BUILDING RESILIENCY OF RURAL SOCIO-ECOLOGICAL PRODUCTION LANDSCAPES:

[LESSONS FROM THE GEF/SGP OP6 PROGRAMME IN GHANA, 2019].

LOCAL ACTION GLOBAL IMPACT

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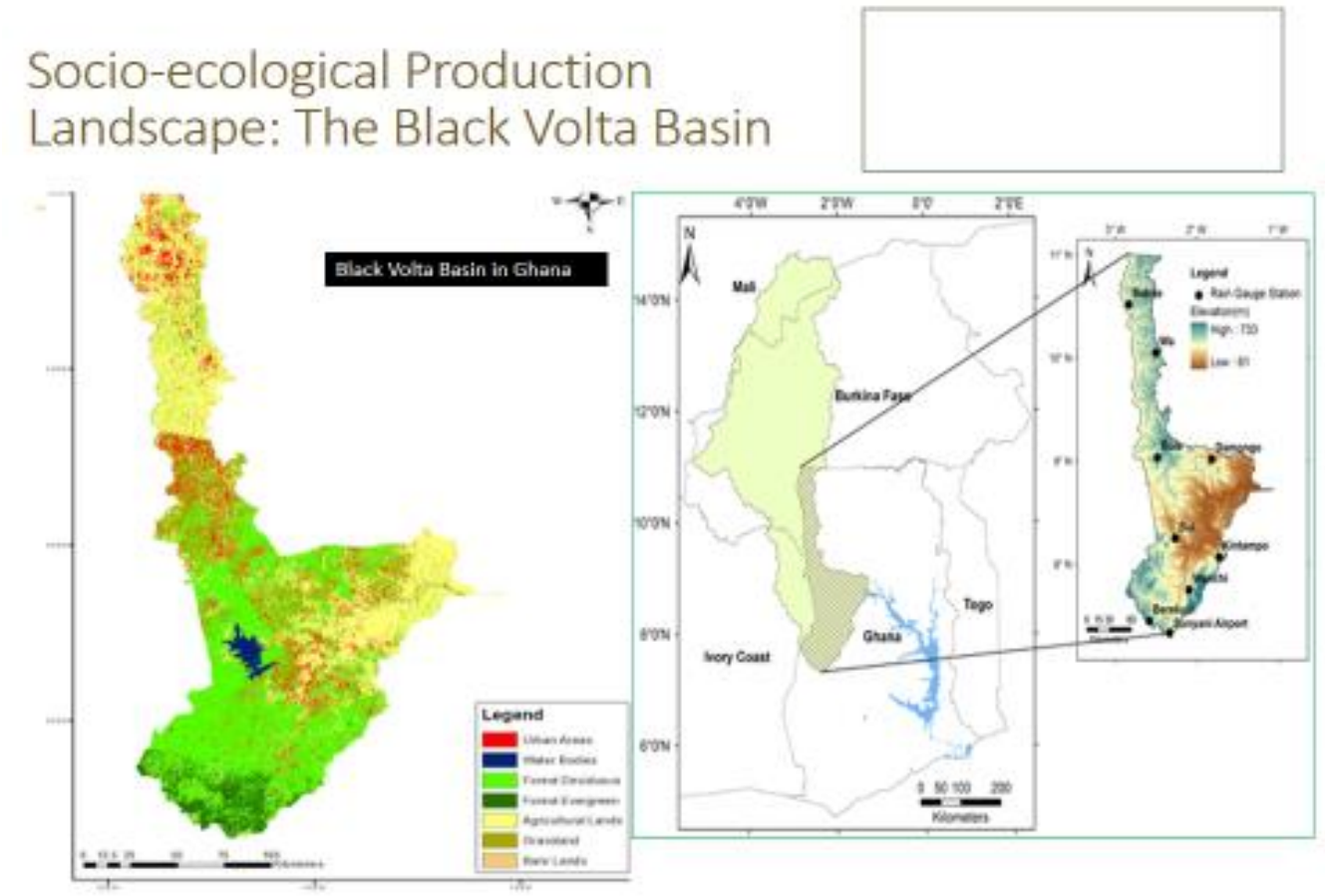

Figure 1: Black Volta Basin Socio-ecological Production Landscape

Figure 2 Main Focal Area Activities

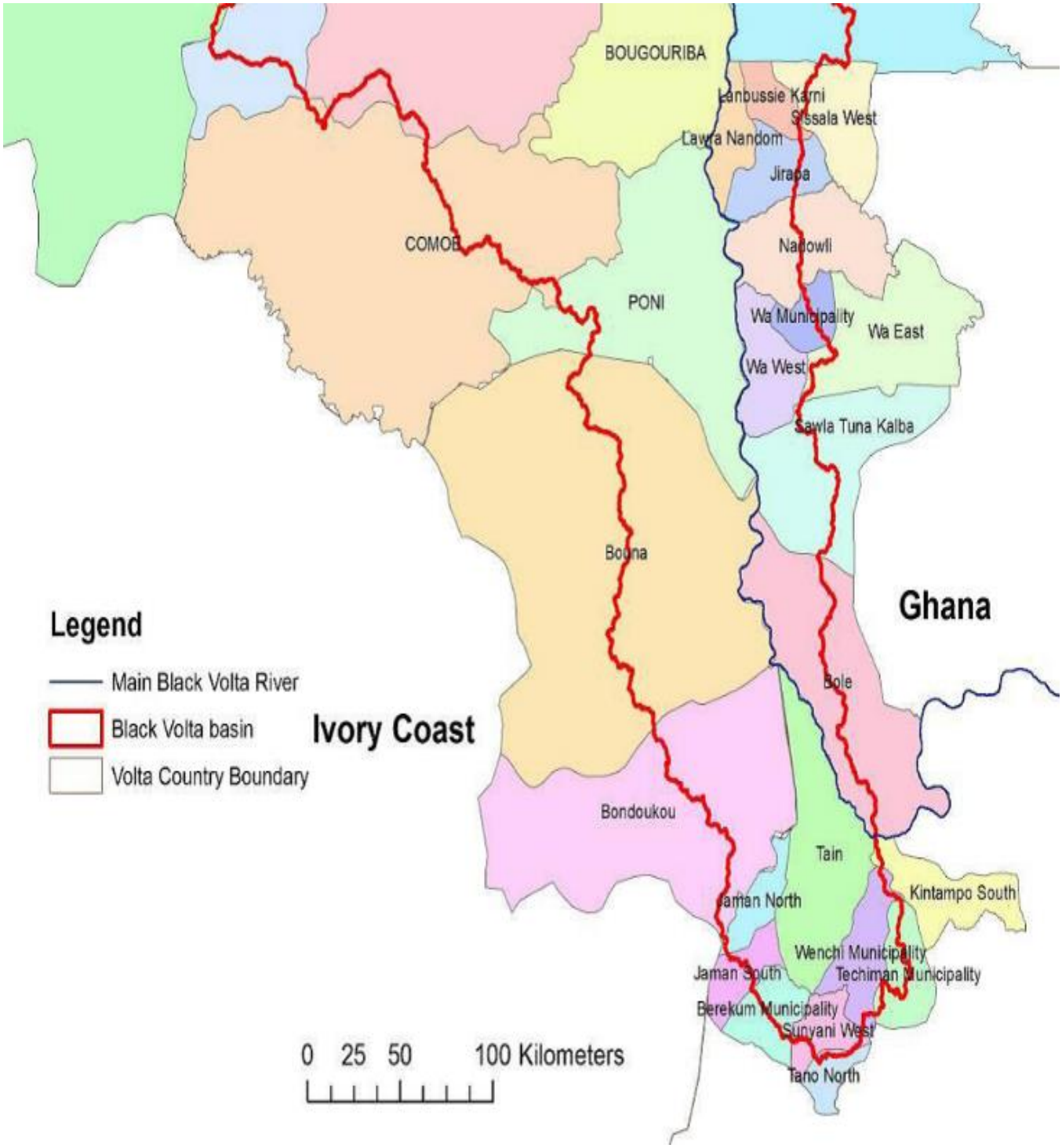

Figure 3: The Political Map of the Black Volta Basin

OUR OP6 STRATEGIC VISION

TO ADDRESS THE UNDERLYING DRIVERS OF ENVIRONMENTAL DEGRADATION IN THE SOUTHERN BLACK VOLTA BASIN AND THE COASTAL SAVANNAH WETLANDS THROUGH COST EFFECTIVE SERVICE DELIVERY AND INNOVATIVE PROGRAMMES TO INNOVATE AND ACHIEVE GLOBAL ENVIRONMENTAL BENEFITS AT COMMUNITY LEVELS.

STRATEGIC OUTLOOK

- MINIMIZE UNSUSTAINABLE LAND USE PRACTICES THROUGH: -
  - ENHANCED RESILIENCE IN AGRO-ECOSYSTEMS
  - HARNESSING AND MAINTAINING ECOSYSTEM SERVICES FOR AGRO-ECOLOGICAL INTENSIFICATION
  - PROMOTING INTEGRATED MANAGEMENT OF PRODUCTION LANDSCAPES
  - MAINSTREAMING SUSTAINABLE LAND MANAGEMENT IN SUSTAINABLE DEVELOPMENT
- PROMOTE A MIX OF PRESSURE-FOCUSED AND DRIVER-FOCUSED APPROACHES BY
  - REDUCING THE USE OF PERSISTENT ORGANIC POLLUTANTS (POPS) CHEMICALS IN VEGETABLE AND CROP PRODUCTION AND SUPPLY CHAINS AND MERCURY IN ARTISANAL SMALL SCALE MINING THROUGH: -
    - DEPLOYMENT OF ALTERNATIVES TO HARMFUL CHEMICALS; -
    - GIVING CONTINUOUS INCREASE IN THE GLOBAL DEMAND FOR NEW CHEMICALS,
    - FOCUS RESEARCH AND DEVELOPMENT OF CHEMICALS AND MANUFACTURING OF CHEMICALS AND PRODUCTS
- PROMOTE SUSTAINABLE USE OF FOREST RESOURCES BY ADDRESSING THE DRIVERS OF DEFORESTATION TO REDUCE THE PRESSURES ON HIGH CONSERVATION VALUE FORESTS. THIS WILL INCLUDE -
  - ENHANCING FOREST MANAGEMENT TO MAINTAIN FLOWS OF FOREST ECOSYSTEM SERVICES AND IMPROVING RESILIENCE TO CLIMATE CHANGE THROUGH SUSTAINABLE FOREST MANAGEMENT. –
  - REVERSING THE LOSS OF ECOSYSTEM SERVICES WITHIN DEGRADED FOREST LANDSCAPES THROUGH AFFORESTATION AND NATURAL REGENERATION; AND -
  - MAINTAINING FOREST RESOURCES, ENHANCE FOREST MANAGEMENT, AND RESTORE FOREST ECOSYSTEMS THROUGH THE TRANSFER OF INTERNATIONAL EXPERIENCE AND KNOW-HOW.
- WORK WITH CSOS TO DEVELOP KNOWLEDGE THAT WILL HAVE IMPACT ON KEY DRIVERS AND JOINTLY CREATE A PLATFORM FOR ACTIONS. THIS REQUIRES BUILDING SYNERGIES WITH RESEARCHERS TO MAKE SCIENCE-BASED SOLUTIONS DEVELOPING PARTNERSHIP GOVERNMENT SERVICE PROVIDERS AND OTHER INTERNATIONAL CSOS.
- CREATE ADDED VALUE FROM GEF FUNDS BY BEING A CATALYST FOR INNOVATIVE ENVIRONMENTAL FINANCE-
- DEVELOP CAPACITIES OF SGP-GHANA AS GRANT MAKER+ TO OFFER VALUE-ADDED ACTIVITIES AND BUILD CAPACITY OF COMMUNITIES AND CSOS.
- UPTAKE OF NEW TECHNOLOGIES AND BUILD SOCIAL CAPITAL TO INCREASE RESILIENCE AND IMPACT.
- BUILD A NETWORK OF STAKEHOLDERS BY STRENGTHENING THE CAPACITIES OF GEF-NGO NETWORK BEYOND GRANT-MAKING.

OUR FOCAL AREAS

- **BIODIVERSITY CONSERVATION** – PROMOTING COMMUNITY CONSERVATION AND MAINSTREAMING BIODIVERSITY CONSERVATION AND SUSTAINABLE USE INTO PRODUCTION LANDSCAPES WITHIN THE AGROFOREST AREAS IN THE BLACK VOLTA BASIN.

- **Climate Mitigation and Energy** – promoting Sustainable Energy for All – [Low Carbon-Energy Access] and reduction of GHG emissions in agriculture through Climate Smart Innovative Agro-ecology in the deprived areas of the coastal and northern savannah zone.
- **Land degradation** - improving the flow and resilience of agro-ecological systems to sustain livelihoods of local communities with the Coastal Savannah and transitional zones.
- **Waste and Chemicals Management** - increasing awareness in phase-out, disposal, and reduction of releases of POP chemicals, mercury, and other chemicals of global concern and remediation of mercury polluted degraded mining areas
- **International Waters and Integrated wetland management** – supporting the rehabilitation of degraded mangroves within relevant RAMSAR sites.
- **Capacity development and knowledge management** – to share best practices and engage in capacity development for local communities through improving the technological and other knowledge systems for Community Landscape Conservation, Climate Smart Innovative Agroecology, Low-Carbon Energy Access co-benefits, and soil, land and water management.

OUR APPROACH

We link global, national, and local issues through a transparent, participatory, and country-driven approach to project planning, design, and implementation.

Our axiom is that global environmental problems can best be addressed if local people are involved and there are direct and copious community benefits and ownership.

FOREWORD

The Global Environment Facility Small Grants Programme (GEF/SGP), also known as GEF in Ghana has become a household name among environmental non-governmental and community-based organizations in Ghana. This is due to its tremendous and catalytic role in supporting community-level activities in environmental management in the country. As a global funding mechanism, the GEF/SGP supports community-level initiatives that simultaneously promote sustainable economic growth, environmental management, and social development. It is refreshing to observe that since its inception 26 years ago, SGP Ghana has concentrated on fragile ecosystems where vulnerable, isolated, and voiceless populations live. In most of these areas, non-governmental organizations (NGOs) and community-based organizations (CBOs) did not exist, and even where they existed; they are ineffective, voiceless, and lacked the requisite technical expertise to operate in the GEF focal area activities. The program today has trained and empowered many people in project planning and management. Many organizations have become effective in addressing global environmental problems.

The sixth operational program of GEF/SGP operations in Ghana focused on **equity** (through poverty alleviation and sustainable environmental management); **efficiency** (through environmental conservation and sound economic and resource-based management); and **empowerment** (through good governance and increased participation of the civil society in the development process). Women's needs have been given considerable attention and support in all the GEF/SGP initiated programs. Grants have helped women and persons with disabilities to enhance their roles and capacities within their communities. They have been strengthened to increase their involvement in the development process.

Within the national development context, the SGP has helped to conserve and protect several hundred thousand hectares of traditionally protected forests to enhance biodiversity outside the gazetted forest reserves. It has pioneered and successfully promoted community involvement in the management of the Black Volta Basin ecosystem. The program has created CREMAs, introduced improved efficient woodfuel stoves at both domestic and commercial levels to mitigate climate change, introduced kiln carbonization of wood and initiated steps towards certification in charcoal production. Alternative energy sources including solar and fuel from plastic waste have been tested and proven to be viable energy sources for the country. Within the Black Volta Basin, the program has piloted best practices in sustainable land management and soil fertility improvement techniques in degraded areas and trained small scale miners to adopt mercury-free practices in gold mining. Currently, the SGP is piloting the community mining concept for economic empowerment and environmental safety.

Indeed, great things have come out of the small grants. It is our hope that the Government and other development partners in Ghana will continue to support the Small Grants Programme which has proven its worth in supporting local communities directly in conserving their environmental resources, whilst promoting sustainable development and earning income to reduce poverty and bringing joy and hope to homes and communities.

DR. DAVID KING AMOAH
(CHAIRMAN, NATIONAL STEERING COMMITTEE)
U.N.D.P, GEF/SGP ACCRA GHANA

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BACKGROUND OF THE BLACK VOLTA BASIN LANDSCAPE

1. INTRODUCTION

Responding to Ghana's obligations under the GEF-6 objectives, the UN Sustainable Development Goals (SDGs), and the UNDP Global Environmental Facility Small Grants Programme (SGP) strategy, Ghana adopted a resilience approach to sustainability, focusing on how to build local capacity to deal with unexpected landscape change. This paper shares Ghana's experience in restoring degraded landscapes for resilient livelihoods. It discusses the methodologies of how rural landscapes can be managed to ensure a sustainable and resilient supply of essential ecosystem services. The paper presents case studies of how the restoration of socio-ecological production landscape can enhance food security as a strategy, the good practices for restoring and enhancing the landscape, and how cultural revival and revitalization of traditions have helped shape the landscape.

1.1 Background of the targeted landscape

The targeted Black Volta Basin socio-ecological production landscape covered an estimated area of 18,384 km^2 of the entire Black Volta Basin. The landscape spans over six traditional councils in four administrative districts and within two political regions of Ghana (Figure 3). The targeted landscape covered 36 settlements with an estimated population (2018) of 151,000 indigenous people. The population has deep cultural beliefs and knowledge systems which explains the strong cultural relationship between the people and nature. The indigenous tribes within the landscape include the Gonja's, Mo's, the Lobi's, and the Bandas.

The landscape has a tropical climate, characterized by moderate temperature, 12°C—25°C for most of the year. Annual rainfall patterns vary from about 1043mm to 1270mm to the south. The minimum potential evaporation is about 1450mm/year to about 1800mm/year and the average runoff is about 243m^3/year.

1.1.1 Landuse occupancy and cultural belief

The Black Volta Basin socio-ecological landscape is a dynamic mosaic landscape encompassing productive agricultural lands; towns, villages, and hamlets; farmlands with adjacent, cocoa, cashew, orange and mango plantations; natural forests/savannah woodlands; sacred groves; national park, fallow grasslands, wetlands, and water bodies (streams, rivers, ponds, and lake). Different traditional farming systems that promote the conservation of biodiversity are practiced within the landscape.

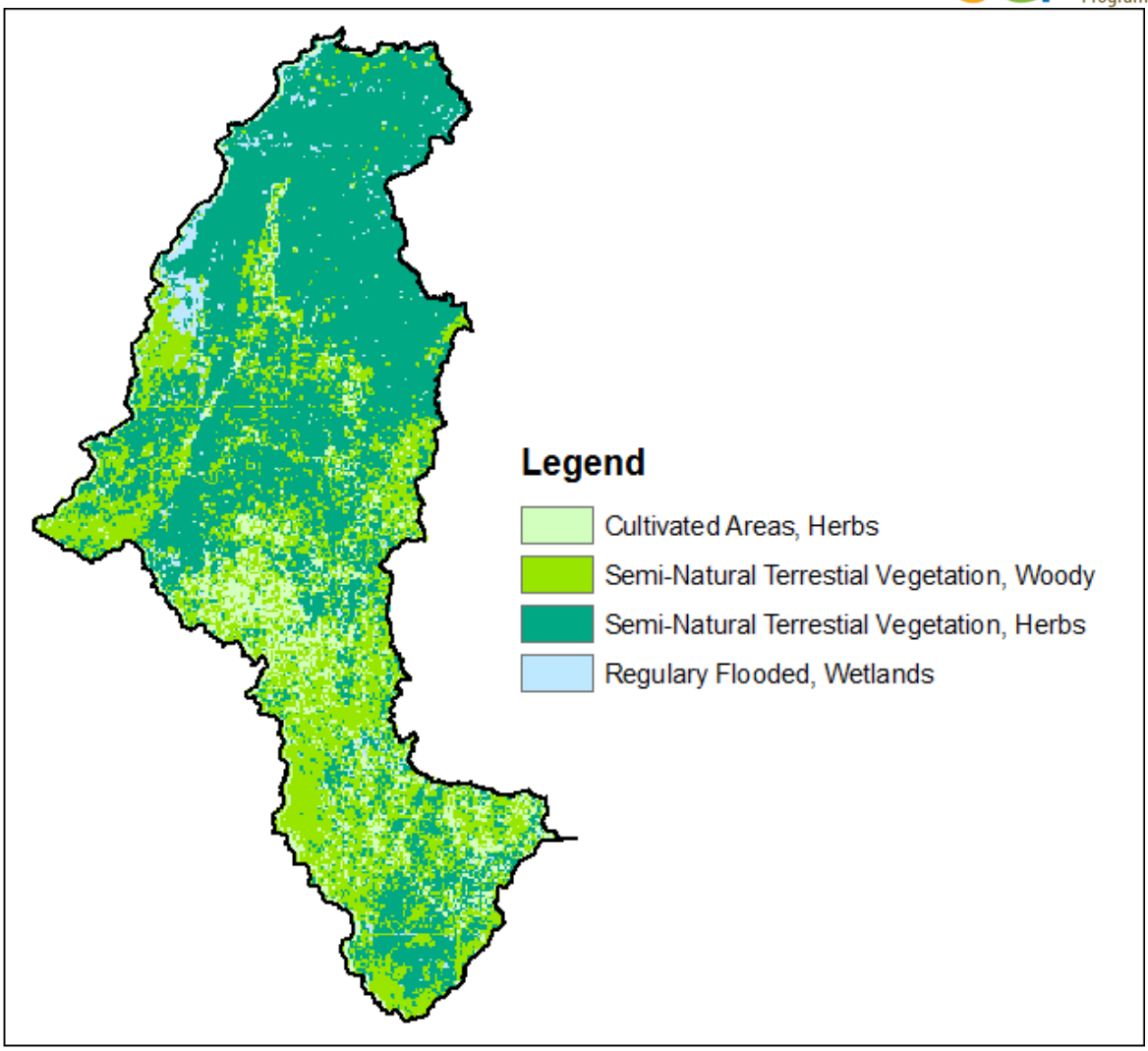


Figure 4 Vegetation cover of the BVB landscape

Farming, hunting, fishing, mining, and petty trading are the main economic activities within the landscape. Farm holdings range from 1.5 ha to 2 ha of arable land, with farmers engaged in mixed-cropping. Cash crops cultivated are cashew, mango, timber (mostly teak), groundnuts, and tiger nuts. The main food crops are yam, plantain, rice, maize, cassava, legumes, and vegetables. Other subsistence activities include small ruminant rearing, cattle ranching, and artisanal mining and fishing. It is estimated that 16 percent of households in the landscape operate non-farm enterprises as additional sources of income, with women operating 72% of these businesses. The landscape is a net exporter of staple foods like yam, maize, processed cassava, fish, and leafy vegetables.

The landscape has been occupied for several centuries and has been shaped over the years by human and nature interactions in ways that have maintained biodiversity and provided humans with goods and services needed for their wellbeing. The people inhabiting the landscape have deep cultural beliefs that have guided the conservation of biodiversity and the protection of

highly environmentally sensitive areas like the caves, sacred forests, and old settlements. The construction of the hydro-electric dam at Bui in December 2009 and the subsequent formation of the lake, as well as the intensive surface mining, are gradually changing the land use form and the settlement pattern of the landscape. New settlements are springing up along the shores of the lake and commercial activities are growing at astronomical rates in the mining communities.

1.1.2 Local knowledge practices and systems within the landscape

Local knowledge about agricultural biodiversity is strong, with farmers practicing bush fallow system, traditional slash and burn agriculture, agroforestry that integrates trees on cocoa, cashew, and food crop farms. Some of the cultural beliefs and practices prohibit farming close to river bodies, and desecration of sacred sites (groves, ancestral burial grounds, and old settlements).

Conservation practices within the landscape are embedded in the cultural values and practices that are intrinsically tied to the conservation of biological resources. Wildlife is protected through the use of totems as bio-cultural heritage, which is handed down from one generation to the other. The bio-cultural heritage includes both tangible and intangible values including:

- Traditional laws and norms;
- Spiritual believes and values;
- Ancestral knowledge and practices; and
- Biodiversity conservation.

1.1.3 Landscape degradation and redundancy

The Black Volta Basin socio-ecological production landscape was experiencing environmental stress contributing to increasing habitat destruction and environmental degradation. The underlying factors were climate change, the inundation of the Black Volta Lake, wildfires, population influx, and cultural infusion. The landscape experienced extreme forms of climate variability– erratic rainfall, extreme temperatures, and incessant wildfires, extensive flooding during the rainy season, prolonged droughts during the dry season, and unsustainable use of chemicals in farming.

The effects of these changes were inadequate livelihood support systems, weak institutional capacity to cope with the environmental stress and the emergence of new cultural practices and belief system which considered the traditional systems as a fetish. The people's response to these climatic and socio-cultural changes was the adoption of charcoal burning, illegal logging of timber, illicit hunting of all forms of wildlife, and illegal artisanal small scale mining as the survival strategy. These practices exacerbated the increasing habitat destruction, biodiversity loss, low land productivity, increasing food insecurity, and dryness of water sources, leading to widespread poverty.

Gradually the landscape lost its identity as the incidences of poverty increased. The landscape became part of the country with a high incidence of poverty and low human development indices. Mapping the incidence of poverty in the country showed that there was a high

concentration of poverty in the Black Volta Basin of Ghana. The districts with high incidences of poverty were: Wa West (92.4%); Wa East (83.8%); Bole (79.4%) Kintampo South District (78.3%); and Banda District (78.0%) [See figure 5].

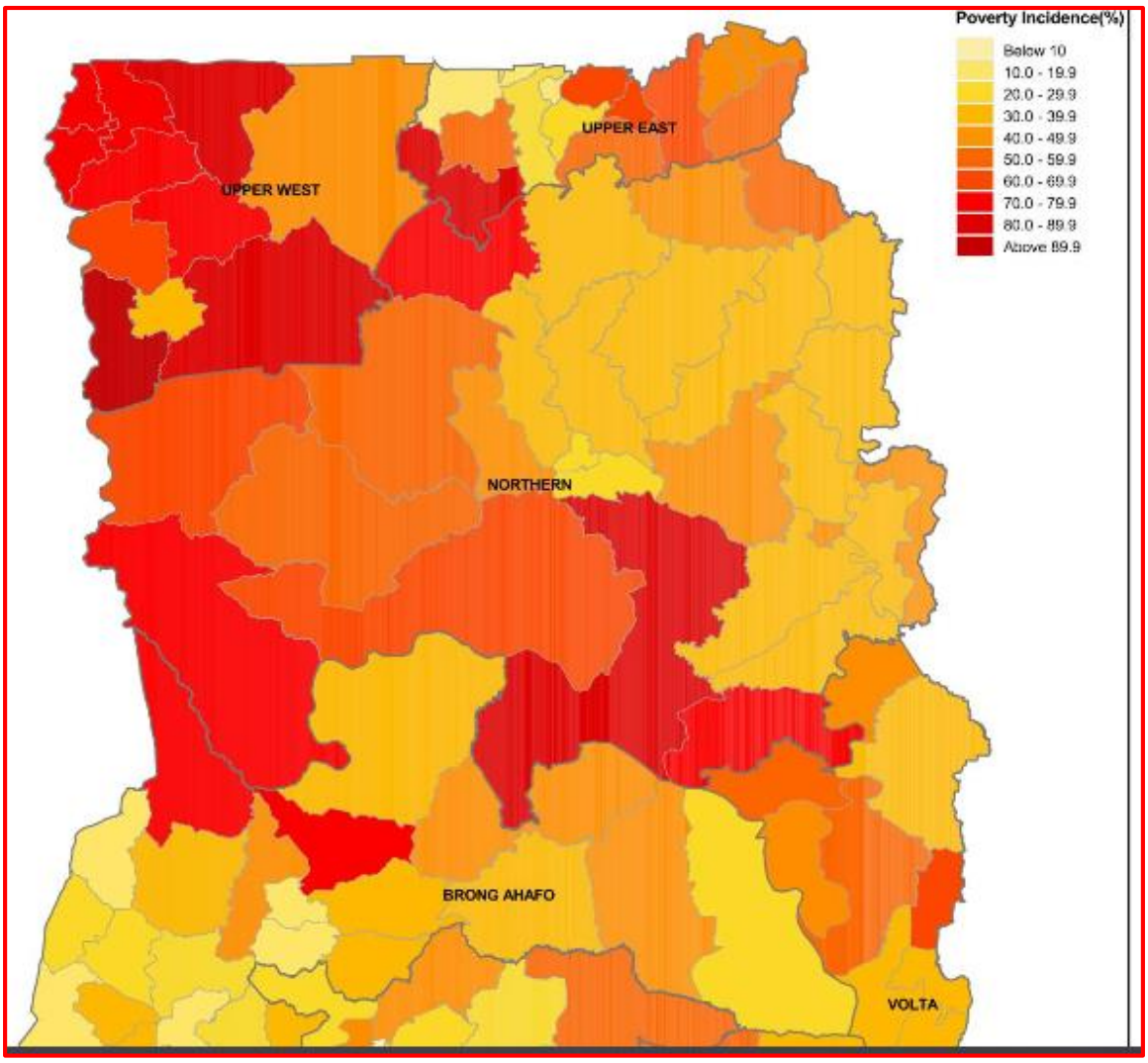


Figure 5 Incidence of Poverty in the transitional and northern savanna ecosystem of Ghana

1.2 Landscape Resiliency Management

1.2.1 Why Resilience Approach

The landscape restoration approach adopted a resilience approach to management. The resiliency sought to maintain, revitalize, and rebuild socio-economic production landscapes in the era of climate change and challenges. It sought to create resilience practices that further wellbeing, and provide support to key ecosystem functions and biodiversity conservation. The resilience approach was based on seven cardinal principles: a) maintain diversity and redundancy, b) manage connectivity, c) manage slow variables and feedbacks, d) foster complex

adaptive systems thinking, e) encourage learning, f) adopt broaden participation, and g) promote polycentric governance systems.

The approach developed a set of indicators as a tool for communities to understand their resilience and steps to strengthen them. The indicators helped to measure a community's capacity to build resilience and harness ecosystem services through innovation, adaptation, and institutional development that regulate and ensure the sustainable use of biodiversity.

1.3 Developing the Landscape Strategy

The resilience model used to promote sustainable landscape restoration was based on previous experience in landscape management under the GEF SGP. The main focus of the model (Figure 6) was based on building the capacity of the indigenes to deal with the external shocks and unexpected changes. The first step was the revival of the cultural and spiritual value systems and practices of the people that have relevance for conservation, livelihood enterprise development, and sustainable management. This involved changing the mindset of the local people as external drivers of ecosystem dynamics and incorporating them as part of systems that interact with the biosphere using their culture and belief systems. The resilience thinking approach was to restore the social-ecological production landscape whilst ensuring a sustainable and resilient supply of the essential ecosystem services on which humanity depends.

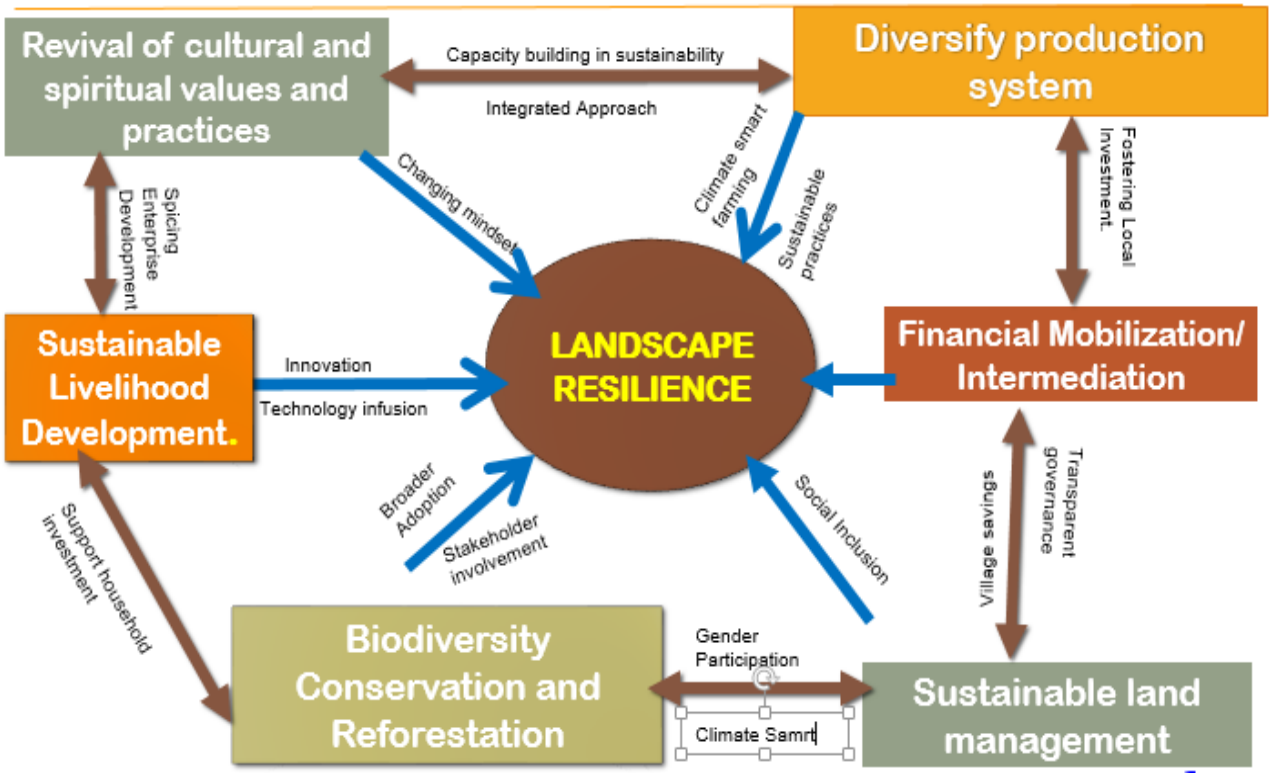


Figure 6: Resilience model adopted for landscape restoration and sustainability

The second resilience approach placed a strong emphasis on diversification of the local economy and the production systems through the adoption of agroforestry, integrated crop-tree farm management system, organic agriculture, cultivation of indigenous cash crops for income generation, and more diverse food crops for improved food security throughout the year. It sought to maintain, revitalize, and reconnect the socio-economic production landscapes to provide support to key ecosystem functions and biodiversity conservation.

The third resilience approach was to build an adaptive system thinking with financial intermediation. Grant support was given to local initiatives to establish local innovative and transformative enterprises as incubators in partnership with the private sector. The project introduced village saving and credit unions and organized special training to women in business management, product development, and design, financial training and finance facilitation, business networking, and creating access to markets.

The fourth resilience approach was the adoption of a sustainable land management system, biodiversity conservation practices, and reforestation strategy. This was done by promoting promote broader participation, a transparent governance system, and gender inclusion in the conservation agriculture, climate-smart farming system, and tree planting.

The fifth approach was the development of livelihood enterprise development which sought to add value to the natural resources generated from within the landscape. The strategy was to add value to the biodiversity products and other raw materials produced within the landscape.

1.4 The adaptive management system

Recognizing the role that local people play as external drivers of ecosystem dynamics, the adaptive collaborative management approach explored ways that rural communities could interact sustainably with ecosystems while maintaining their spiritual, cultural, and economic connections to the landscapes they inhabit (Figure 7).

Using the seven principles of resilience, the program undertook a wide range of project interventions in 36 rural communities aimed at creating resilience practices to strengthen the well-being of these communities and support key ecosystem functions and biodiversity conservation in the landscape. The adaptive model aimed to: maintain, revitalize, and rebuild socio-ecological production landscapes, promote food security, encourage learning systems, promote broader participation and adoption, and promote polycentric governance systems.

The adaptive landscape management approach involved five stages relevant for socio-ecological production landscape transformation as follows:

Stage 1: Understand the landscape through community engagements.
This requires:

- A landscape baseline assessment to define problems and interventions and get the local community support;
- Formulating a participatory community program strategy to guide interventions.

- Continuous stakeholder meetings and capacity building to support landscape activities.

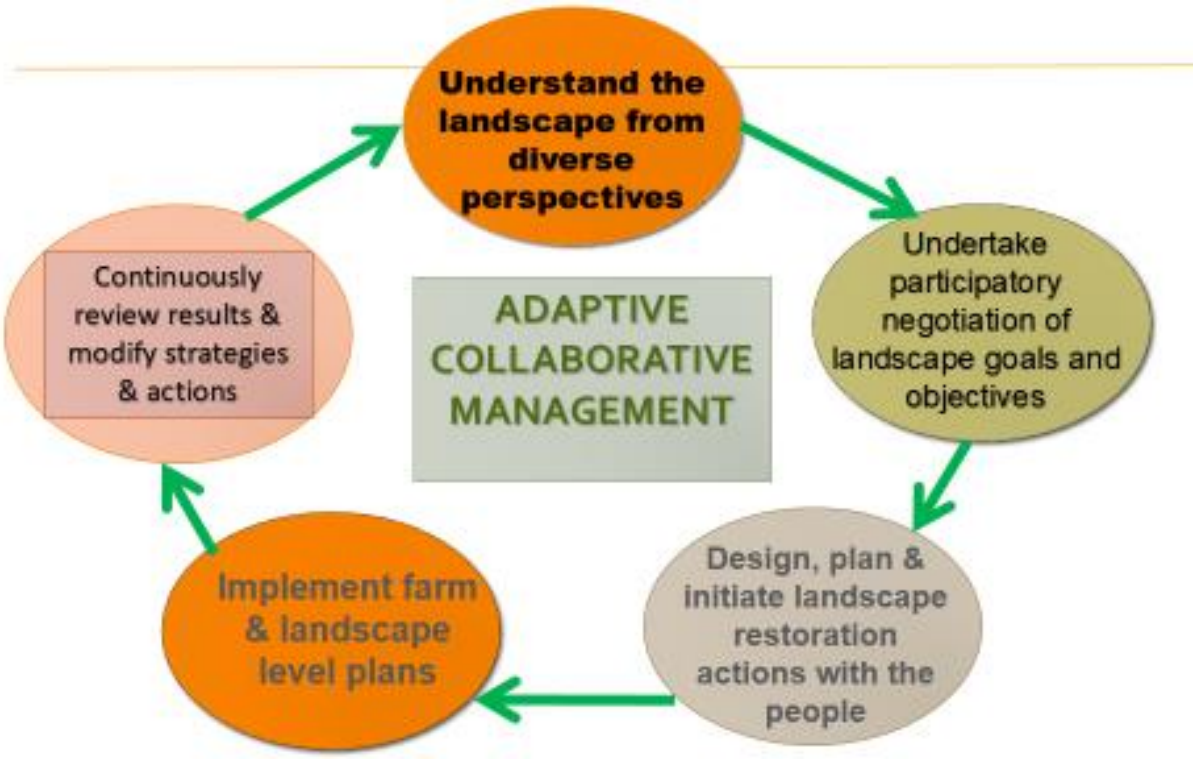


Figure 7: Adaptive Collaborative Management Approach

Stage 2: Negotiate landscape goals towards multi-level governance and enhanced resilience.
This stage required understanding landscapes in order to:

- define the landscape around commonly perceived conservation, production and/or livelihood issues and opportunities;
- identify and support communities and organizations with clear stakes in the landscape assets to manage resources for the realization of new opportunities; and
- form working groups to collaborate with experts to adopt innovative practices within the landscape.

Stage 3: Initiate action planning and implementation of agreed activities
The action plan is to develop a thriving socio-ecological production landscape where the local communities are actively involved in the sustainable management and utilization of local natural resources for increased production, the restoration of biodiversity, improvement of livelihoods, and continuous flow of ecosystem services. The planning process should be participatory and addressing the needs expressed by the beneficiaries to:

- Conserve the natural and semi-natural habitats and ecosystem services;
- Promote sustainable ecological agriculture;
- Sustain the establishment of livelihood enterprises,

- Build the wellbeing of target social groups within the landscape and develop institutional capacity at the landscape level.

Stage 4: Implement farm and landscape plans
Consider possible 'entry points' and strategies for the new interventions and provide startup capital for trained community members. Provide support to innovative practices and upscale the best practices like sustainable water harvesting, food and fodder security (agriculture), agroforestry and reforestation, conservation tillage applied for water harvesting in furrows and improving soils through zero tillage and production of organic material in the form of compost, and/or application of organic fertilizer that would lead to soil rehabilitation and sustainable land management.

Stage 5: Participatory reviewing of results and modifying strategies and actions
Use participatory social cost-benefit analysis to evaluate the costs and benefits of the project interventions to local communities and households within the livelihood support framework. Ensuring a good governance system, transparency in dealing with the local communities. It also requires developing an early exit strategy and building a financial management system to sustain the project results and the community commitment beyond the project implementation period. Sharing findings from the various tools with stakeholders and using peer reviews to adapt and improve the system are some of the participatory actions needed.

The next section describes the OP6 program portfolio and its impact on the landscape.

2. THE OP 6 PROGRAMME

The sixth operation program (OP6) of the GEF/SGP in Ghana was implemented from October 2016 to June 2020 with the objective of building the resilience of the local communities in the Black Volta Basin to address the underlying drivers of environmental degradation. The architecture of the OP6 country program strategy (CPS) was aligned to the GEF 20/20 Strategy, UNDP's Strategic Plan, the Sustainable Development Goals, the Ghana Shared, Growth, and Development Agenda (2014-2017), the 2013 Ghana National Climate Change Policy and Action Plan, the 2011 Forest and Wildlife Policy and Master Plan, National Climate-smart Agriculture and Food Security Action Plan and the National Strategic Energy Plan (2006-2020) (Figure 8).

The program translated the CPS strategies into community and local level actions, thereby contributing to the transformational changes in biodiversity conservation, climate change mitigation and adaptation, sustainable land management, and chemical and waste management.

2.1 Programme Portfolio

The OP6 portfolio was 44 projects which increased resource flow to communities and civil society organizations (CSOs) through effective use of local assets and innovative environmental financing mechanisms. The GEF focal area interventions as summarized in figure 9 were as follows:

i. **Biodiversity Conservation** (14%) sought to promote community conservation and mainstreaming of biodiversity conservation and sustainable use into agroforest and production landscapes within the Black Volta Basin.

ii. **Climate Mitigation and Energy** (18%) – promoted Sustainable Energy for All – [Low Carbon-Energy Access and improved wood carbonization] and reduction of greenhouse gas (GHG) emissions in agriculture through climate-smart innovative agroecology in the deprived areas of the Black Volta basin ecosystem.

iii. **Sustainable Land Management** (29%) - improved the flow and resilience of agro-ecological systems to sustain the livelihoods of local communities within the basin.

iv. **Waste and Chemicals Management** (23%) - increased awareness in phase-out, disposal and reduction of releases of POP chemicals, and formalization of mercury-free in artisanal small-scale mining in the Upper East and Upper West regions.

v. **Capacity Development and Knowledge Management** (5%) supported the sharing of best practices in capacity development for local communities including improved technological and other knowledge systems for community landscape conservation, climate-smart innovative agroecology, low-carbon energy access co-benefits, and soil, land and water management.

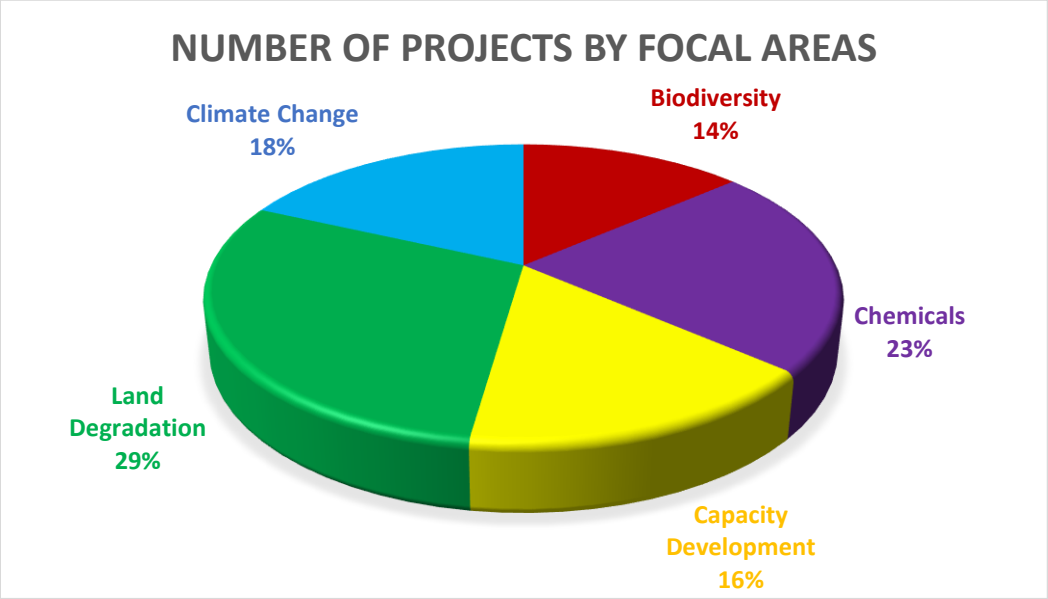


Figure 9: OP6 Focal Area Portfolio

The implementation of the field activities supported effective and efficient interventions in achieving global environmental benefits and has contributed directly to the attainment of UN Sustainable Development Goals, particularly poverty reduction (goal 1); zero hunger (goal 2); gender equality (goal 5), clean water and sanitation (goal 6), affordable and clean energy (goal 7), reduced inequality and social inclusion (goal 10), sustainable communities (goal 11); climate action (goal 13), life on land (goal 15), peace and justices (goal 16), and partnership (goal 17).

PROGRAMME RESULTS

3. BIODIVERSITY CONSERVATION AND RESPONSIBLE CONSUMPTION

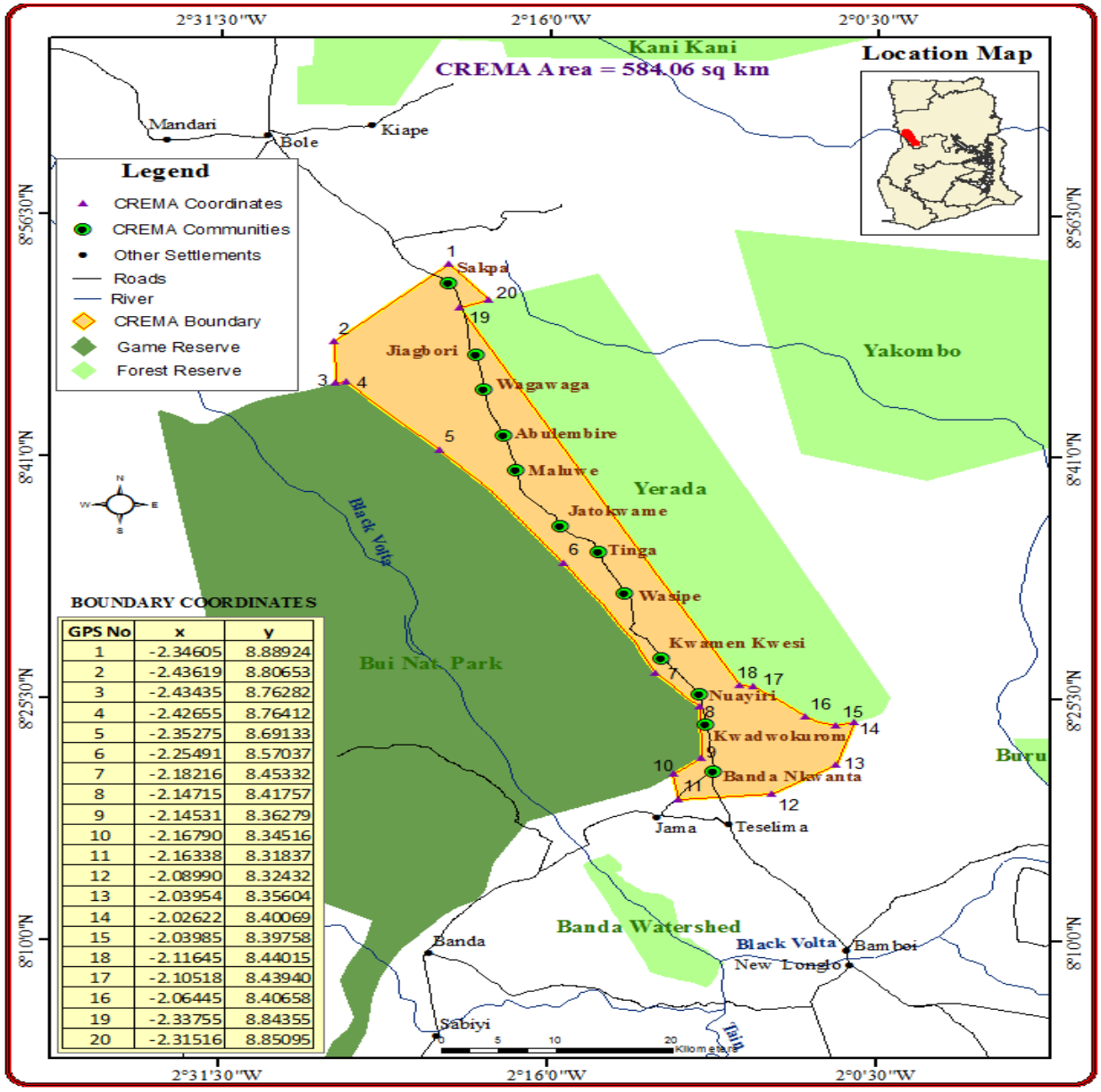
The program implemented six biodiversity projects to promote innovative agroecology practices and mechanisms for the conservation of carbon stocks in the Black Volta landscape. This was done by introducing integrated landscape management systems that reduce pressure on natural resources from competing for land uses in the wider landscape by investing in cashew, mango, and woodfuel species (agro-ecology) combined with food crop production. The local farmers were supported to invest in climate-resilient organic farming technologies, cash crop agroforestry farming system (65ha), and managed 50,000-seedlings capacity bamboo nursery.

The project GHA/SGP/OP6/Y2/CORE/BD/2016/004, supported fifty (50) farm families to integrate poultry and small ruminants into agroforestry farms systems. Sixty-five (65) champion farmers were each supported to invest in 2.5 ha agroforestry incorporating the cultivation of yam, maize, banana, cashew, and vegetables to ensure food security. Indigenous trees (Khaya spp, Ceiba, Emire, Otie, and Onyina) were nurtured on farms. In general, the project has helped to create 162.5 ha agroforestry farms within the landscape. The project supported district level advocacy for the integration of bamboo agroforestry into the Banda District's Sustainable Development Plan and introduced 250 people to the village saving scheme, which now has working capital of US$15,000.

The project **GHA/SGP/OP6/Y2/CORE/BD/2017/011** sought to enhance sustainable management and biodiversity conservation of the transitional forest by establishing community reserve management area within the Maluwe traditional area adjacent to the Bui National Park. The project intervention has led to the following outputs:

- 584 km^2 of the transitional forest has been conserved as CREMA bordering the Bui National Park by 12 forest fringe communities.
- 400 ha of natural regeneration areas created by 6 communities to promote the conservation of indigenous seedlings.

- 25,000 indigenous seedlings planted on farms mostly *Anogeissus leiocarpus, Terminalia avicennoides, Combretum nigricans, Khaya senegalensis, Bombax spp* and *Diospyros mespiliformis* (jackalberry-edible fruits. African ebony).



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17	-2.10518	8.43940
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20	-2.31516	8.85095

Figure 11 Maluwe CREMA

The project GHA/SGP/OP6/Y2/CORE/BD/2016/007 promoted collaborative mitigating measures for the conservation of the marine ecosystems in the Lower Volta Basin within the Songor Ramsar and Biosphere Reserve. This has promoted marine ecosystem protection through the replanting of 5ha mangrove (*Avicennia marina*). Besides, 12 ha mangrove land has been put under natural regeneration. Two (2) Volunteer groups are creating awareness on the effects of climate change and the need to conserve the mangroves in the local communities and the basic schools within the buffer zone. The groups have mounted five (5) information and prohibitive signboards and constructed one ecological restoration training center at the Korkunya community. The project has supported 116 households to construct energy-efficient wood cookstoves (65% efficiency). In general, 13,455 kg of mangrove wood that would have been used daily for heating and cooking is saved.

Figure SEQ Figure * ARABIC 12: Volunteers in Mangrove Restoration in Songhor Biosphere

The significant species whose conservation status were enhanced in the Songhor biosphere project area included migratory birds namely: Yellow-billed stork, Mycteria ibis; African open bill, *Anastomus lamelligerus;* Black stork*, Ciconia nigra; Abdim's stork, Ciconia abdimii;* Woolly-necked stork, *Ciconia episcopus*; White stork, *Ciconia;* Saddle-billed stork, *Ephippiorhynchus senegalensis*. Three species of Marine turtle (*Dermochelys coriacea; Chelonia mydas* and *Lepidochelys olivacea)* were protected within the Songhor RAMSAR seascape. The plant species promoted included Acacia mangeum, bamboo (*sitesympodial* and *monopodial*), whiles the food_species were *Dioscorea Rotundata*, *D. cayenensis. D. alata. D. polystachya. D. bulbifera. D. esculenta. D. dumetorum. D. trifida.*

The program under the project GHA/SGP/OP6/Y2/CORE/BD/2016/003 promoted bio-energy technology, and community investments in alternative biomass resources for sustainable energy generation, and reforestation of degraded lands to reduce carbon emissions at Sabiye, and Boase farming communities. The success of the project included the establishment of 15 hectares of bamboo plantation integrated into the natural forests. Two (2) communities (Sabiye and Boase) are involved. There are 137 (85 female and 52 males) beneficiaries involved in the promotion and the cultivation of bamboo as an alternative biomass resource. Thirty (30) farm families have been mobilized and trained as a wildfire management volunteer's squads. They serve as watchdog committees and ensure responsible environmental behavior in firefighting.

Figure 13: Bamboo cultivation being integrated into the natural forest.

Figure 14: Beneficiaries interacting with NC on Integrated Bamboo Plantation

4. MINIMIZING UNSUSTAINABLE LAND USE PRACTICES

Using the landscape management approach, 13 projects were supported to promote climate-smart innovative agroecology and community-led initiatives that simultaneously conserve the landscape, promote food security, and support livelihoods enterprise development. These interventions have promoted gender equality and women's empowerment.

The landscape management approach has yielded the following results:

- 500 farmers are using improved soil fertility, organic farming technologies in sustainable land management systems.
- Six (6) income-generating micro-enterprises have been established by the local women entrepreneurs currently operating profitably. These enterprises are groundnuts oil processing, detergent making, Shea butter processing, petty trading, integrated poultry and animal husbandry, and commercial/industrial wood stove construction. 300 people are benefiting directly from the livelihood support enterprises.
- 30 ha multipurpose woodlot and fodder banks have been established in five rural communities.
- 6 metal charcoal kilns installed for the production of charcoal and operating at 65% efficiency
- 150 households and 30 commercial efficient woodfuel stoves constructed and are in use.
- One 100-bird poultry enterprise established and operated by community members.
- 1,200 beneficiaries are involved in village savings and credit rotation scheme with an operating capital of US$55,000.
- 584km^2 of Community Resource Management Area (CREMA) created to serve as a buffer to the Bui National Park and is managed by 12 forest fringe communities (Figure 6).

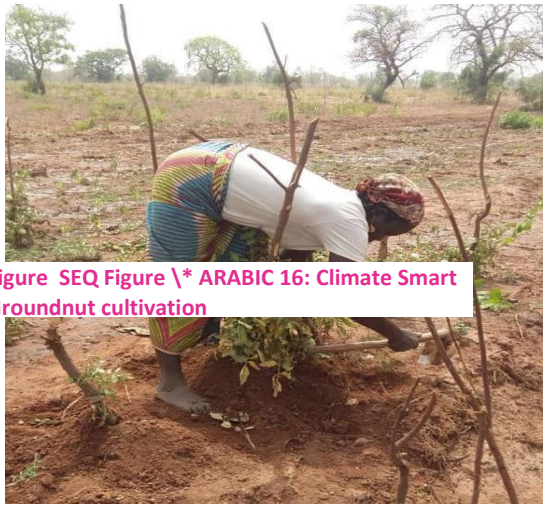


Figure SEQ Figure * ARABIC 16: Climate Smart Groundnut cultivation

Figure 17: Farm compost preparation

The project **GHA/SGP/OP6/Y2/CORE/LD/2016/002** enhanced community resilience to climate change to reduce Green House Gas (GHG) emissions through Climate Smart Agricultural (CSA) practices and ecological farming. The major success of this project was the restoration of degraded landscapes, integration of soil fertility restoration technologies in the traditional farming system, and the adoption of a village savings operating system with over 250 beneficiaries. The project built the resilience capacities of the 120 indigenous farmers in sustainable land management practices, soil fertility improvement techniques, integrated pest management in crop production, the processing of bio-chemicals and compost to minimize the use of persistent organic pollutant chemicals in crop cultivation and management of solid waste. It also enhanced the adaptability and resilience of the local farmers to climate change through climate-smart agricultural practices, ecological farming systems, and sustainable livelihood enterprise development.

The agroecological farming was practiced by 120 beneficiary farmers who have combined farming with animal rearing including apiary, piggery, small ruminant, and poultry utilizing the animal droppings to prepare compost.

Figure 18: Apiary Integrated on farms

The village savings and loan scheme has been upgraded into a cooperative society due to its high loan repayment success, increased membership, and the running capital. The cooperative now has 300 members with US$ 17,000.00 capital. Loans are given to beneficiaries to invest in agroecology and mixed farming systems. Community members involved in Piggery and livestock rearing alongside farming.

The program developed climate-resilient agriculture and food systems promoted organic and agroecology farming within the buffer zones of the critical ecosystems by integrating the elements of in-situ conservation of genetic resources, climate-smart agriculture, agroecological innovative farming and land-based organic providers (i.e. bio-deposit) to reduce the use of chemical-based fertilizers while also reducing emission from ozone-depleting substances such as nitrites and nitrates.

Figure 19 Sharing Funds during Village Savings Meeting.

The program promoted sustainable use of forest and savanna resources by addressing the drivers of deforestation to reduce the pressures on the high conservation value forests. Five (5) projects were implemented to a) enhance forest and savannah management to maintain flows of ecosystem services whiles improving community resilience to climate change through sustainable resource management; b) reverse the loss of ecosystem services within degraded forest landscapes through afforestation and natural regeneration.

5. CLIMATE CHANGE MITIGATION AND ENERGY

The program completed 5 projects to support 12 communities to adopt climate change mitigation approaches. This included climate-smart farming, wildfire management, adopt improved technologies in wood carbonization, construction of energy-saving stoves for domestic, commercial and industrial usage, and promotion of eco-certification of woodfuel production. The project has introduced 245 energy-efficient cookstoves to 125 families in 6 communities; trained 35 artisans and engaged 115 women in sustainable woodfuel production. This has reduced wood consumption by 60%.

Under the climate change mitigation program, the GEF/SGP developed three (3) typologies of community-oriented, locally adapted energy access solutions with successful demonstrations for scaling up. These technologies are kiln carbonization of wood; efficient domestic, institutional, and commercial wood stoves for cooking, fish smoking, and solar drier for nuts and seeds. Twenty four (24) communities gained energy access to locally adapted community solutions, and 245 households achieved energy access co-benefits (ecosystem effects, income, health, and others). The annual volume of wood saved through the project is about 150,000 kg.

The project GHA/SGP/OP6/Y2/CORE/CC/2017/012 supported local farmers to establish 25 ha woodlot (mainly cassia) and placed 100 ha natural woodland under sustainable woodfuel production in Bamalekura. The project is piloting eco-charcoal production and marketing system. Woodfuel production and marketing is an informal enterprise within the Black Volta Basin landscape that employs 1,800 rural farmers mostly women. The project model involves 125 wood producers (managing the 120 ha natural and planted woodland); 88 charcoal producers using three efficient metal kilns to produce charcoal; and a group of 12 women involved in the packaging, transportation, and trade in kiln-carbonated charcoal. This rural enterprise also operates village savings and credit scheme with a running capital of US$15,500. A certification scheme is part of the piloting for upscaling and broader adoption.

The kiln technology has a wood conversion efficiency of 65%, reduces the noxious emission by 70%; with completing a production cycle of 6 days including cooling.

Another project GHA/SGP/OP6/Y3/CORE/CC/2018/ 031 promoted sustainable energy for all through the adoption of efficient commercial, institutional, and domestic biomass clean cooking devices in five communities to mitigate the negative climate change impact of energy production. The project trained and certified 15 artisans in the construction of improving clean cookstoves for industrial and commercial use. Twenty (20) selected women were also trained and certified as community environmental educators.

Figure 22: Commercial Wood fuel stove

They serve as panelists on weekly radio shows, organize training for schools and churches on climate change; Ten (10) community certified extension officers were trained as trainers in climate-smart farming and alternative adaptation practices. Ten (10) were trained as managers of village savings and loans schemes and now operate 8 groups with average working capital of US$11,000 each. Twenty-two (22) women have become micro-enterprise operators in soap making.

Figure 23: Institutional Woodstoves

7.1 Wildfire Management

The program invested in five (5) projects to support 21 communities to adopt a landscape management approach to fight against wildfires in the BVB. Wildfire is one of the constraints to high agricultural yields within the BVB landscape. Prior to the inception of the program, several lives and properties were lost through a bushfire. In collaboration with the Ghana National Fires Services, the Ministry of Food and Agriculture, and the Department of Social Welfare, 150 young men and women were trained in ten (10) communities in the Banda District to adopt measures to combat wildfires. The trained Fire Volunteers were equipped with resources and knowledge

in creating fire rides and removing highly flammable vegetation from within the rides and firefighting techniques.

Figure 24: Fire Volunteers on Drill

6. FOOD SECURITY AND AGRO-ECOLOGICAL PRACTICES

During the reporting period, 6 projects in the land degradation portfolio were completed. The total number of farmer leaders involved in the successful demonstrations of agroecological practices (i.e. incorporating measures to reduce farm-based emissions) was 74, whiles the number of hectares brought under improved agricultural, land, and water management practices (by management practice) was 176 ha.

With the support of the Ministry of Food and Agriculture, the program established Farmer Field Schools (FFS) methods in Integrated Pest and Disease Management strategies. The school offered training to 185 household farmers in ecological and climate-smart farming technologies. The fundamental activities were the preparation of crop fields downstream, using A-frame leveling; the conversion of household waste into organic manure; and the rearing of poultry and small ruminants as inputs to the preparation of organic manure. The farmers were trained to produce pesticides from the liquefied bird droppings mixed with Neem extracts to spray the fields instead of pesticides. The introduction of organic farming led to the reduction of the release of Persistent Organic Pollutants (POPs) in the environment.

The Farmer Field School (FFS) built the capacities of 86 registered trainee farmers in:

i. Water-saving cultivation methods including, solid ridge making, stone bonding, and mulch.
ii. Application of basal fertilizer. Application of organic matters, mainly compost and cow dung, as basal fertilizer was the major technique to improve soil fertility and moisture. This technique was mainly for upland crops and vegetable production.
iii. Preparation and application of liquid and granular organic fertilizer.
iv. Nursery management for preparation of healthy seedlings, including grafting of cashew and mangoes.
v. Crop propagation techniques for the production of planting materials, crop rotation, and mix planting to prevent crops from such damages and quality seed multiplication and storage.

Figure 25: Compost on prepared land for planting

The project GHA/SGP/OP6/Y2/CORE/LD/2016/008 enhanced the agroforest landscape management for biodiversity conservation and sustainable land management in Sakpa and Bekweikura in the Bole District. The project conducted environmental outreach on radio, in schools, churches, mosques, and market places, educating people on environmental management and need to grow more trees and to adopt organic agriculture. About 100,000 people (30% Yabum radio listeners) were reached on the radio with the messages. Two (2) Environmental Clubs were formed in schools to take action on tree planting. One community tree nursery has been established and producing 25,000 seedlings annually. The project has trained 200 farmers in agroforestry and mixed farming practices and 141 farmers (58 women) have each invested in one hectare organic and agroforestry farms. Two natural regeneration groups were formed and trained in resource management and 2 natural regeneration sites (55 ha each) were established and demarcated. The project trained 14 Community Conservation Committee members from the two communities on conflict resolution and action planning.

Figure 26: Farmer practicing mulching

Figure 27: Application of A-FRAME in land management

Figure 28: Stone bunding as land management practice

Figure 29: Communal Compost Preparation

The project **GHA/SGP/OP6/Y3/CORE/LD/2017/016** at Bongasi Community is developing innovative climate-smart agroecology community landscape conservation practices within the Black Volta Basin. The project focused on building 15 champion farmers and the following were the results:

- 15 households have invested in beekeeping with 5 beehives each.
- 10 household beneficiaries invested in small ruminants, poultry, and piggery rearing.
- 5,000 seedlings of grafted cashew and mango were produced and distributed.
- 35 farmers have been trained in alley cropping and are practicing.

The project **GHA/SGP/OP6/Y2/CORE/LD/2017/014** is promoting climate-resilient agriculture and food security within the Bole traditional area. The project covers 85 households as beneficiaries in sustainable land management and soil fertility restoration. The project has trained 120 individual farmers in compost preparation and climate-smart agriculture. In addition, 15 men and 5 women are involved in beekeeping with 3 beehives each supplied to beneficiary farmer-households. There are three (3) Village savings and loans scheme groups each having 35 membership.

Figure 30: **A shea butter processing and grinding mill for commercial purposes.**

Figure 31: Some Beneficiaries and members of the village savings and loans.

The project **GHA/SGP/OP6/Y3/CORE/LD/2017/025** supports farmers of Kelampoble and Gbenfu communities to adopt and practice agroecological innovations to enhance food security and integrated crop-livestock farming systems within the Black Volta Basin. The outcome so far includes:

- 200 farmers involved in the Village saving and loans schemes
- 60 household farmers practicing agroecology and mixed farming.
- 100 farmers trained and supported with environmentally friendly alternative livelihoods options-such as bee-keeping, livestock rearing, apiary, soap and pomade making skills, etc.
- 15 beneficiaries in beekeeping with 12 beehives each

Figure 32: Beneficiaries showing Livestock rearing

Figure 33: An apiary belonging to an individual beneficiary

The project **GHA/SGP/OP6/Y2/CORE/LD/2016/008** is enhancing sustainable forest and agroforest landscape management for biodiversity conservation and sustainable land management in Sakpa and Bekweikura in the Bole District. The project successes include:

- 20ha of degraded landscape restored and maintained as woodlots with cassia species and teak.
- 20ha of agricultural land plotted with crops such as maize and cowpeas and inter-planted with cashew seedlings by 40 farmers
- 40 charcoal producers(80% women) adopted efficient charcoal production skills using2 metal kilns and improved homemade cookstoves
- 40 women involved in shea butter processing
- 30 women involved in beekeeping

Over 500 community people in 2 communities and about 10,000 radio listeners in 2 districts and beyond reached with messages and made aware of the Black Volta landscape degradation and rehabilitation options available to them through radio programs.

7. WASTE AND CHEMICALS MANAGEMENT

Recognizing the need to minimize mercury use and to protect human health and the environment, the program complemented the Government of Ghana's effort in implementing the provisions of the Minamata Convention. Accordingly, five grant projects were implemented to promote sustainable artisanal small scale mining in the three regions of the north focusing on:

- building capacity of small scale miners to eradicate the use of mercury in mining, whiles adopting the use of improved technology in mining;

- remediating degraded and contaminated mining areas using proven models; and
- providing alternative livelihood for women in mining.

The program initiated training of artisanal and small-scale miners to develop their capacities in the safe use of mercury and mercury-free processes for small-scale gold extraction. It shared knowledge with the miners in the safe handling and use of mercury, under the Minamata Convention and safe amalgamation and retorting using innovative mercury-free direct smelting method and distribute some retorts and direct smelting kit for sustained interest in the processes. The program promoted transparency and the rule of law in the artisanal and small-scale mining (ASM) sector and compiled sanctions for violations so that Inspectors can take direct action if a miner is found culpable.

The project GHA/SGP/OP6/Y2/CORE/CH/2016/009 built the capacities of 35 artisanal miners in improved gold refining technologies to reduce and finally eliminate the use of mercury in gold processing and to support the establishment of social enterprise as alternative livelihoods. The project is being implemented in Wakawaka, Jama, and Banda Nkwanta mining communities. So far, the project has undertaken the following activities:

- Conducted community education and awareness creation on the harmful effects of mercury on human life and the environment.
- Organized the artisanal miners into groups of 30 membership with leaders and trained them in group dynamics, conflict resolutions; health and safety principles to guide their operations and village saving techniques.
- Conducted health screening for the 120 miners and other members of the community on the presence of mercury in their bodies (testing of urine)
- Trained the organized miners in alternative technology in gold extraction without the use of mercury. This included;
    - *improving concentration by using sluices, shaking tables, centrifuges (Falcon concentrators);*
    - *reduce- Hg loss through spillages during amalgamation, amalgam tailings disposal, further processing of sponge gold;*
    - *improving processing/ refining methods such as avoiding open-air burning of amalgam, use of fume hoods, and retorts.*
- Supported interested miners to invest in processing plastic waste into diesel, petrol, and grease on a commercial basis.
- Established an effective system of monitoring the activities of the small scale miners by the group leaders and the traditional authorities on the use of mercury.
- Trained 40 youth (45% female) in organizational management, environmental management, and safeguards.

Figure 35: Retort for non-mercury gold processing

The project GHA/SGP/OP6/Y3/CORE/CH/2018/033 is piloting managing waste and chemicals for community wealth creation and sustainable environmental management in Banda Nkwanta. The project is gradually building local capacities in plastic waste conversion into 4 different types of fuels; petrol, diesel, gasoline, kerosene using the pyrolysis process. Plastic waste as raw materials to produce fuel. The pyrolysis (the processes of converting plastic waste into the four different types of fuel) is still undergoing research.

8. CAPACITY DEVELOPMENT AND KNOWLEDGE MANAGEMENT

Two standalone projects were completed. The project GHA/SGP/OP6/Y2/CORE/CD/ 2016/005 facilitated a dialogue between the GEF/CSO Network and the Government (Ministries of Environment, Science Technology Innovation, and Forestry). The dialogue was in two meetings, covering 30 Civil Society Organizations (CSOs) made up of Project Coordinators, Directors, and Chairpersons of CBOs and NGOs, Government service providers; Local Governments, and Traditional Authorities, 35% were women. The program has undertaken capacity development and knowledge management for 35 CSOs towards the implementation of Multilateral Environmental Agreements (MEA) and national and subnational policy, planning, and legal frameworks. All materials on MEAs, national policies, and strategies designed have been printed and training for its usage and application was organized for 40 CSOs on Minamata and Stockholm Convention.

Special capacity development workshop for 23 CSOs was conducted covering: Organizational development; Project cycle (problem identification, project formulation, implementation, and management); and Sustainable land management and land-use planning. The training also focused on:

- GEF focal area project planning and implementation especially in Biodiversity Conservation, Climate Change, International Waters, Persistent Organic Pollutants, and Sustainable land management.
- Environmental participatory monitoring.
- Formulation of a business plan.

- Gender mainstreaming and development.

The program has been assisting stakeholders' especially local communities and Civil Society Organizations (CSOs) to develop capacities as "Barefoot Consultants" to access non-GEF funds such as the Adaptation Fund and Green Climate Fund focusing on GEF focal area activities. The program has assisted the establishment of a "CSO-Government Policy and Planning Dialogue Platform" (which could be in partnership with the GEF NGO Network); one transformational change that SGP had succeeded is in the trust-building that results from civil society and government joint work in NSCs and in projects such that there is increased acceptance by governments to civil society involvement. The program established a barefoot training institute to train local people and CSOs in the best innovative practices in sustainable agriculture, low carbon technologies, and biodiversity enterprise development.

9. SOCIAL INCLUSION

The project intervention on social inclusion (Persons with Disabilities) was directed towards fighting the plastic waste menace. The program developed the capacities and resilience of Persons with Disabilities (PWD) in Bolgatanga and Bongo to collect and process the plastic wastes into shopping bags, hats, wallets, living room sofa, and doormats. Under this project, the Programme empowered 36 PWD to collect and process one ton of plastic waste each month.

Besides, they became local ambassadors that were educating the local communities to refrain from open burning of plastic waste and adopt the culture of recycling.

From the testimonies of Mark Atila Sadik, *"the initiative has created jobs and improved incomes for PWDs, thereby curbing the migration of the PWDs to the South as beggars"*

Working closely with the District Food and Agriculture Ministry, the Department of Social Welfare the Wildlife Division of the Forestry Commission, and the Ghana National Fire Service, the PWDs have adopted innovative strategies, procedures, and opportunities to create incentives for increasing community investment in sustainable land management and environmental management. Much work has been done in promoting organic farming and innovated integrated in-situ conservation of genetic resources, climate-smart agriculture, agroecological innovative farming, and land-based organic providers (i.e. bio-deposit) to reduce the use of chemical-based fertilizers, while also reducing emission from ozone-depleting substances such as nitrites and nitrates.

Figure 38 Persons with Disabilities in plastic bag making

10. YOUTH INVOLVEMENT

Two (2) projects targeted mainly the youth as the beneficiaries. Project GHA/SGP/OP6/Y3/ CORE/CH/2017/028 was a community waste compost enterprise established in Abrono to support climate-smart sustainable agriculture and livelihood development projects. The Youth were trained and supported to process domestic and farm waste into organic manure. The products are being packaged and sold to local farmers to invest in organic agriculture. The Youth were trained as local farmers to invest in integrated pest management (IPM) for controlling pests. Through this project 20 Youth have gained permanent employment. About 5,000 tons of

chemicals, pesticides, and chemical fertilizers are being avoided annually in the agricultural sector and incomes of farmers have increased by 100 percent.

The program supported the upscaling of innovative low carbon technologies, including the use of improved charcoal and wood stoves for domestic, institutional, and commercial use in the coastal and northern savanna areas. The program enabled 20 Youth to manufacture and distribute 500 improved fish smoking stoves to fish smokers in the coastal savannah ecosystem, supplied 20 secondary institutions with institutional stoves. They also assisted 600 households to construct and use energy-efficient cooking woodstoves.

CONCLUSION AND LESSONS LEARNT

11. SUMMARY OF PROJECT ACHIEVEMENTS

The performance of the GEF/SGP interventions in the country during the OP6 has been very substantial. The review has revealed that:

1. The program has made substantial gains towards GEF focal areas and sustainable development goals, especially in biodiversity conservation, climate change mitigation, and land degradation. The program approach, strategies, and methodologies adopted have been participatory, transparent, and have allowed a high level of ownership of the process. The project interventions have deepened the understanding of the local communities in GEF focal area activities, business management, and rural investment. This is a good sign of ownership of the process and employment opportunity for the local communities.

2. The capacity-building efforts of the program has been satisfactory. The techniques for developing specialized skills in the women to diversify income source, develop business acumen, and ensure quality standards, good trade practices and code of conducts in business has been effective. Training in resource management, financial record keeping, and marketing techniques has been very beneficial to most CBOs and NGOs.

3. Through the project intervention, the literacy level of CBOs in resource management, business management, record keeping, and reporting is improving. The capacity-building workshops coupled with the formation of community-based groups for resource management has strengthened the capacity of vulnerable groups to exercise voice and demand their rights. It has helped the women and the youth to realize their rights associated with livelihoods and has increased the voices of women to demand accessible, affordable, and quality social services (education, health, and social welfare). Women are now vocal in the decision-making process in their communities and can convene community meetings.

4. Capacity building and training among NGOs and other stakeholders is an integral strategy to ensure a quality portfolio. It is especially relevant for GEF focal areas and concerns, design, monitoring, and evaluation. Not only is this useful in building a new program, but training is a continuous need to reflect changes in the NGO community and target groups.

5. The project has made substantial progress towards making credit available to rural farmers, especially women, through the operations of the revolving funds. The credit scheme is operated by the women and the membership continues to increase, thus,

sustaining the project outcomes. This has generated trust to leverage financial resources and technical assistance in the project areas.

6. The projects implemented have established a partnership with community-based organizations operating in the GEF/SGP focal areas. It has also mobilized a cadre of volunteers who are mobilizing the communities to fight against environmental degradation and poverty.

7. *Community Land Management.* Reinstituting and expanding community-based land management decision making within the project area is a significant step to creating sustainable mechanisms to prevent future land degradation. By establishing a community-managed natural regeneration area through agreements with the landowners, and agreeing to manage it according to forest management principles is likely to remove several barriers and promote sustainable land management and community cooperation.

8. *Building social capital for land management.* Prior to the project implementation, the subsistence farmers in the areas were not cooperating in land management decisions, bush fire and the resultant land degradation were rampant. After the establishment of the regeneration area, the agroforestry farmers with cashew and bamboo, and the creation of the natural resource management areas and CREMA, it is expected the local environment and the quality of life will improve. Such improvements will demonstrate that cooperation in natural resource management is beneficial to the communities and will help to overcome the emotional and cultural barriers that often present obstacles to local collaboration.

9. *Building Dialogue with the Local Government.* The project is rooted in participatory processes that stress the importance of listening and learning. All the participating NGOs/CBOs are implementing the project with the full knowledge of the Local Government and Traditional Authorities. This has facilitated dialogue between the communities, government agencies, NGOs, and businesses to address issues relating to land management. Most of the Government agencies are providing extension services and technical backstopping to the project and leverage additional resources.

10. *Identifying Opportunities for Sustainable Land Management and livelihood development.* The project has unearthed a lot of potentials and opportunities that will support sustainable land management in the Black Volta Basin. The community fodder banks and natural regeneration areas are providing a clear understanding of how sustainable land management can directly impact on the alleviation of rural poverty. Under this project

community cooperation on land management decisions is central to the project implementation as well as setting the foundation for continued land degradation prevention. Given the similar social structures found in Northern Ghana, the possibility of scaling up exists in terms of expanding this project to include additional surrounding communities or setting up a similar project in another area. This project could also serve as an example to other regions of the globe that have land degradation problems of a similar nature because, the management techniques introduced for organic farming, agroforestry, and fire prevention are already widely used in other areas of the tropics; especially the composting methods and the use of the non-native leguminous *Leucaena leucocephala* as a fodder tree.

11. Village Savings and Credit Schemes are becoming more relevant to village life. Currently, the program has established over 32 village savings and credit schemes in the landscape. The purpose is to help microfinance practitioners set up Village Savings and Loan Associations (VS&LAs) in the challenging and very poor environment. There is a need to document and develop manuals to guide operations.

12. The program has set up a "Grassroots Reach" communication channel for use not only by SGP but also by the government, and other international donor agencies, and the private sector interested as a business partner on marketing sustainable products. The program will have to maintain a partnership with the press to sustain awareness creation on sensitive environmental issues. To develop the Black Volta basin as the main landscape target and waterscape conservation. The program will have to focus attention on:
    - networking and strengthening community and civil society groups operating in the areas for constructive dialogue with government in national and district level environmental planning and policy development;
    - implementing proven working models for further scaling up, replication and mainstreaming of new innovative technologies;
    - increasing resource flow to communities and local CSOs through the effective use of local assets and innovative environmental financing mechanisms.

12. LESSONS LEARNED

- There should be regular training and retraining of these artisanal miners on health and safety principles to guide their operations. Miners are willing to submit themselves to health screening.
- There is a need for capacity building and skills development by NGOs and civil society organizations to minimize the associated risks and health hazards that accompany the wrong use of mercury.
- Environmental regulators and law enforcement bodies should make efforts to establish cordial and working relationships with the artisanal miners. This will help reduce the negative environmental impacts of their activities.

- Social enterprise support services are most relevant to peripheral miners to engage in safe but rewarding enterprises instead of exposing themselves to unnecessary environmental risks at the mining sites.
- Logistical support in the form of protective gear should be supplied to registered small scale miners.

13. KNOWLEDGE MANAGEMENT

The SGP Ghana vision for OP6 was to become a major knowledge center for community-based initiatives that address environmental problems at the local level while achieving significant global environmental impacts. Accordingly, the following has been achieved:

- developing a web platform that allows better knowledge capture and sharing, monitoring and evaluating the use of new media;

- contributing to knowledge bases and fora by increasing alliance with birdlife international and forming a constituency of CSOs with capacity, motivation and systematic information flow;

- establishing information exchange links with the national policy-making bodies, especially with the ministry of environment science, technology, and innovation;

- providing guidance to the CSOS on how to capture and disseminate knowledge and conduct knowledge exchange at the local level to be aggregated at the global level.

14. CONCLUSION

The OP6 has been on course and the output indicators being monitored indicate that the program is likely to realize its full objectives. At the fifth year, the program has generated:

<u>Community Empowerment</u>

- Positive attitude change on the sustainable use of natural resources.
- Increased capacity of small producers to identify and take advantage of market opportunities and to build market linkages with local, regional, and international markets.
- Increased awareness and understanding of environmental, ecosystem services, and the economic benefits of sustainable land management practices with trade development.
- Access to new technologies, development of networks and associations of producers of ecosystem goods and sustainable land management products to develop links with buyers and markets and to facilitate the organization of, and participation in promotional activities (e.g. trade fairs) introduced by the end of the plan period.
- Involvement of local communities in preserving ecosystems and their services, managing land sustainably, and restoring degraded areas facilitated by the end of the project.

Sustainable Land Management

- 60 squads of fire volunteers have been trained and equipped across the landscape
- 20% of farmers and farm families operate sustainable land management
- At least ten community-operated tree nurseries operate profitably
- 400 ha under natural regeneration and sustainable management
- At least 6 income-generating micro-projects developed and operating profitably.
- 50% of economic activities set up in 1st year are still operational after 2 years
- publications and video documentary on best practices in sustainable land management are being prepared and disseminated
- 500 farmers using improved soil fertility technologies, organic farming, and sustainable land management systems
- 100 members of the community trained in wildfire management by 2nd year of the project
- Incidence of wildfire cases reduced by 60% by end of 2nd year

Livelihood Development

- 100 people benefiting from alternative livelihood support activities by end of the project.
- 1 automated oil mill established to provide groundnut oil for the local market
- 20 ha multipurpose woodlot and fodder banks established by 2nd year of the project.
- 4 metal charcoal kilns operating at 35% efficiency installed and yielding 12-15% profit.
- 100household and 10 commercial efficient woodfuel stoves constructed
- One 100-bird poultry established and operated by community members,
- 2,200 beneficiaries involved in village savings and credit rotation scheme with operating capital of US$95,000.

Biodiversity Conservation

- 600 ha of savannah forest conserved
- Hippo population conserved
- Wildlife management promoted through ecotourism

Endangered/threatened species being protected

- Migratory birds (There are 8 species in the project area: Yellow-billed stork, Mycteria ibis; African open bill, Anastomus lamelligerus; Black stork, Ciconia nigra; Abdim's stork, Ciconia abdimii; Woolly-necked stork, *Ciconia episcopus*; White stork, *Ciconia*; Saddle-billed stork, *Ephippiorhynchus senegalensis*)
- Manatees (family *Trichechidae, genus Trichechus*)
- marine turtle (*Dermochelys coriacea; Chelonia mydas* and *Lepidochelys olivacea*)
- A*cacia mangeum*

Other Species being promoted

- Improved Small ruminants (goats and sheep),

- apiculture,
- guinea fowls and poultry farming,
- piggery,
- wild-animal domestication (grasscutter farming).

VOICES FROM THE FIELD

"The trainings on using climate smart agriculture technologies has helped this community a lot. Since I became part of the Women Farmers Association, I harvest six bags of groundnuts from my one acre farm as against two bags previously. This project is indeed our savior. Our groundnut seeds can withstand drought. Whether it is rainy or sunny, I'm able to harvest a lot to hire labour, take care of my children and home. Today I have additional money to save with the credit union" (Madam Diana Annane, June, 2019)

"Formerly we were using fertilizer and chemicals in our farms. This did not help our land as we continued to add more fertilizer. The quality of the soil fell and consequently low yields. However, with the intervention from GEF/SGP we shifted to organic farming using organic compost we make from waste food, animal droppings, and dead wood. Now maize yield from my one acre land is five times more than before. My cashew grows faster. I combine food crop cultivation with cashew and my farm income has doubled. Surprisingly my family and I are looking healthier. We don't go to the hospital often as we use to in the past because we eat what we produce. Our soil is rejuvenating and I am happy." (Madam Esther Boakye Yiadom. July, 2018)

"The project helped me to acquire twelve beehives and I am able to harvest two (2) gallons (10 liters) of honey from each beehive, which I used to fend for myself and take care of my family. Combining beekeeping and farming has increased my income by three times. I have enough to complete the construction of my house which I stated ten years ago. I intend to increase the number of my beehives in order to get more harvest" (Nonga Nie, July 2019.

"This project has brought a big change in my community. My people are more united than ever. They meet every Sunday evening to collect money, fight bushfires, settle household quarrels, and plan for the development of the community. Indeed, the credit union has brought money to our doorsteps. They give soft loans to people in need to trade, farm, or invest and share investment bi-yearly to provide capital to individuals to invest. Thanks to the UNDP/GEFSGP for the implementation of this project. One interesting thing is that for the past twenty years that I was on the throne as the Chief, no government official visited this traditional area, but with the GEF project, the District Chief Executive, Director of Agriculture and the regional press corps has visited this community more than once. I get phone calls to speak on the radio for this project. Oh! this project has been of great benefit, not only to women but men and families in the communities as well. [Nana Augustine Nsiah, July 2019]

"Nana Busu, the husband to one of the women benefiting from the project informed me that his wife took care of the house and children with some of the profits from her groundnut sales after his savings and loans delayed. He said, her health is also in good condition since improved cookstoves were introduced at home. I am very grateful that my community is a beneficiary of this project", [Dorbor July 2019]

15. APPENDIX 1: BVB PROJECTS APPROVED AND IMPLEMENTED

The OP6 program was aligned to the GEF's focal area strategies and Ghana's commitment to many international agreements. Pursuant to this, the program has eight projects as summarized in table three.

Table 1: Project approved and implemented under OP6 (June 2020)

Main CPS Focus	**Approved projects under implementation (As at December 2018)**	**Program Outcome (June 30, 2020)**
Promoting ecosystems management through community landscape and waterscape (CLSC) strategies to conserve biodiversity, sustainably develop the ecosystem goods and services, and enhancing their sustainable utilization based on the experiences obtained from the implementation of CREMA and COMDEKS. [Aichi CBD targets by 2020].	Promoting innovative agroecology models and mechanisms for conservation of carbon stocks within the savannah landscapes in Seripe and Wakawaka communities.	The projects have promoted ecosystem management and stimulated the adoption of climate-smart agriculture and agroecology in agriculture. The outputs achieved so far are: € 45,000 community members within the land have been made aware of the effects of climate change on biodiversity conservation, sustainable land management and livelihood development within the Black Volta Basin; € 5,500 community members have been trained and enhanced with the knowledge to trigger the attitudinal and behavioral change in environmental management. € 1,500 youth have been educated and trained in wildfire management to reduce the risk of the total loss of investment by providing crop insurance and enhance carbon stocks (woodlots,
	Supporting Bunguase Community to invest in innovative Climate-Smart Agroecology Community Landscape Conservation practices within the Black Volta Basin.	
	Developing guidelines for mainstreaming Climate Smart Innovative Agro-Ecology practices and Gender Development into community-level activities within the Black Volta Basin	

	Enhancing sustainable forest and agroforest landscape management for biodiversity conservation and sustainable land management in Sakpa and Bekweikura in the Bole District.	trees on farms, trees on school compounds. € 245 farm families have adopted and invested in climate-smart agriculture. € 150 ha of indigenous and exotic species have been planted as carbon stocks on farms to increase tree cover of the landscape through natural regeneration, enrichment planting, the establishment of woodlots. € 650 ha of natural regeneration and CREMA has been established and managed by the local communities with support from the Forestry Commission. € 30 ha. of indigenous community conserved woodland areas natural regeneration and 2 Community Conservation Committees (10 members each) € 250 farm families have invested in compost and organic pesticide preparation. 10 ha of farms are under agroforestry and organic agriculture. € 250 women farm families have been supported to diversify livelihoods including improved Shea-butter processing, bee-keeping, and small ruminant rearing.
Designing the conservation, and governance of community-managed protected areas by tracking, mapping, documenting, and monitoring terrestrial and marine ICCAs, to achieve the Aichi targets 11 (protected areas), 14	Enhancing the conservation and governance of indigenous and community conserved areas through tracking, mapping/documentation, and mainstreaming of biodiversity conservation into the Black Volta Basin socio-ecological production landscape.	The project is enhancing the conservation and governance of indigenous community conserved areas through tracking, mapping/ documentation, and mainstreaming of biodiversity conservation into the socio-ecological production landscape of the Black Volta Basin**.** This will be done by identifying, delineating and documenting sacred groves;

(ecosystem services) and 18 (traditional knowledge) and to national objectives of mainstreaming biodiversity conservation.		conducting a participatory inventory of plants diversity, mapping endemic and medicinal plants species within the sacred groves and documenting rare biological, geographical and culturally significant features within sacred groves; quantifying carbon storage within sacred groves and negotiating for the registration of the sacred site on ICCA global maps and guidance for the restoration of the degraded sacred landscapes
Supporting the sustainable management of coastal wetlands, mangrove conservation, and sustainable utilization of resources within degraded RAMSAR sites.	Collaborative mitigating measures for the conservation of the marine ecosystems in the Lower Volta Basin in the Songor Ramsar and Biosphere Reserve.	The project is promoting the protection of the marine ecosystem in the Lower Volta Basin and the Songhor Biosphere through collaborative resource management to improve livelihood
Climate-resilient agriculture and food systems, promote organic and agroecology farming within the buffer zones of critical ecosystems, within the Black Volta Basin.	Enhancing community resilience to climate change to reduce Green House Gas (GHG) emissions through Climate Smart Agricultural (CSA) practices and ecological farming in Dorbor community in the Banda District of the Brong-Ahafo Region. Develop and sustain the capacities of women farmers in Sogrunu Kope and Akramaman to adopt innovative practices that will integrate indigenous and economic trees on farms, minimize wildfire incidence, and ensure sustainable land management utilizing agroecology strategies whilst investing in sustainable livelihood enterprise development through the introduction of apiculture and small ruminant rearing.	Project is promoting sustainable agroforestry through alley cropping and woodlot establishment on degraded lands, build and sustain capacities of local farmers in ecological farming through zero tillage, organic compost preparation, and good agronomic practices to sustainably increase agricultural productivity and income of farmers and to support sustainable livelihood enterprise development as compensation for the provision of ecosystem goods and services through the processing of natural resources to enhance sustainable land management to enable the farmers to cope with climate change. SGP is innovating by integrating the elements of in-situ conservation of genetic resources, climate-smart agriculture, agroecological innovative farming, and land-based organic providers (i.e. bio-deposit) to reduce the use of chemical-based fertilizers,

		while also reducing emission from ozone-depleting chemicals.
	Reducing deforestation through climate-smart agriculture technology transfer and livelihood promotion among rural poor farmers in Gbenfu, Lanpoga, and Manful in the Bole district	The project seeks to support farmers to practice conservation agriculture, rehabilitate degraded forest through good agronomic practices and agroforestry technologies in 3 rural communities namely Gbenfu, Lanpoga, and Manful within the Black Volta River Basin in the Bole Bamboi Areas. It promotes conservation agriculture and climate-smart agricultural techniques, the project addresses the drivers of farming induce forest degradations, the risk associated with climate change variability, and food insecurity and promote the adoption of innovative climate-smart agro-ecology approach; through farmers capacity building and support, the project will develop climate-resilient agriculture and food systems, promote organic and agroecology farming.
The program will create major activity on forest corridors in sloping lands from slash-and-burn cultivation with the dual purpose of preventing cover loss and erosion as well as forest fragmentation.	Developing and sustain the capacities of Kogyei farmers to identify innovative practices, procedures, and opportunities to invest in biodiversity conservation and sustainable land management utilizing agroecology strategies.	The project is assisting the farmer groups to restore degraded lands through integrated water and soil management, community-based forest woodlot/agro-forestry, wildfires management, natural regeneration establishment, and enrichment planting; and support the Kogyei farmers' Association in sustainable livelihood enterprise development.
● Build on "bottom-up energy solutions" strategy within the SE4ALL process, using an integrated approach wood carbonization and establishing wood fuel plantations aimed at increasing climate resilience and reducing poverty.	Developing and sustaining the capacities of Senge-Chiechie cashew farmers to adopt innovative practices that will integrate indigenous trees into cashew plantation, minimize wildfire incidence, and ensure sustainable land management utilizing agroecology strategies, whilst investing in sustainable livelihood enterprise	The project is developing the capacities of targeted farming communities to adapt and invest in agroecological farming practices by integrating bamboo cultivation with a tree growing, food/cash crop cultivation, animal rearing, and sustainable woodfuel production for poverty reduction and environmental sustenance.

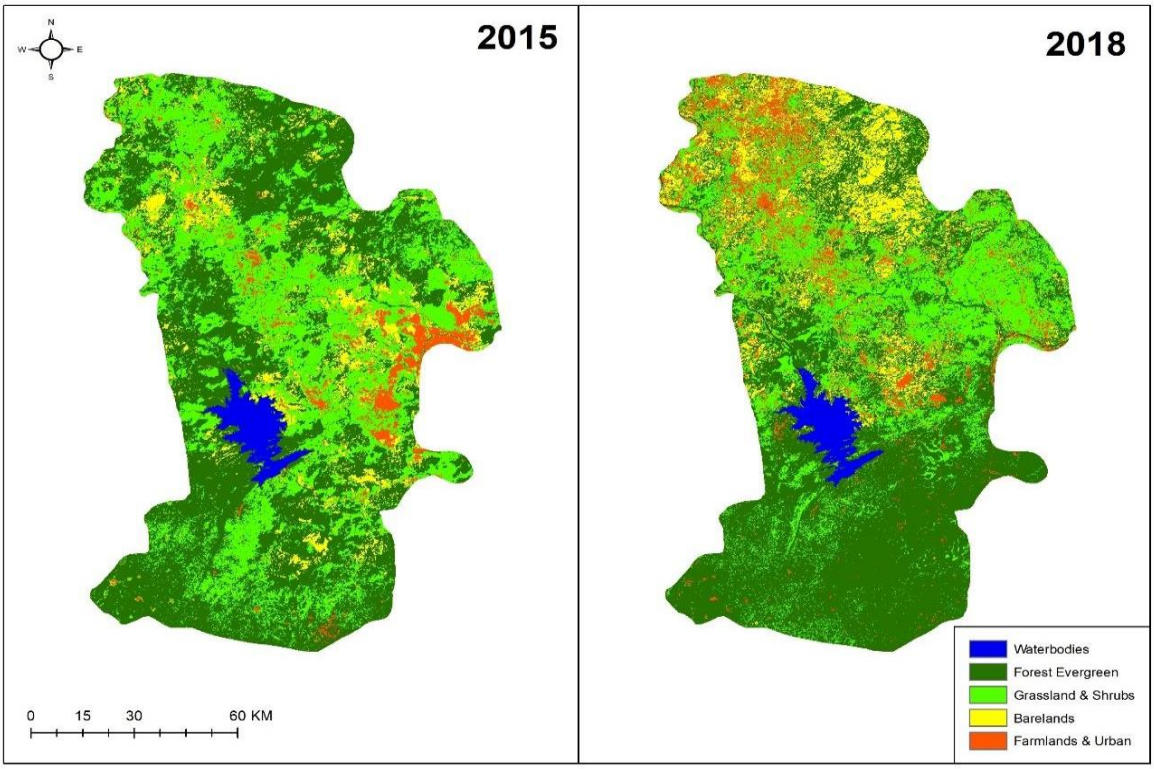
	development through the introduction of apiculture and small ruminant rearing.	The project is developing the capacities of local farmers in Boase and Sabiye to establish model agroecological farms by integrating organic food/cash crop cultivation, with the cultivation of different species of bamboo, the tree growing under agroforestry schemes and animal rearing for compost preparation. It has supported local champions (farmers) to invest in sustainable bamboo agroforestry, and small-scale private bamboo firewood and provide technical support to woodfuel producers to establish and invest in micro/small scale business enterprises to process wood/bamboo utilizing improved carbonization technology utilizing metal kilns.
Focus support to communities in the forefront of chemical threats either as users or consumers by:-	Promoting mercury management among artisanal miners and processing of plastic waste into fuel in Wakawaka, Jama, and Banda Nkwanta, within the Black Volta Basin.	The project is supporting 100 artisanal miners in the Upper East region to reduce the use of mercury in gold mining through improved processing/ refining methods such as avoiding open-air burning of amalgam, use of fume hoods and retorts. In addition, most of the degraded lands are being remediated with cash crops and fuelwood. In the Upper West region, a community mining project has been initiated. Negotiations are on the way to get concessions from the Minerals Commission. Also, the miners are being trained to adopt mercury-free technologies. -. Networking and strengthening community and civil society groups operating in the areas for constructive dialogue with government in national and district level environmental planning and policy development;

		Implementing proven working models for further scaling up, replication and mainstreaming of new innovative technologies Supporting sector-wide awareness-raising linked to innovative, affordable, and practical solutions to chemical management have been initiated. Waste segregation and waste management at household levels is being practiced and processing of plastic waste into diesel and petrol has been tried. Establishing partners with IPEN as well as new partnerships that will strongly include government agencies, research institutions, and international agencies such as UNIDO and WHO. Establishing systems of local certification of organic producers of vegetables, initially through producer-consumer agreements and eventually graduating to national government policy.
● Focus on building more institutional and commercial woodfuel stoves, low carbon emission transport systems, solar drying, and solar for irrigation. ● Maintain partnership with the press to sustain awareness creation on sensitive environmental issues.	Capacity Development and Knowledge Management for Civil Society Organizations towards the implementation of Multilateral Environmental Agreements and national and sub-national policy, planning, and legal frameworks.	● The project is supporting 100 artisanal miners in the Upper East region to reduce the use of mercury in gold mining through improved processing/ refining methods such as avoiding open-air burning of amalgam, use of fume hoods and retorts. In addition, most of the degraded lands are being remediated with cash crops and fuelwood. ● In the Upper West region, a community mining project has been initiated. Negotiations are on the way to get concessions from the Minerals Commission. Also, the miners are being trained to adopt mercury-free technologies. -.

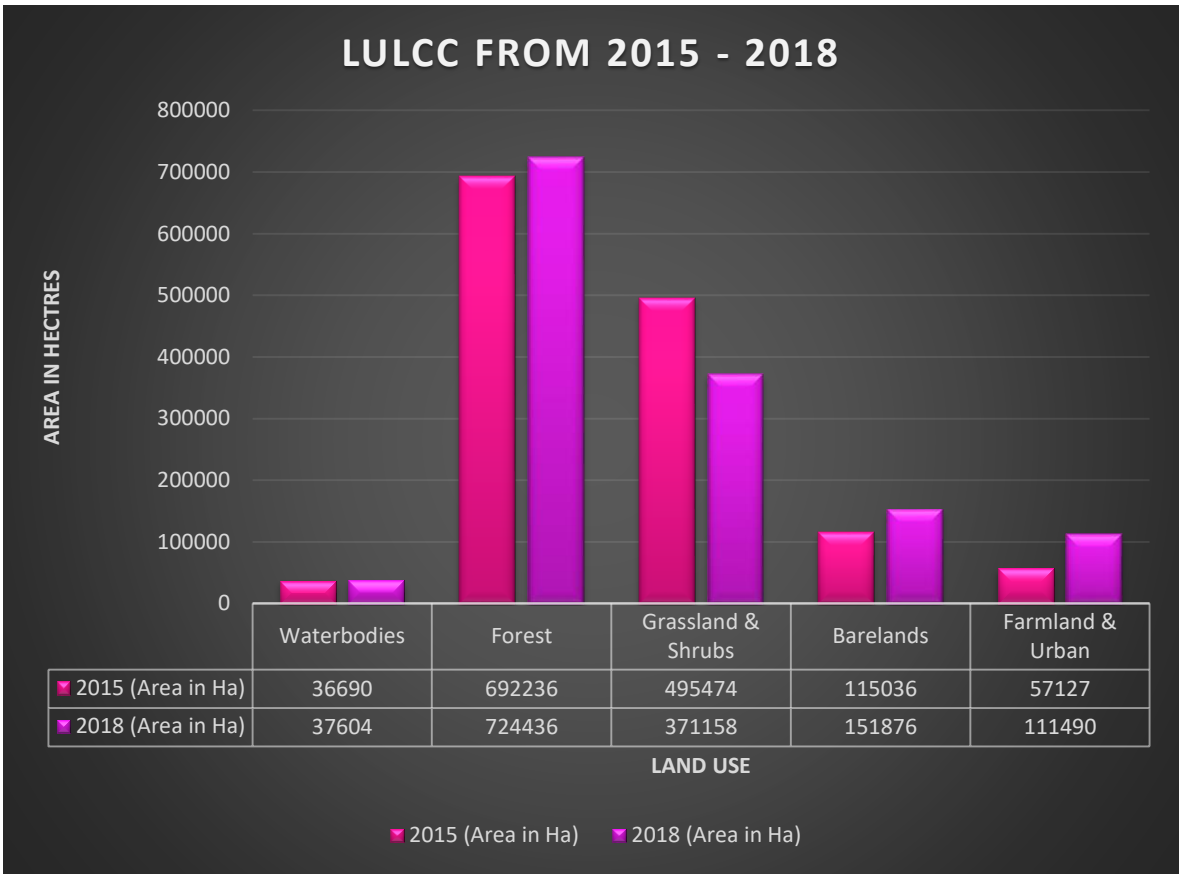
		• Networking and strengthening community and civil society groups operating in the areas for constructive dialogue with government in national and district level environmental planning and policy development; • Implementing proven working models for further scaling up, replication and mainstreaming of new innovative technologies • Supporting sector-wide awareness-raising linked to innovative, affordable, and practical solutions to chemical management have been initiated. Waste segregation and waste management at household levels are being practiced and processing of plastic waste into diesel and petrol has been tried. • Establishing partners with IPEN as well as new partnerships that will strongly include government agencies, research institutions, and international agencies such as UNIDO and WHO. • Establishing systems of local certification of organic producers of vegetables, initially through producer-consumer agreements and eventually graduating to national government policy.

16. APPENDIX 2 DETECTION OF LAND COVER CHANGE

Change Detection Analysis (2015-2018)



LANDUSE CLASSES	2015		2018	
	(Area in Ha)	(%)	(Area in Ha)	(%)
Water bodies	36690	3	37604	3
Forest	692236	50	724436	52
Grassland & Shrubs	495474	35	371158	27
Bare lands	115036	8	151876	11
Farmland & Urban	57127	4	111490	8
Total	**1,396,563**	**100**	**1,396,563**	**100**



There has been a change in the forest cover by 32,200 ha (increase by 4.65%) which might be attributed to the creation of CREMA, planting of new trees, and natural regeneration. More farmlands are being created for the cashew plantation.

Unfortunately, the bare land area has increased by 32%. This was mostly on the north-eastern side where the project activities were minimal. There are also areas where the small-scale mining activities take place but were not covered under the project.