

SPATIO-TEMPORAL ANALYSIS OF THE SGP-GEF-UNDP FUNDED PROJECTS IN NIGERIA (2009–2022): IMPACTS, TRENDS, AND STRATEGIC IMPLICATIONS

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ABSTRACT

This study aims to analyze the spatial and temporal patterns of projects funded by the Small Grants Programme (SGP) under the GEF and implemented by UNDP in Nigeria from 2009 to 2022. Methods employed include Geographic Information System (GIS) mapping, time-series analysis, and thematic categorization to examine project locations, themes, and their evolution over time. The results demonstrate regional disparities, shifts in environmental priorities, and development trajectories, revealing significant spatial and thematic trends. The final conclusion emphasizes that these insights can guide policymakers and stakeholders in optimizing future interventions to promote sustainable development tailored to Nigeria's environmental and socio-economic contexts.

Keywords: SGP-GEF-UNDP; Spatiotemporal; CSO; Ecological Impact; Ecological Focal Areas; GIS

INTRODUCTION

Nigeria's diverse ecological zones, socio-economic challenges, and rapid urbanization necessitate targeted environmental interventions. Since 2009, the SGP-GEF-UNDP initiative has supported grassroots projects aimed at biodiversity conservation, climate resilience, sustainable livelihoods, and community empowerment (UNDP Nigeria, 2020). Understanding the spatial and temporal dynamics of the projects is crucial for assessing their impacts, identifying gaps, and guiding future strategic planning. The objectives of the Study are to;

1. Map the geographic distribution of projects from 2009 to 2022.
2. Analyze temporal trends in project initiation, thematic focus, and regional engagement.
3. Identify hotspots and regions with low project coverage.
4. Examine the evolution of project themes over time.
5. Provide policy recommendations based on findings.

Data Processing

Table 1: Data Types, Sources, and Purpose

	Data Type	Source	Purpose
1.	How the GEF SGP operates to fund project operates in Nigeria	SGP and UNDP Office, Abuja, SGP Grantees	To understand the mode of operation of the GEF SGP
2.	Number of GEF SGP-funded initiatives	SGP and UNDP Office, Abuja, SGP Grantees	Mapping of location of project
3.	Types of SGP Environmental Initiatives	SGP Office, SGP Grantees	Evaluation
4.	The trend of SGP projects across the States, 2009-2021	SGP Office	Trend analysis

Figure 1 shows that Nigeria has two major vegetation types, which are further divided into three each, making it six major vegetation types, namely the Sahel Savannah, Sudan- savannah.

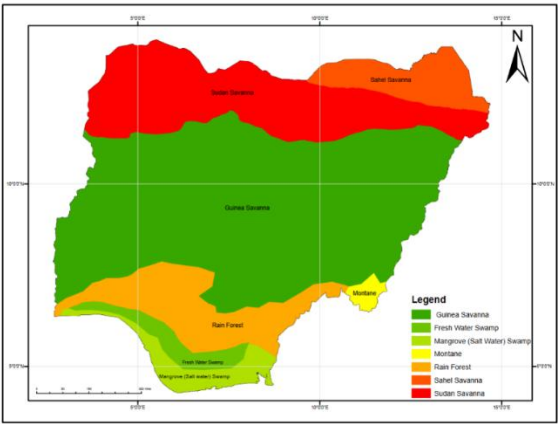


Figure 1: Vegetation Types in Nigeria
Source: NDA Geography Department, 2023

MATERIALS AND METHODS

Data Collection

Data sources included:

- UNDP Nigeria project databases (UNDP Nigeria, 2021).
- GEF project documentation (GEF, 2022).
- Geospatial datasets (administrative boundaries, ecological zones) from the Nigeria National Space Research and Development Agency (NASRDA, 2019).
- Project reports and monitoring and evaluation (M&E) data.

5.	Effects of the SGP projects on: - Biodiversity/ecology - Climate Change initiatives - Land Degradation - Management of Persistent Organic Pollutants and Chemicals - International Waters	Field survey		Evaluation of impact of project
6	Gender dynamics of the SGP and relevance for policy formulation	Focused Discussion, Survey.	Group Field	Evaluation of impact of project

Source: Author's Compilation (2024)

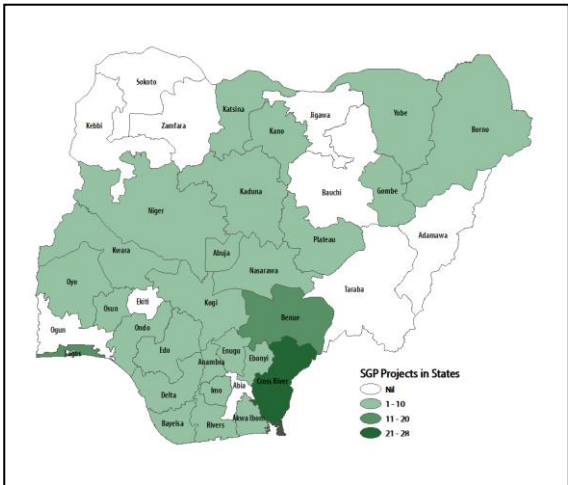


Figure 2: Distribution of GEF-SGP-funded projects In Nigeria by states.

Source: GEF-SGP Operational Phase 7 Country Programme Strategy (2024)

Spatial Analysis

- GIS mapping to visualize project locations.
- Kernel density estimation to identify hotspots (Silverman, 1986).
- Overlay with environmental and socio-economic maps (World Bank, 2020).

Temporal and Thematic Analysis

- Time-series plots to reflect project counts annually.
- Sankey diagrams to illustrate thematic shifts over the years (Hoffmann & Spittel, 2016).
- Cluster analysis to group regions with similar project profiles (Everitt et al., 2011).

RESULTS

Spatial Distribution and Hotspot Identification

- **Regional Concentration:**
A significant concentration of projects was observed in the

Niger Delta, attributable to the region's ecological degradation and socio-economic vulnerabilities (Adeniyi et al., 2018).

Northern Nigeria also exhibited notable project activity, particularly on desertification and water scarcity issues (Olaniyi & Adebayo, 2020). The Cross River Basin emerged as a biodiversity conservation hotspot (Oko et al., 2019).

- **Peripheral Regions:**
Regions such as North-Central Nigeria showed sparse project presence, indicating potential gaps in intervention coverage.

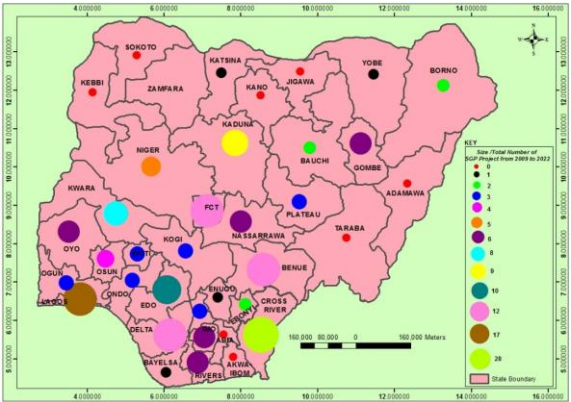


Figure 3: SGP-supported projects from 2009 -2021

Source: Author's generated from data.

The research also collected the temporal distribution of the projects supported by the GEF SGP. This was to elucidate the trend of the projects supported, if there are significant deductions in the period which the projects were supported in the different states. The research found out that some states had more projects spread across different periods than others. It was discovered that aside the demand-driven nature of the grant, fund availability and the global priority in line with national priorities play key roles in the number of projects supported.

Table 2: States and Study Population

STATE	CIVIL SOCIETY ORGANISATION (CSO)	COMMUNITIES (NAMES)	NO. OF COMMUNITIES
SOUTH-WEST REGION			
Ondo	Better Living Foundation (BLF)	Igbokoda, Ilaje	1
Ogun	Environmental Management and Development Trust (EMADET)	Ja	1
Ekiti	Friends of the Environment (FOTE)	Ita-Oluwo	1
	Environmental Management and Development Trust (EMADET)	Ipotu, Ogotun	2
Oyo	Igbehinadun Agroforestry (IA)	Aratu	1
	Life Builders	Ijaiye	1
Lagos	1. Lekki Urban Forest and Animal Sanctuary Initiative (LUFASI)	Lekki	1
	2. Friends of the Environment (FOTE)	Odongunyan	1
	3. Global Social Welfare Support Advocacy Organization (GSWA)	West Senatorial District	1
	4. Sustainable Research and Action for Environmental Development (SRADeV) Nigeria	Oke-Aro,	1
	5. Nigeria Energy Forum (NEF)	Sagbokoji	1
Osun	Environmental Management and Development Trust (EMADET)	Ileran	1
SOUTH-SOUTH REGION			
Akwa Ibom	Biodiversity Preservation Centre (BPC)	Itam	2
	Tropical Research and Conservation Centre (TRCC)	Mbiakong	1
Cross River	Development Concern (DEVCON)	Edondon	1
	Biakwan Light	Biakwan	1
	Peace Point Action (PPA)	Creek Town	1
	Green Concern for Development (GREENCODE)	Esuk Mba	1
Delta	River Ethiope Development Foundation (RETFON)	Ukwani	1
NORTH CENTRAL REGION			
Federal Capital Territory	Global Initiative for Food Security and Environmental Protection (GIFSEP)	Abuja	1
Benue	Empowerment Strategy for Women and Youth Development Initiative (ESWYDI)	Mararabam, Burum	1
	Biodiversity Education and Resource Centre (BERC)	Sheda	1
	Women Environmental Programme (WEP)	Dobi And Padgana	2
	Gender and Environmental Risk Reduction Initiative (GERI)	Usar	1
Plateau	Women Environmental Programme (WEP)	Benue State – Tsar and Adikpo	2
	AIDS Care Education and Training Society (ACET) Nigeria	Mabudi And Sabo Gida	2
	Sustainable Environment and Fisheries Foundation (SEFFA)	Gurapwana And Dahwol-Bob	2
	Hope for the Youth Models Nigeria (HYMN)	Gindiri Ngok, Bungaha Gida and Jwak Millet	3
NORTH-WEST REGION			
Kaduna	Care and Action Research NGO (CaRE-NGO)	Sabon Tasha	1

Source: GEF-SGP Nigeria Data Base, 2023

3.2 Temporal Trend

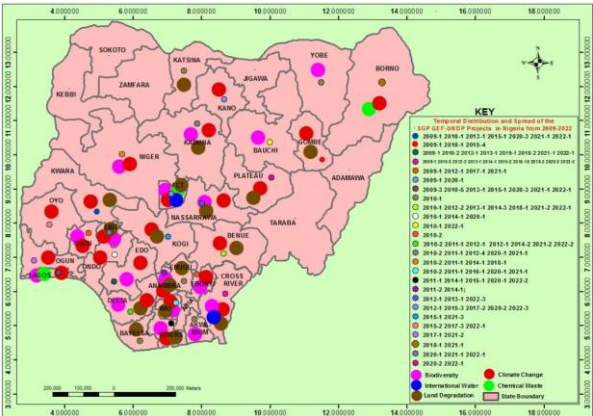
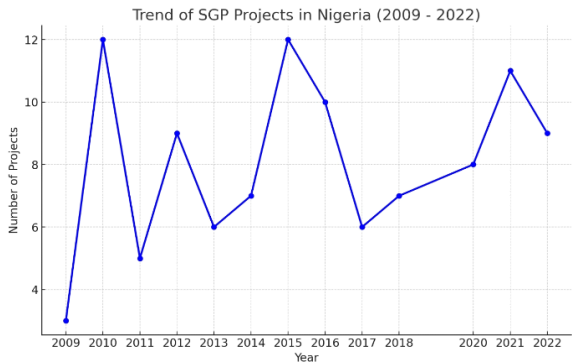


Figure 4 Temporal distribution of SGP supported project in Nigeria from 2009 – 2021. Source: Author's generated from data.

- Project Volume:0**
 Fig. 4.5 Temporal Trend of SGP -Supported Environmental Project in Nigeria
 Source: Researcher's Production from data collection
 There was a steady increase in projects from 2009 (approximately 20 projects) to a peak in 2015 (over 60 projects), followed by a slight decline (UNDP Nigeria, 2019) see fig 4.6.
- Thematic Shifts:**
 Early projects emphasized conservation and environmental awareness. Post-2015 saw a rising focus on climate adaptation and sustainable livelihoods, aligning with Nigeria's climate commitments (Federal Ministry of Environment, 2015).

Reg0ional Engagement Dynamics:

The diversification of project locations over time suggests expanding outreach and capacity building in underserved areas.0

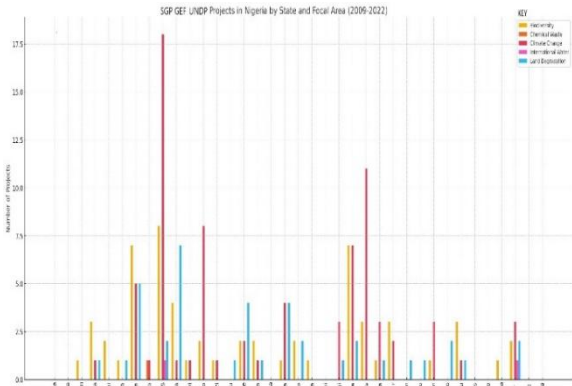


Thematic Evolution

- Initial Focus:**
 Projects centered on biodiversity protection, environmental education, and capacity building (UNDP Nigeria, 2012).
- Recent Focus:**

A notable shift towards climate resilience, renewable energy, and urban greening initiatives (GEF, 2021).

- Emerging Themes:**
 Incorporation of gender-sensitive approaches and urban sustainability strategies.



Impact Indicators

- Environmental Outcomes:**
 Enhanced mangrove protection, reforestation efforts, and water resource management initiatives have contributed to ecosystem resilience (Adeleke et al., 2021).
- Social Outcomes:**
 Projects facilitated poverty alleviation, employment, and local capacity development (Nwoko & Okonkwo, 2019).
- Challenges:**
 Limited project coverage in remote and conflict-affected areas remains a concern (Ojo et al., 2020).

DISCUSSION

The spatial analysis indicates targeted interventions in ecologically and socio-economically vulnerable zones. The concentration of projects in the Niger Delta aligns with the environmental degradation caused by oil exploration and pollution (Akinola & Oladipo, 2017). The thematic shift reflects Nigeria's alignment with international climate and Environmental frameworks, such as the Paris Agreement (UNFCCC, 2015).

However, gaps in coverage, especially in remote northeastern regions affected by conflict, highlight the need for inclusive and resilient project planning. The evolution toward integrated approaches underscores the importance of combining environmental conservation with socio-economic development.

The GEF Small Grants Programme (SGP) operates across five key focal areas: biodiversity, climate change, land degradation, chemicals, and international waters. Illustrates a graph showing the distribution of projects across Nigerian states based on these focal areas.

The analysis reveals that biodiversity projects are predominantly concentrated within forest landscapes, reflecting the rich ecological diversity of these areas. In contrast, there are fewer biodiversity initiatives in other landscapes, such as the savannah regions located in the northern parts of Nigeria.

Conversely, projects addressing land degradation and climate change are more prevalent in the northern regions of the country.

This distribution indicates that the GEF SGP strategically allocates support to regions facing specific environmental challenges, with interventions tailored to address the unique and region-specific issues faced by different parts of Nigeria.

To enhance the effectiveness and sustainability of environmental projects, it is essential to conduct longitudinal impact assessments at the community level. This approach allows for a comprehensive evaluation of how interventions influence local livelihoods, ecosystems, and social dynamics over time, providing valuable insights for future planning and scaling of successful initiatives.

Additionally, employing climate modeling techniques can help identify future vulnerability hotspots, enabling policymakers and practitioners to prioritize areas most at risk from climate-related hazards and to develop targeted adaptation strategies. Evaluating the socio-economic benefits and gender impacts of projects is equally important, as it ensures that interventions promote inclusive development and address the needs of all community members, thereby fostering equitable outcomes.

Finally, applying advanced geospatial analytics, such as machine learning algorithms, can significantly improve predictive planning by analyzing complex spatial data patterns. This technological integration enhances the ability to anticipate environmental changes and optimize resource allocation, ultimately contributing to more resilient and adaptive environmental management strategies.

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