The GEF Small Grants Programme

COMMUNITY ACTION GLOBAL IMPACT

Ecological Restoration through Ecosystem-Based Adaptation of the Botanic Reserve at Fourah Bay College, University of Sierra Leone

Project Nos : SLE/SGP/OP7/Y1/CORE/BD/17/12/2020/2

SLE/SGP/OP7/Y3/STAR/ BD/1/11/2022/45

Grantee: Department of Biological Sciences, Fourah Bay College, University of Sierra Leone

Location: Mount Aureol, FBC, Freetown

SGP Contribution: USD $50,000

Cash Co-Financing: USD $ 4,260

In-Kind Co-Financing: USD $17,005

Project Duration: 24 months

Number of people served: 1,010

Focal area: Biodiversity Conservation

BACKGROUND

The United Nations Development Programme (UNDP), Global Environment Facility Small Grants Programme (GEF-SGP) in Sierra Leone supported a critical biodiversity conservation initiative towards a transformative ecological restoration. The project was implemented by the Department of Biological Sciences at Fourah Bay College (FBC), University of Sierra Leone. With a total grant of **USD 50,000** over a two-year period 2021 and 2022, titled. **"Ecological Restoration through Ecosystem-Based Adaptation of the Botanic Reserve at Fourah Bay College".** The project **h**as yielded exceptional ecological, educational, and socio-economic impacts.

The FBC Botanic Reserve is located on Mount Aureol, a key ecological extension of about 82 hectares of the Western Area Peninsula Forest (WAPF), approximately five kilometers south of central Freetown. Historically, the reserve featured a diverse closed-canopy moist forest, savanna patches, and supported rich biodiversity, including over 120 bird species (some endemic), 20 mammal species (notably primates), 108 butterfly species, and several unique reptiles and amphibians such as the endemic *Arthroleptis aureolli*. Additionally, the reserve played a vital role as a watershed, supporting the water needs of downstream communities in parts of central Freetown .

However, decades of encroachment by inhabitants of surrounding settlements, particularly during and immediately after the civil war (1991–2001), severely degraded the reserve due to undefined boundaries and weak enforcement of conservation regulations. In that period, the reserve experienced uncontrolled exploitation of its wood, indiscriminate deforestation, destructive stone mining, and land grabbing for housing construction.

FUNDING SUPPORT

In 2021, the UNDP Global Environment Facility Small Grants Programme (GEF-SGP) provided a grant of US$30,000 to the Department of Biological Sciences at Fourah Bay College (FBC), University of Sierra Leone, to implement the project titled *"Ecological Restoration through Ecosystem-Based Adaptation of the Botanic Reserve at Fourah Bay College."* This initial support was followed by an additional grant of US$20,000 in 2022 to scale up project activities. Together, these contributions played a critical role in revitalizing the FBC Botanic Reserve by enhancing institutional capacity and supporting ecological restoration efforts, thereby strengthening the conservation and sustainable management of the reserve.

ACTIVITIES

This project exemplifies the multifaceted approach of the GEF Small Grants Programme combining **ecological restoration, community empowerment, academic enrichment, and sustainable biodiversity conservation**. The main activities of the project include:

1. Restoration of the Botanical Reserve through Ecosystem-Based Adaptation:
2. Establishment of a Generational Learning Laboratory:
3. Student Training in Ecosystem-Based Adaptation Strategies:
4. Dissemination of Project Results to Stakeholders:
5. Development of Peer-Reviewed Scientific Publications:

Generally, the overall conservation status of key threatened species, notably *Afzelia africana* and *Arthroleptis aureolli* (formerly *Cardioglossa aureolli*), both listed by IUCN and uplisted to CITES Appendix II in 2023, has shown measurable improvement. Additionally, there is an improvement in a year-round water availability which flows from two main catchment sources within the reserve as the key resource that the communities need. Over 120 students and technical staff were trained on biodiversity, environment and climate change, whilst 35 local women gardeners were trained on organic farming and compost making to help them improve on productivity without the need to clear more land.

IMPACTS

a) Restoration of degraded areas

The UNDP GEF-SGP funded project successfully catalysed the ecological revival of the reserve and restored over a total of about 10 acres of critical degraded areas within the botanical reserve using ecosystem-based adaptation strategies leading to the protection of natural springs and catchment areas, and improved biodiversity. The strategies included the establishment of a nursery with **13,027 seedlings** consisting of **25 plant species**, including **4,000 seedlings of**

Afzelia Africana a species currently listed as *Vulnerable* by the IUCN Red List (2023). These seedlings were transplanted into the degraded zones laying the foundation for long term ecosystem recovery. Each of the planted seedlings were code-marked with a tag number and GPS data and a database was established. Some of the seedlings have been adopted by people from different works of life who are interested in environmental issues and are contributing some token towards the care of the respective trees.

b) Community Empowerment and Socio-Economic benefits

A significant milestone was the signing of a Memorandum of Cooperation between FBC and a cooperative of **35 local women gardeners**, who have secured access to land for gardening in exchange for a nominal rental fee. This agreement helps prevent land grabbing while fostering sustainable livelihoods. The women received training in key environmental practices, including nutrient cycling, water management, and composting techniques.

c) Academic and Research Contributions

The initiative also created valuable research opportunities for students in the Department of Biological Sciences. Three honours students conducted thesis research directly related to the project as listed below:

- **Unisa Sesay** (Grade: 63, Second Class First Division)
  Research Title: Growth and survival status of seedlings in the FBC Botanic Reserve (2021–2023)
- **Cherinor Umar Bah** (Grade: 74, First Class Honours)
  Research Title: Digitization of the FBC Herbarium: Diversity and distribution of Fabaceae species
- **Amadu Koroma** (Grade: 67, Second Class First Division)
  Research Title: Digitization of the FBC Herbarium: Distribution of species in Euphorbiaceae, Rubiaceae, Apocynaceae, and Combretaceae families

These studies contributed to the **digitization of 190 plant species**, with herbarium specimens prepared and archived. A digital database was developed to enhance accessibility for researchers, staff, and students.

Recent research supported by the funds from GEF-SGP has revealed that the FBC Botanic Reserve is home to seven globally threatened plant species, including one classified as endangered. The reserve also provides habitat for two globally threatened bird species namely the Hooded Vulture (*Necrosyrtes monachus*, Critically Endangered) and the Yellow-casqued Hornbill (*Ceratogymna elata*, Vulnerable). Additionally, two threatened freshwater fish species were discovered, these are *Barbus liberiensis* (Endangered) and *Clarias laeviceps* (Vulnerable), according to the IUCN Red List (2024).

d) **Sustainability and Student Engagement**

To promote environmental stewardship, the department established the **Biological Sciences Society for Environment and Development (BioSSED)**. This student-led group has been instrumental in awareness campaigns (including World Environment Day), tree-planting drives (over 500 trees are planted annually since 2023), and biodiversity surveillance in collaboration with staff in the department.

In addition to its core programmes and activities, BioSSED has actively collaborated with partner organizations to promote environmental awareness and community engagement.

One such collaboration is with African Women Initiators for a Sustainable Environment (AfricaWISE), Sierra Leone Chapter. A Memorandum of Understanding (MoU) was signed between AfricaWISE and BioSSED to support women engaged in gardening activities within the Botanic Reserve. Through this partnership, the women who rely on gardening as their primary source of livelihood have gained improved knowledge and skills on conservation, enabling them to better support the restoration while raising funds for their families and children's education from gardening activities.

BioSSED also established a formal partnership with the Roots and Shoots organization to advance shared goals in environmental education, youth engagement, and conservation advocacy. This collaboration, formalized through a signed Memorandum of Understanding (MoU), reflects a mutual commitment to fostering student involvement in environmental management and promoting the protection of endangered species, particularly chimpanzees and their habitats. The partnership is focused on the following key thematic areas:

- Environmental Education Programs,
- Chimpanzee Conservation Campaigns
- Student-Led Conservation Projects
- Capacity Building and Mentorship
- Knowledge Sharing and Resource Development.

CHALLENGES

While the involvement of local community volunteers significantly increased interest in the conservation of the FBC Botanic Reserve, maintaining sustained engagement and expanding their technical understanding of ecological restoration remains an ongoing challenge. Volunteers are gaining valuable firsthand experience, but continuous training and motivation are required to reinforce their role as long-term stewards of the reserve.

Despite comprehensive awareness-raising and capacity-building efforts targeted at women gardeners, a small number exhibited destructive behaviours, such as damaging young seedlings by cutting terminal buds or wrapping plants with disused materials. Strong disciplinary measures were instituted to reduce such incidents, but ensuring full community compliance and ownership remains a delicate issue requiring ongoing sensitization.

Concerns were raised by FBC authorities regarding the long-term use of the Botanic Reserve by women gardeners, particularly the potential for land tenure conflicts or perceived land grabbing. Although the women gardeners expressed willingness to pay a nominal rent for land use, mistrust and hesitation persist among FBC leadership. Continued stakeholder consultations are needed to reach consensus and establish transparent land-use agreements.

An unexpected ecological challenge emerged when nursery seedlings of *Afzelia africana* were damaged at the cotyledon stage by pouch rats which was an issue not observed in previous germination efforts. Although protective measures such as mosquito-netting were successfully deployed to mitigate further damage, this unusual behaviour raised questions about changing ecological dynamics. The project team conducted further investigations, including tests on the palatability of *A. africana* cotyledons, to understand the root cause of this phenomenon.

IMPLEMENTATION STRATEGY

To ensure effective implementation and community ownership of the GEF-SGP-funded project, a participatory and capacity-building approach was adopted. Initial on the site consultations were conducted with local women gardeners to introduce the project and emphasize the importance of understanding the conservation and sustainable management of the FBC Botanic Reserve.
To deepen community engagement and knowledge transfer, two town hall meetings and a structured training workshop were organized. These sessions served to raise awareness about the project's objectives and to build the capacity of women gardeners in key areas, including:

- Understanding nutrient and hydrological cycles within the reserve.
- Compost production and management techniques, with a focus on improving soil fertility to enhance their gardening practices.

As part of the strategy to strengthen community involvement, ten (10) community volunteers were identified and engaged in a one-day consultation and refresher training, alongside eight technical staff from the Department of Biological Sciences. This ensured a shared understanding of project goals and technical approaches.
To formalize collaboration and clarify roles, a Memorandum of Cooperation was signed among key stakeholders, establishing mutual commitments and responsibilities.
Additionally, a nursery site was established to support ecological restoration activities. Students, community members, and other project stakeholders actively participated in restoration work, field-based research, and environmental surveillance thereby fostering ownership and sustainability of the project outcomes.

SCALING UP AND REPLICATION

The project prioritized the propagation of endemic, endangered, and threatened plant species through a combination of seed, seedling, cutting, and other propagule techniques. These species were systematically conserved within the nursery site established at the FBC Botanic Reserve to serve as a multiplication centre for endemic, endangered, and threatened plant species. Already, organizations implementing tree planting projects including the Freetown City Council and Environment Protection Agency have made enquires and acquired samples of endemic, endangered, and threatened trees plant species for restoration in several communities. In the future, FBC Botanic Reserve will be capable of supplying large quantities of plant species to be reintroduced to targeted habitats nationwide.

STAKEHOLDER PATICIPATON

Thirty-five women gardeners, ten community volunteers and eight technicians participated in the project. Over 120 students were trained on biodiversity, environment and climate change. The project indirectly benefited 1,000 community people in settlements Through leadership, student participation, scientific collaboration, and local community engagement, the Fourah Bay College Botanic Reserve is once again on a path to becoming a thriving ecological haven.

PROJECT HIGHLIGHTS

Local communities have been given designated zones for utilizing the water resources and for gardening without encroaching on the Botanic Reserve.

Student-led BioSSED leading activities on Environmental awareness raising through a float parade held on 5th June 2023, on the main campus of Fourah Bay College (University of Sierra Leone).

Student-led BioSSED leading activities of the restoration on the campus. Students have resource mobilized promoted conservation of the Botanic Reserve and embarked on building a learning centre which will serve as a sustainable, hands-on learning environment and a long-term resource for ecological research, education, and community engagement.