood manufacturers in Côte d'Ivoire,
- the contributions of the local NGOs (as working time of their members).

46 The majority of the co-funding from the countries will come from the reforestation activities. In fact, out of the 200 hectares of planned reforestation, 100 hectares are proposed to be entirely financed by the wood manufacturers in Côte d'Ivoire for the benefit of the local populations in the project area, under the supervision of the project and in fulfillment of the project objectives as required by the forestry reform in Côte d'Ivoire.

47 GEF would only finance 100 hectares equitably distributed between Ghana and Côte d'Ivoire. Some activities will be implemented in the framework of the overall VRB Project (Core project). They are referenced as "Core project" in the budget below.

4. Linkage to National/Regional Priorities and Programs

4.1 Linkage to National/Regional Priorities and Programs: Cote d'Ivoire

48 The reduction of forest area from 16 million hectares in the fifties to 3 million hectares at present compels authorities to adopt some political, institutional, legal and financial mechanisms. The project has linkages with national priorities, programs, legal and institutional frameworks as follows:

- In 1988, the Forest Guidelines covering the period 1988 – 2015 was adopted. Its main result is the Sector Forest Project;
- In 1994, the decree no. 94-368 introduced the reform of forestry in rural areas resulting in:
 - allocation of forestry areas (PEF) of at least 25,000 hectares;
 - Introduction of contributions to local development for the benefit of the riparian population of the PEFs; and introduction of the obligation for recipients of PEF to reforest.
- In 1995, the National Environment Actions Plan for the period 1995 -20015 proposed strategies for environment protection and natural resources management;
- In 1996 and 1998 the environmental and water laws were respectively adopted followed by the integrated water resources management master plan in 2000;
- In 2000, national constitution adopted general legal framework of environment protection;
- In 2009, the Strategy Document for Poverty Reduction (DSRP) is finally elaborated and includes reforestation process across the country.

49 Actually, there are no major ongoing projects in the region of Zanzan because of the social-political crisis but some programs have been implemented by national institutions (agriculture, environment, water and forest), and NGOs (World Food Program, CARE, Local RED CROSS,).

50 At regional level, the demo project “DP 3” corresponds to the initiatives of Volta Basin Authority through different projects such as Volta Hycos.

4.2 Linkage to National/Regional Priorities and Programs: Ghana

51 Since 2001 the government of Ghana has been implementing a national tree planting programme covering approximately 20 000 hectares per year. The purpose of this project is to ensure that within a five- year period 10% of the land will be covered by forests. This would consequently make up for the lack of timber in the wood industry, ensure the protection of water, guarantee the supply of food and ensure the protection of the environment.

52 After the severe drought of 1982 the bush fires have become a recurrent phenomenon in Ghana. They affect all types of ecosystems in the country regardless of the intensity of the dry season. Bush fires are therefore considered to be one of the most important factors responsible for the loss of soil fertility and soil input into the water bodies as well as for the destruction of the biological diversity.

53 In order to remedy this, the Ghana Forestry Commission has initiated a monitoring project for bush fires in the transition zones. This project aims to promote the participation of the communities in the sustainable management of natural resources. It has among other things been used to test the program for poverty reduction implemented by the Ghanaian government during the period from 2003 to 2005.

5. Project Management Structure

5.1 Institutional framework

54 The main components of the institutional framework are:

- Project Steering Committee (PSC);

- Project Implementing Partners (PIP);
- Hosting/Executing Institution (HI);
- Bilateral Steering committee;
- Project Management Team (PMT).

5.1.1 Project Steering Committee (PSC)

55 In Cote d'Ivoire, local project steering committee will be composed as follow:

- Regional Prefect of Zanzan (Bondoukou and Bouna)
- Sub-Prefects of administrative departments of Zanzan region;
- Presidents of Local Council (Bouna and Bondoukou);
- Mayors of Zanzan towns;
- Regional Director of Agriculture;
- Regional Director of Environment, Water and Forest ;
- Regional Director of Animal Production and Fish ;
- Regional Director of Industry and Private Sector ;
- Regional Director of Mines and Energy
- National Coordinator of the GEF VOLTA project;
- A Representative of NGO from each District of national portion of Volta river basin;
- Local Communities (Associations of youth and women)
- ANADER;
- CNRA (National Centre of Agriculture Research)

56 Ghana local project steering committee will consist of regional representatives, when available, of the following institutions:

- Water Resources Commission
- Forest Service Division of Forestry Commission (FSD-FC)
- Ministry of Food and Agriculture MOFA
- Partnership in Development (PAPADEV)
- Customary Land Secretariat-Traditional Authority (CLS-TA)
- Environmental Protection Agency
- District Assemblies of concerned communities (NCCE, Water & Sanitation)
- Ghana National Fire Service (GNFS)

5.1.2 Project Implementation Partners (PIP)

56 The lead implementing partners shall coordinate the project at national level and are to serve as interface between the project and different agencies involved in the project, and with the PMU (Accra), the local as well as the bilateral steering committees.

57 In Ghana, this will include: Environmental Protection Agency (EPA), Forest Service Division of Forestry Commission (FSD/FC), Ministry of Food and Agriculture (MOFA), Ghana National Fire Service (GNFS), Bole and Sawla/Tuna District Assemblies (Bole and Sawla/Tuna-DAs), Customary Land Secretariat/Traditional Authorities (CLS/TA), National Commission on Civic Education (NCCE) and Partnership in Development (PAPADEV) a local Non Governmental Organization (NGO).

Table 8: Project Implementation Partner in Ghana

Potential Members	Role	Expected support
Water Resources Commission	-Monitor key performance indicators and reporting -Lead in project implementation	-periodic reports on project activities
FSD-FC	-Identify and mobilise and register local charcoal producers- Build capacity of women in tree nursery development -Provide seeds and seedlings -Assist in delineation hotspots for reforestation -Assist community in land preparation, pegging, tree planting, weeding and plantation development -Provide technical services in woodlot development -Support the creation of fire/green belts	-Reduction in tree felling and degradation of river basin -Restoration of degraded forest landscapes -Protection of biodiversity and water resources
MOFA	- Provide support for training on agro-forestry practices and on concept of agriculture without burning/fires	Awareness on impact of human-induced activities and the need for environmental protection
PAPADEV-NGO / (NCCE to be involved in Information dissemination)	-Mobilise and create community awareness on degradation of river basin with posters and flies -Sensitise communities on impacts on cultivation and settlement in 30-metre buffer zone -Train charcoal producers on new technology for charcoal production -Educate communities on impact of use of chemicals in fishing and mining in the basin -Develop posters on charcoal burning and bushfires -Train charcoal producers on new technology for charcoal production	Awareness on basin degradation. Training of local communities on improved livelihood activities and encouraged in the implementation of sustainable utilization of natural resources. Awareness on impact of human-induced activities and the need for environmental protection
Bole and Sawla/Tuna/ Kalba, Brong Ahafo-District Assemblies	-Provide enabling environment for project implementation -Pass by-laws on protection of basin -Mobilise women participation in project implementation -Incorporate the project activities into the action programmes of local community/District action plans	Women involvement in implementation. Awaking of environmental consciousness in the districts
GNFS	-Develop materials on impact of bushfires -Establish and train bushfire volunteers -Organise radio programmes on bushfires	Reduction of bushfires and Success stories of no-burning concept
Project Areas Communities	-Assist in delineation of sites -Participate in tree nursery establishment -Participate in dredging of major tributaries -Support reforestation and protection of basin -Produce fence-baskets to protect tree seedlings -Assist in creation fire belts -Form volunteer for fire detection and suppression -Mobilise community on improved livelihood projects	Restoration of forest landscape. Capacity building, awareness creation and poverty reduction

58 In Cote d'Ivoire, the PIP will be composed of representatives of ANADER, CNRA, University of Abobo-Adjame, Local NGOs, Local representations of Ministry of Agriculture, Ministry of Animal Production and fisheries, SODEFOR, Private wood Company, National Ivorian Committee of Forest Protection and Control of bush fires, local associations of youth and women.

Table 9: Project implementation partners in Cote d'Ivoire

Potential members	Role	Expected support
DRE	-Monitor key performance indicators and reporting -Lead in project implementation	-periodic reports on project activities
Riparian populations	-Establishment of tree breeding -Detection and fight against the bush fires -Agro-forestry activities and dredging of river beds	Poverty reduction Environmental management capacity building Restoration of the environment
DREF Bondoukou; CNRA-ANADER	-Training on the impacts of bush fire on the soil in cultivated areas -Training on the concept of agriculture without land-burning/fires -Training on new technology for charcoal production	Restoration of the soil fertility, reduction of the erosion. Reduction of fires and their impact on the soil
DREF - SODEFOR	-Supply of planting materials, -Support for the establishment of land for planting -Support for planting of seedlings	Restoration of Forest landscapes Protection of soils, wild fauna habitats and water resources
University of Abobo-Adjamé	-Monitoring and scientific study on hydrology and forestry	Development of scientific tools for monitoring environmental management
NGOs; Local association for women and youths; Local Agriculture Organization	-Mobilisation and awareness raising of the communities -Training on protection of water against pesticides	Restoration of Forest landscapes awareness creation programmes on environmental issues
	-Training on agro-forest practices	Capacity building of local population
Local Authorities, Town councils	-Enactment of law on protection of the basins -Consideration of environmental projects in the action programmes of the local communities	Restoration of forest landscapes Appropriation of environmental protection practices by communities
National Ivorian Committee of Forest protection and control of bush fires	-Establishment of local committees for combating fires, -Introduction of a national radio and TV programme for awareness raising against bush fires	Reduction of bush fires Success of the “no fire” concept

5.1.3 Implementing Agency and Hosting institution (HI)

- 59 The hosting institution shall be based in the region where the project will be implemented; in priority the regional representation of the Ministry corresponding to the implementing agency. This agency/institution will be responsible for supporting the project implementing team, supervises the project activities and facilitates contacts with local stakeholders and beneficiaries.
- 60 In Cote d’Ivoire, DRE (Direction des Ressources en Eau) will act as the lead implementing partner and sign a MOU with UNOPS for the project management. The hosting agency for the PMT is the Regional Directorate of Environment, Water and forest at Bondoukou. A separate project account will be opened and managed by Regional Directorate at Bondoukou with a joint signatory of the recruited project manager-CI.
- 61 In Ghana, Water Resource Commission (WRC) will act as the lead implementation partner and also sign a memorandum of understanding (MOU) with UNOPS for the management of the project. The Project Management Team will be hosted by Forest Service Division of Forestry Commission (FSD-FC) at Bole due to availability of infrastructures. A separate project account will be opened and managed by WRC with a joint signatory of the recruited project manager-Ghana.
- 62 The GEF Volta project shall recruit a consultant to conduct Project Planning Workshop with all the project implementation partners in order to agree on detailed activities, workplan and budget for project partners. The final MOU to be signed shall be based upon the output of these workshops.

63 Financial releases to project implementation partners shall be through the project implementation leader and shall take into consideration the half-yearly report and approved workplan and budget, subject to the approval of the countries National Project Coordinator for the GEF Project, the GEF Volta PMU and overall UNOPS procedures.

5.1.4 Bilateral Steering Committee

64 In each country, a seven (7) team local steering committee will be established. The committee will advise the implementing team on key issues and monitoring activities of the project. The composition of the committee shall vary with each country and depends on local representations of national institutions, NGOs, populations, etc. Final decision of the composition will be taken by National Focal Point taking into account the involvement of all stakeholders. The two (2) Committees from each country will constitute the Bilateral Committee. The Project Managers from each country will be ex-officio members and co-chair Committee meetings.

65 The Committee will represent the local people in the project area to participate in basin management as follows:

- DCEs (District Chief Executives or Regional Prefect) ;
- Local Chiefs ;
- National Focal Point office ;
- 3 Reps of relevant institutions based on the topic (at least one (1) woman) ;
- 1 NGO representative.

5.1.5 Project Management Team

66 A project Implementation Team to be established is as follows:

- A full-time Project Manager, appointed by the Cote d'Ivoire Administration in collaboration with PMU;
- A full-time Project Manager, appointed by the Ghanaian Administration in collaboration with PMU.
- Two part-time bilingual Administrative Assistants/Secretaries: One in CI (placed next to the Project Manager-CI), responsible for all administrative and financial activities. The second will be positioned in Ghana (placed next to the Project Manager-GH), responsible for all administrative and financial activities.
- Two part-time drivers made available by the national institutions/administrations.

67 The Project Implementation Team shall report directly to the national implementing institution. The national implementing institution/agency shall be responsible for maintaining direct relationship with the host institution where different.

68 The day to day management of the project will be made by the project implementing team. The monitoring of implementation activities shall be based on quarterly PIP report and joint periodic reports prepared by the project managers in Cote d'Ivoire and Ghana under the responsibility of the National Coordinators of the overall GEF Volta Project of the two countries in collaboration with other implementing partners.

69 The quarterly work plan and activity report must be submitted to the lead implementing agency and the PMU and the yearly report about activities and financial issues shall be discussed during bilateral steering committee.

70 The Project Implementation Teams shall be based at Bondoukou and Bole in Cote d'Ivoire and Ghana respectively.

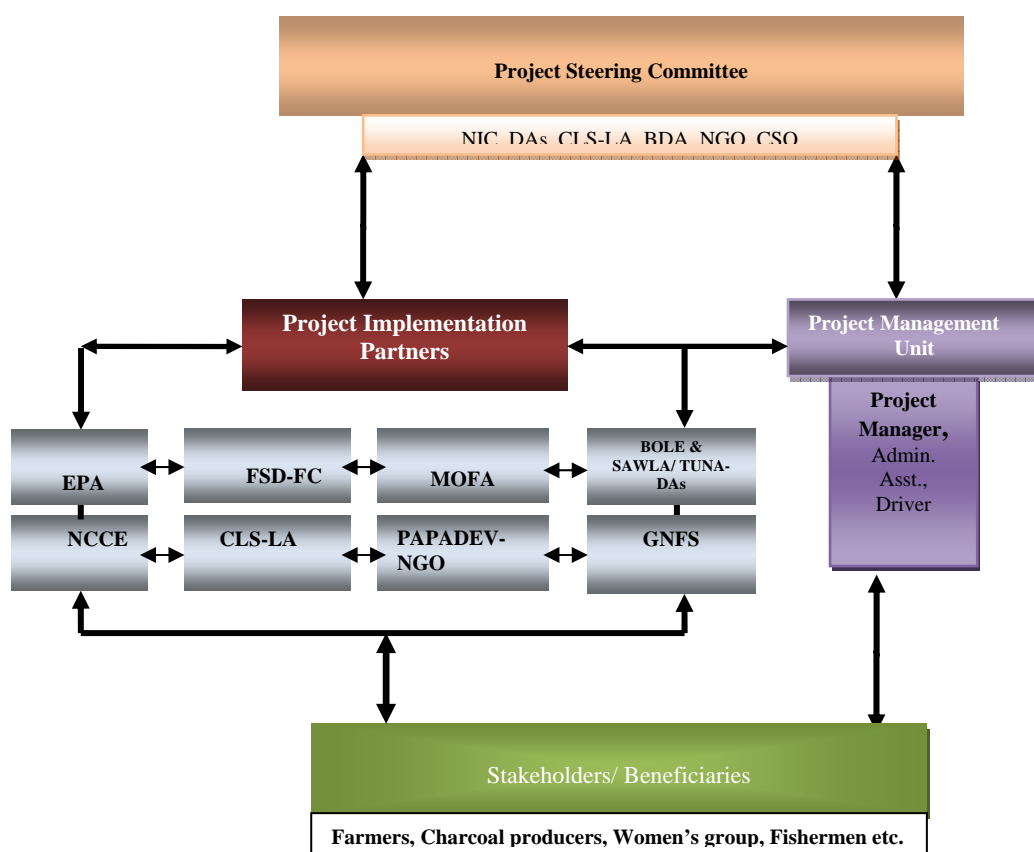


Figure 16: Project Management Structure in Ghana

5.2 Beneficiaries

- 71 The beneficiaries are the rural communities in Côte d’Ivoire and Ghana living in the demonstrated areas and the hotspots (Table 7) which have been selected for implementing the demonstration project 3.
- 72 The native populations (land-owners) as well as the non-indigenous populations should profit from the effects of the project. The project is going to work with these communities through their women associations with women and young people executing specific tasks: the associations of women will be mostly involved in the production of plant material while the men will be exclusively employed by preparing the land for reforestation, by river dredging, by silvi-cultural works, etc. Some work will be done by mixed teams. The selection of direct beneficiaries should be done according to the impartial criteria guaranteeing a complete participation of the populations directly concerned with the project.
- 73 From the Ghanaian side, approximately 200 agricultural families spread over the targeted “areas” – where at least 30% of woman playing the role of head of the family – shall participate directly in the implementation of the project. For sustainability of the project, each community will be engaged in improved livelihood projects such as efficient charcoal production. Other livelihood activities that could be beneficial to the communities would be encouraged based on experience from previous projects and lessons learnt.
- 74 The project approach allows smallholder farming-communities, living in the vicinity of the Black Volta River and major tributaries to participate in collaborative watershed management in which they could allocate between 10% and 30% of their land estates along the Black Volta River for restoration, protection and livelihood schemes without suffering appreciable financial losses. This

would bring direct participation of fringe communities in collaborative forestry resource management as a means of protecting watershed and enhancing beneficiary incomes, food security and poverty reduction. The beneficial communities would include Ntereso, Insunia, Chache, Senyeri and Saru in Bole and Sawla district in the Northern Region of Ghana.

- 75 The project's target beneficiaries are smallholder farmers living on the fringes of the Black Volta basin – men, women and their families, many of whom are landowners, farmers and fishermen whose lands have been assigned to them through traditional rulers. They also include migrant farmers (Ewes and Dagartis) who cultivate land under various sharecropping arrangements. The selection of direct beneficiaries was considered to ensure that the proportion of participating women is not less than 20%. The women association will be mostly involved in the production of plants material while the men will be exclusively employed for preparing the land for reforestation, river dredging and silvicultural works among others. Selection of key activities shall be done by mixed teams, especially nursery establishment, fire detection and suppression, transplanting, thinning and other silvi-cultural management practices. The project will facilitate and strengthen these groups.
- 76 From Côte d'Ivoire the targeted beneficiaries have already been regrouped into active organisations in the field (Bouna and Bondoukou departments):
- Local authorities, town councils;
 - Associations of women;
 - Associations of young people;
 - Land-owners, farmers and fishermen;
 - Bush fire Volunteers;
 - Charcoal producers.

5.3 Monitoring and Evaluation Process

- 77 The monitoring and evaluation will be based on reporting, visual inspection, workshops and seminar reports submitted to the GEF Volta Project. Details of the indicators are provided in the project logical framework below.
- 78 The day to day monitoring of the project will be made by the executing agencies offices in Côte d'Ivoire and Ghana. Periodic monitoring by the overall GEF Project, through the Regional Coordination, shall be based on harmonised periodic reports elaborated under the responsibility of the Project Manager of Cote d'Ivoire and support of Project Manager-Ghana, in collaboration with other people involved in the project (National Focal Points, National Operational Focal Point, etc.).
- 79 The stress reduction indicators (annex C) have been defined with the plan to determine or assess them in the fields and specifically at hotspot areas. The different selected parameters are measurable directly and will be verified during implementation using appropriate hydrological approaches.

Table 10: List of the various reports to be produced by the demonstration project for monitoring and evaluation work plan

Activity/Reporting	Time/ Frequency	Responsible Institution
Quarterly workplan	3 months	Implementing agencies (CI & GH)
Minutes and reports of meetings	3 months	Project Managers (implementing team)
Half-Yearly activity report	6 months	National Operational Focal Point Project Manager
Yearly activity report	1 year	National Operational Focal Point Project Manager
Financial report	6 month; 1 year	Project Managers/ Administrative Assistants; Implementing Agencies Accountant
Technical reports	Technical studies	Project Manager; National Operational Focal Point
End of Project report	Once	National Operational Focal Point Project Manager



6. Annexes

6.1 Annex A: Bibliography

- 80 PNUD & MINISTERE du Plan et du Développement « Tableau de Bord Social Côte d'Ivoire 2003 – Tome 1: Analyses Thématiques » ; 2004.
- 81 PNUD & MINISTERE du Plan et du Développement « Tableau de Bord Social Côte d'Ivoire 2003 – Tome 2: Note Méthodologique et Base et Données » ; 2004.
- 82 PNUD & MINISTERE du Plan et du Développement « Tableau de Bord Social Côte d'Ivoire 2003 –Tome 3: Note de synthèse » ; 2004.
- 83 EXPERCO Int. & Ministère de l'Agriculture et des Ressources Animales « Etude relative à l'élaboration d'un plan de développement de l'irrigation Phase 1 – Vol. 1: Bilan et Diagnostic de l'existant » ; 2003
- 84 EXPERCO Int. & Ministère de l'Agriculture et des Ressources Animales « Etude relative à l'élaboration d'un plan de développement de l'irrigation Phase 1 – Vol. 2: Préliminaire & Bilan Diagnostic du potentiel » ; 2003.

6.2 Annex B: Updated Logframe of the Demo Project # DP3

Intervention Logic	Objectively verifiable indicators	Sources of verification	Assumptions and risks	Observations
Project's overall objective: Sustainability of water resources in the Black Volta River basin through participative campaigns of reforestation	• Sediment yield into selected rivers reduced by 20% (by year 2)	• Reports of bathymetric measures • Hydrological data	<ul style="list-style-type: none"> • Project capacity to develop and implement successful communication strategy • Commitment of local & central authorities • Motivation of civil servants • Participation of populations • Social-political situation not improved in Bouna department 	• To be confirmed during the inception phase
	• Water retention in the forest area increased by 25% (by year 2)	• Reports of hydrological measures		• To be confirmed during the inception phase
	• Forest landscapes of the pilot plots targeted by the project are restored and protected by year 2	• NFP, NIC, Project and Field visits reports		
	• Surfaces burned by bush fires in selected areas are reduced by 50% (by year 2)	• PMU, NFP, NIC, Project and Field visits reports		
	• Capacity of local stakeholder and national institutions in charge of forest and water resources management strengthened	• Training packages • Workshops, Awareness raising campaigns and training sessions reports		
Outputs / Results corresponding to Immediate Objective n° 1: Reinforce the capacity of stakeholders involved in forest and water resources issues				
Intervention Logic	Objectively verifiable indicators	Sources of verification	Assumptions and risks	Observations
1.1 Demo project management established including project monitoring and evaluation plan	• Demo project management bodies established and functional by year 1	<ul style="list-style-type: none"> • NFP reports • Contracts signed by personnel • Acts of nomination • Minutes of meetings 	<ul style="list-style-type: none"> • Commitment of local & central authorities • The two countries failing to participate fully and actively to ensure project success 	
	• Convention of collaboration prepared and signed with governments of Côte d'Ivoire and Ghana by year 1	• Signed conventions		
	• Baseline situation and quantified targets defined during project inception phase	<ul style="list-style-type: none"> • NFP, NIC reports • Inception report and M&E plan (demo project 3) • Study reports 		

Intervention Logic	Objectively verifiable indicators	Sources of verification	Assumptions and risks	Observations
1.2 Capacity of national institutions and NGOs in charge of forest and water resources management strengthened	<ul style="list-style-type: none"> • Training needs for forest and water resources management identified; training plan developed and implemented for technical staff in the two countries by year 1 	<ul style="list-style-type: none"> • NFP, NIC reports • Training packages • Training reports 	<ul style="list-style-type: none"> • Project capacity to develop and implement successful communication strategy • Motivation of civil servants • Willingness of national and local authorities to enhance the capacity of their staff 	
	<ul style="list-style-type: none"> • Categories and number of staff trained in the key institutions by year 1 	<ul style="list-style-type: none"> • Workshops and training sessions reports 		
1.3 Local stakeholders are conscious of forest and water resources issues and involved in their management/protection	<ul style="list-style-type: none"> • Awareness raising material on forest and water resources management developed and awareness raising campaigns planned and conducted in the two countries by year 1 	<ul style="list-style-type: none"> • NFP, NIC reports • Awareness raising packages • Awareness raising campaigns reports 	<ul style="list-style-type: none"> • Project capacity to develop and implement successful communication strategy • Participation of populations 	
	<ul style="list-style-type: none"> • Number and categories of stakeholders involved in the project activities 	<ul style="list-style-type: none"> • NFP, NIC reports • Local stakeholder groups 		
1.4 Capacity of local population strengthened in alternative livelihood activities	<ul style="list-style-type: none"> • 30% of women in hotspots communities trained in alternative livelihood activities by year 2 	<ul style="list-style-type: none"> • Workshops and training sessions reports • Field visits reports 	<ul style="list-style-type: none"> • Participation of local populations 	
Outputs / Results corresponding to Immediate Objective n° 2: Restoration/protection of pilot plots of land through experimental and demonstrative actions				
2.1 A limited number of hot spots of river beds restored	<ul style="list-style-type: none"> • Volume of sediments removed from the most critical hot spots of river beds by year 1 	<ul style="list-style-type: none"> • NFP, NIC, Project and Field visits reports 	<ul style="list-style-type: none"> • Awareness and participation of populations and local authorities 	
	<ul style="list-style-type: none"> • 10 km of river embankment restored by year 1 	<ul style="list-style-type: none"> • NFP, NIC, Project and Field visits reports 		
2.2 The forest landscapes of the pilot plots targeted by the project are restored/protected	<ul style="list-style-type: none"> • 200 hectares of selected plots of lands reforested and maintained by year 2 	<ul style="list-style-type: none"> • NFP, NIC reports • Projects reports • Field visits reports 	<ul style="list-style-type: none"> • Commitment of Forest Companies • Involvement of riparian populations and local authorities 	<ul style="list-style-type: none"> • 100 ha financed by Ivorian Forest Companies and 100 ha financed by GEF: approx. 50 ha in each Country



Intervention Logic	Objectively verifiable indicators	Sources of verification	Assumptions and risks	Observations
	<ul style="list-style-type: none"> • Water retention in the forest area increased by 25% (by year 2) • Land degradation within hotspots communities reduced by 30% 	<ul style="list-style-type: none"> • Reports of hydrological measures • Soil water characteristic analysis 	<ul style="list-style-type: none"> • Involvement of National Committee for bush fire breaking 	
2.3 The surfaces burned by bush fires in selected areas are reduced	<ul style="list-style-type: none"> • 50 km of firewalls realized around plot of yards reforested and forests gallery by year 2 	<ul style="list-style-type: none"> • NFP, NIC, Project and Field visits reports 	<ul style="list-style-type: none"> • Awareness and participation of populations and local authorities 	
	<ul style="list-style-type: none"> • Number of hectares burned reduced by 50% (by year 3) 	<ul style="list-style-type: none"> • NFP, NIC, Project and Field visits reports 		

6.3 Annex C: Project Activities

Code	Activities	2008				2009				2010				2011			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
A1.1.1.	• Establish the Demo Project Management Units in Côte d'Ivoire and Ghana						X	X									
A1.1.2.	• Organise Project Inception Planning Workshop; Prepare and sign LOU/cooperation agreement on the implementation of the Demo project						X	X									
A1.1.3.	• Establish Demo project bilateral committee							X									
A1.1.4.	• Organise at least 3 bilateral meetings on project implementation							X			X			X			
A1.1.5.	• Conduct a study on the baseline situation and prepare project M&E plan						X										
A1.1.6.	• Prepare the inception report							X									
A1.1.7.	• Submit the inception report and M&E plan to the bilateral committee for approval							X									
A1.2.1.	• Identify training needs of national institutions and NGOs for forest and water resources management and develop training material								X								
A1.2.2.	• Organise national training sessions on forest and water resources management and technology for charcoal production								X								
A1.3.1.	• Develop awareness raising campaigns material relevant to the sensitization and training of local stakeholders on forest and water resources management								X	X							
A1.3.2.	• Organise at national level, awareness raising campaigns on forest and water resources management for local stakeholders								X			X		X			
A2.1.1.	• Dredge hot spots of selected river beds								X	X	X	X	X				
A2.1.2.	• Restore 10 km of river embankment								X	X	X	X	X				
A2.1.3.	• Monitor water flow duration in selected hot spots of river beds							X	X			X	X				
A2.1.4.	• Conduct bathymetric campaigns and monitor sediments yield into the river at least once a semester								X				X				
A2.2.1.	• Reforest 200 hectares usable for fuel wood, construction (100 ha financed by wood industrials and 100 hectares financed by the project with local populations of hotspots)							X	X	X	X	X	X				
A2.2.2.	• Maintain and protect the new parcels of forest									X	X	X					
A2.2.3.	• Develop plan for the management of the new parcels of forest								X								
A2.2.4.	• Select 2 experimental sites per country in hotspots after agreement with local population: 1 in the reforested area and 1 as witness site							X									
A2.2.5.	• Equip the selected experimental sites and measure hydrologic parameters on regular basis (flow, infiltration, evaporation, precipitation, etc.)								X								
A2.2.6.	• Conduct comparative study on the evolution of hydrologic parameters in the experimental sites (flow, infiltration, evaporation, water retention, etc.)								X								
A2.2.7.	• Select, adjust and apply soil loss model by using as inputs experimental data								X								



Code	Activities	2008				2009				2010				2011				
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
A2.3.1.	• Make 50 km of firewalls around the plot of yards reforested and around gallery forests in selected area in agreement with local population							X	X	X	X							
A2.3.2.	• Organise at national level, awareness raising campaigns on bush fires impacts						X		X									
A2.3.3.	• Establish local committees of bush fires control					X	X											

6.4 Annex D: Project Budget

UNEP BUDGET LINE/OBJECT OF EXPENDITURE		GEF DP	GEF Core Project	Countrepart	Countrepart	Total
		US\$	US\$	Cash US\$	Kind US\$	US\$
10	PROJECT PERSONNEL COMPONENT					
1100	Project Personnel w/m (Show title/grade)					
1101	Project Manager (CI) 24 w/m	12,000			6,000	18,000
1102	Deputy Project Manager (GH) 24 w/m	12,000			6,000	18,000
1199	Sub-Total	24,000	0	0	12,000	36,000
1200	Consultants w/m (Give description of activity/service)					
1201	Situation appraisal (CI)		5,000		2,250	7,250
1202	Situation appraisal (GH)		4,000		2,250	6,250
1203	Plan for the management of the new reforested area.	5,000			2,000	7,000
1204	Mapping, Collecting Hydrological and meteorological data and modelling	12,000	10,000		4,000	26,000
1205	Socio-economist and misc.	4,000			3,000	7,000
1299	Sub-Total	21,000	19,000	0	13,500	53,500
1300	Administrative support w/m (Show title/grade)					
1301	Administrative Secretary (CI)	7,000			1,050	8,050
1302	Administrative Secretary (GH)	7,000			1,050	8,050
1303	Driver (CI)	4,500			1,050	5,550
1304	Driver (GH)	4,500			1,050	5,550
1399	Sub-Total	23,000	0	0	4,200	27,200
1400	Volunteers w/m					
1401						0
1499	Sub-Total	0	0	0	0	0
1600	Travel on official business (above staff)					

1601	CI officials to GH	5,400				5,400
1602	GH officials to CI	5,400				5,400
1603	Field Visit CI Nat Impl. Agency	4,000				4,000
1604	Field Visit GH Nat Impl. Agency	4,000				4,000
1605	Mission drivers	2,200				2,200
1607	Field visit PMU		10,000			10,000
1699	Sub-Total	21,000	10,000	0	0	31,000
1999	Component Total	89,000	29,000	0	29,700	147,700
20	SUB-CONTRACT COMPONENT					
2100	Sub-contracts (MoU's/LA's for UN cooperating agencies)					
2101						0
2199	Sub-Total	0	0	0	0	0
2200	Sub-contracts (MoU's/LA's for non-profit supporting organizations)					
2201						0
2299	Sub-Total	0	0	0	0	0
2300	Sub-contracts (commercial purposes)					
2301	Mechanical shovel (2 weeks)	16,000		6,000		22,000
2302	Production of Seedlings	12,000		12,000	5,000	29,000
2303	Preparation of plot of yard	23,000		24,000	10,000	57,000
2304	Maintenance of plantations	20,000		20,000	10,000	50,000
2305	Community Mob/Awareness -NGO (CI)	7,000			3,000	10,000
2306	Community Mob/Awareness -NGO GH)	7,000			3,000	10,000
2307	Establishment/Realisation of firewalls	12,000		12,000	5,000	29,000
2308	Restoration of 10 km of river embankment	19,000		10,000	5,000	34,000
2399	Sub-Total	116,000	0	84,000	41,000	241,000
2999	Component Total	116,000	0	84,000	41,000	241,000
30	TRAINING COMPONENT					
3100	Fellowships (total stipend/fees, travel costs, etc)					
3101	Student fellowships			7,000		7,000
3102	Student mission			7,000		7,000

3199	Sub-Total	0	0	14,000	0	14,000
3200	Group training (study tours, field trips, workshops, seminars, etc) (give title)					
3201	Capacity Building/Planning Workshop	7,000			3,000	10,000
3204	Demonstration on charcoal production	3,000			2,000	5,000
3205	Livelihood project demonstration and equipment	3,000			2,000	5,000
3206	Validation of inception report (workshop)	0			0	0
3299	Sub-Total	13,000	0	0	7,000	20,000
3300	Meetings/conferences (give title)					
3301	Bilateral meetings	12,000		16,000	6,000	34,000
3303	Steering Committee	7,000			4,500	11,500
3399	Sub-Total	19,000	0	16,000	10,500	34,000
3999	Component Total	32,000	0	30,000	17,500	68,000
40	EQUIPMENT & PREMISES COMPONENT					
4100	Expendable equipment (items under (\$1,500 each, for example))					
4101	Stationery and office cost	3,000			6,000	9,000
4199	Total	3,000	0	0	6,000	9,000
4200	Non-expendable equipment (computers, office equip, etc)					
4201	Computers	5,000				5,000
4202	Topographic equipments and GPS	4,000				4,000
4203	Equipment for the measurement of hydrologic parameters	13,000		10,000		23,000
4204	Maintenance/assistance	1,000				
4299	Sub-Total	23,000	0	10,000	0	32,000
4300	Premises (office rent, maintenance of premises, etc)					
4301	Office Maintenance+Electricity					0
4399	Sub-Total	0	0	0	0	0
4999	Component Total	26,000	0	10,000	6,000	41,000
50	MISCELLANEOUS COMPONENT					
5100	Operation and maintenance of equip.					

	(example shown below)					
5101	Rental & maint. of computer equip.					0
5102	Rental & maint. of copiers					0
5103	Repair & maint. of vehicles & insurance					0
5104	Rental & maint. of other office equip					0
5105	Rental of meeting rooms & equip.					0
5199	Sub-Total	0	0	0	0	0
5200	Reporting costs (publications, maps, newsletters, printing, etc)					
5201						0
5299	Sub-Total	0	0	0	0	0
5300	Sundry (communications, postage, freight, clearance charges, etc)					
5301	Communication	2,000				2,000
5302	Auditing					0
5303	Unspecified					0
5399	Sub-Total	2,000	0	0	0	2,000
5400	Hospitality and entertainment					
5401						0
5499	Sub-Total	0	0	0	0	0
5500	Evaluation (consultants fees/travel/ DSA, admin support, etc. internal projects)					
5501	Evaluation (Travel and consultants)		15,000			15,000
5599	Sub-Total	0	15,000	0	0	15,000
5999	Component Total	2,000	15,000	0	0	17,000
	TOTAL COSTS	265,000	44,000	124,000	94,200	514,700

6.5 Annex C: Process and Stress reduction indicators

6.5.1 Annex C1: Process indicators

Process Indicators/Activity	Parameters measured	Target and Baseline	Means of Verification	Location of Action
Capacity of local stakeholder and national institutions in charge of forest and water resources management strengthened	<ul style="list-style-type: none"> ▪ Number of training workshops undertaken, based on key training needs identified ▪ Number of people trained ▪ Number of awareness raising campaigns organized 	Target: By year 1 Baseline: None	Workshop/training Reports FP, NIC, APR, PIR and HYP reports	Côte d'Ivoire and Ghana
Forest landscapes of the pilot plots targeted by the project are restored and protected	<ul style="list-style-type: none"> ▪ 200 hectares of selected plots of lands reforested and maintained 	Target: By year 2 Baseline: None	FP, NIC, APR, PIR and HYP reports	Côte d'Ivoire and Ghana

6.5.2 Annex C2: Stress reduction indicators

Stress Reduction Indicators	Parameters Measured	Target and Baseline	Means of Verification	Location of Action
Sediment yield into selected rivers reduced by 15-20%	<ul style="list-style-type: none"> ▪ Sediment levels in the river bed 	Target: By year 3 Baseline: Will be defined during the inception phase of the demo project	FP, NIC, APR, PIR and HYP reports Report of hydrometric measures Thematic reports	Côte d'Ivoire and Ghana
Water retention in the forest area increased by 20-25%	<ul style="list-style-type: none"> ▪ Water flow and Runoff ▪ Infiltration, Evaporation, Precipitation ▪ Basin protection and Vegetation index 	Target: By year 3 Baseline: Will be defined during the inception phase of the demo project	FP, NIC, APR, PIR and HYP reports Report of hydrometric measures Thematic reports	Côte d'Ivoire and Ghana
Surfaces burned by bush fires in selected areas are reduced by 40-50%	<ul style="list-style-type: none"> ▪ 50 km of firewalls realized around plot of yards reforested and forests gallery ▪ Number of hectares burned 	Target: By year 3 Baseline: Will be defined during the inception phase of the demo project	FP, NIC, APR, PIR and HYP reports	Côte d'Ivoire and Ghana
30-40% of trees use for charcoal are dead wood	<ul style="list-style-type: none"> ▪ Number of charcoal producers who use dead wood ▪ Quantity of dead wood used for charcoal production 	Target: By year 2 Baseline: Will be defined during the inception phase of the demo project	NFP, NIC, Project and Field visits reports	Cote d'Ivoire and Ghana