EXPANDING THE LIMITS OF COMMUNITY-LED BIODIVERSITY MONITORING OF ANTHROPOGENIC PRESSURES IN KEY BIODIVERSITY AREAS IN GHANA

COMMUNITY-LED INDEPENDENT REPORTING

Policy Paper , 08-23

Policy Paper - 08-23: Making Community-Led Biodiversity Monitoring Central to the Post-2020 Biodiversity Framework of the Convention on Biological Diversity

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Background

There is increasing recognition of the interconnectedness of biodiversity loss, climate change and agricultural practices or agricultural intensification. Existing evidence indicates that ecosystems with low biodiversity are less resilient and more vulnerable to the effects of climate change[1]. Also, recent IPCC (AR6 WGII) report establish a clear causal relationship between climate change biodiversity loss, and a high confidence that human activities such agriculture constitutes a primary driver of both climate change and biodiversity loss[2]. The European Green Deal (EGD) further highlights this relationship indicating that the main drivers of biodiversity loss include the change in land and sea use, natural resources direct exploitation and climate change[3]. As a country, Ghana recognizes its responsibilities for reducing climate change and biodiversity loss through the support of the principles and regulations contained in international agreements and conventions such as the Paris Agreement on Climate Change, (2030); Convention for the Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central Africa Region, (Abidjan Convention 2017); Africa Union Agenda 2063; Agenda 2030 for Sustainable Development, 2030; Africa Convention on the Conservation of Nature and Natural Resources, 2014; International Convention for Bunker Oil Pollution Damage, 2001; United Nations Convention to Combat Desertification, 1994; The Rio Declaration and Agenda 21, 1992; International Convention on Oil Pollution, Preparedness, Response, and Co-operation, 1990; Indigenous and Tribal Peoples Convention, (The Concept of free, Prior, and Informed Consent), 1989; Convention on the Conservation of Migratory Species of Wild Animals, 1979; Convention on Wetlands of International Importance, Especially as Waterfowl Habitats, (Ramsar Convention), 1971, etc[4].

Policy is definitely a central cog in the delivering on these global and regional commitments, and there is no shortage of policies relevant to reducing climate change and biodiversity loss in Ghana, including National Environment Policy (2014), Water Policy (2007), Buffer Zone Policy (2011), Forest and Wildlife Policy (2012), National Climate Change Policy (2014), National Energy Policy (2010), National Land Policy (1994), Ghana Fisheries and Aquaculture Policy (2008), Local Content Policy for Petroleum Upstream (2011), Energy Sector Strategy and Development Plan (2010), National Energy Policy (2010), the Renewable Energy Policy (2015), the Environmental Management Policy for the Oil and Gas Industry, among others (MESTI, 2019). Yet, Ghana continues to experience biodiversity loss at an alarming rate,

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[1] Muluneh, M.G. Impact of climate change on biodiversity and food security: a global perspective—a review article. *Agric & Food Secur* 10, 36 (2021). https://doi.org/10.1186/s40066-021-00318-5
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https://www.wur.nl/en/show/biodiversity-loss-and-climate-change-two-mutually-reinforcing-crises.htm

[2] IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3–33, doi:10.1017/9781009325844.001.

[3] European Commission 2019: Communication on the EGD

[4] The Ministry of Environment, Science, Technology and Innovation (MESTI) (2019). The National Environmental Management Policy for the Oil and Gas Industry, MESTI, Ghana.

including protected areas due to: poor involvement of the local people in the management of natural resources and weak local governance structures and processes. For instance, the Mole National Park in Damongo in the Northern Region is under threat of illegal loggers and poachers who are said to be taking advantage of the inadequacy of staff and security at the facility. In the Keta Lagoon Complex Ramsar Site, the threat of a new oil and gas project called the Keta Delta Oil Block has become a massive threat to the ecologically or biologically significant values within the Keta Ramsar Complex Site. Other protected areas are under threat due to uncontrolled logging for charcoal production, excessive hunting, incessant wildfires, illegal gold mining; unsustainable farming practices; increasing use of agrochemicals, reduction in soil fertility, rarity, and loss of flora and fauna[5]. These realities suggest that there is still a wide gap between ecologically-aware policies and its actual implementation at local level. This gap calls for the mainstreaming new capacities into policy implementation. For instance, the National Biodiversity Policy (NBP)[6] of Ghana recognizes that one major stakeholder that can contribute much to biodiversity monitoring is local communities who serve as the grass-root stakeholders and can contribute to restoring or reversing biodiversity losses. In Ghana, this capacity is urgently required in order to ensure that local communities contribute to the realization of the targets and goals of the Post-2020 Biodiversity Framework of the Convention on Biological Diversity (CBD), as well as the SDGs (particularly goals 14 and 15) by 2030. Therefore, under this project[7], efforts have been made to connect local communities the biodiversity conservation process in Ghana by scaling-up community-based independent reporting in selected biodiversity areas, namely the Keta Lagoon Ramsar Complex Site, the Mole National Park and Lake Bosomtwe Biosphere Reserve using the TIMBY mobile application. This project first reviewed community-led biodiversity monitoring and reporting systems in Ghana using Outcome Mapping Methodology. Premised on the review, the project supported effort to train and engage 30 Resident Sustainability Monitors to co-generate, verify, validate and share ground data in the form of written report, video or audio reports on the current drivers of biodiversity decline, including poor farming practices, habitat loss and fragmentation, agrochemical use and pollution, climate induced loss and damage as well as soil and cropping conditions in Mole National Park, Keta Ramsar Complex Site and Lake Bosomtwe Biosphere Reserve. Observations from these engagements and data generated have been analyzed to provide community-based insights on constraints and recommendations for long term capacity required for real-time monitoring of the full impact of anthropogenic pressures and possible ways to move forward with collating and coordinating monitoring projects and programmes in key biodiversity areas in Ghana. In this policy paper, we make recommendations for the mainstreaming community-led biodiversity monitoring of anthropogenic pressures into the Post-2020 Biodiversity Framework of the Convention on Biological Diversity by 2030, as well as the SDGs (particularly goals 14 and 15) implementation frameworks.

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[5] UNEP: https://sgp.undp.org/spacial-itemid-projects-landing-page/spacial-itemid-project-search-results/spacial-itemid-project-detailpage.html?view=projectdetail&id=30052

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[6] Ministry of Environment, Science, Technology, and Innovation (MESTI), National Biodiversity Policy, (2021).

[7] Expanding the limits of community-led biodiversity monitoring of anthropogenic pressures in 3 key biodiversity areas in Ghana – the Keta Ramsar Complex Site, the Mole National Park and Lake Bosomtwe Biosphere Reserve.

Can Local Community Capacities Help In Bridging The Gaps?

From existing literature, it is evident that the general paucity and inadequacy of data about biodiversity states prior to the rise of harmful anthropogenic activities in geographic area is a critical limitation for understanding and implementing appropriate conservation goals and strategies (Mihoub et al., 2017). Monitoring schemes have proven to be an important tool to document changes in biodiversity over time, making the implicit assumption that the state of biodiversity when the scheme started is an appropriate temporal baseline against which to measure that change. Recently, major efforts are being made to mobilize and standardize biodiversity data globally. The recently proposed Essential Biodiversity Variables (EBVs), including genetic composition, species populations, species traits, community composition, ecosystem function, and ecosystem structure has established a broader basis for measuring changes the different components of biodiversity over time and space (Brummitt et al., 2014; Geijzendorffer et al, 2015). At the local level, some new approaches are also being experimented.

Recent studies have proven that the sharp increase in the number of monitoring schemes from the 1990's likely reflecting a response to the reporting commitments outlined in the European Nature Directives or similar obligations from international conventions, such as the Convention on Biological Diversity or the Convention for Migratory Species (European Commision (EEC), 2009; UN (United Nation, 1971). This is in line with previous studies showing that structured biodiversity monitoring schemes have been recently implemented and that accurate biodiversity data for major realms is not available before the 1960's (marine, terrestrial or freshwater (Costello et al., 2010); Schmeller et al., 2012).

Despite biodiversity monitoring schemes contributing to an increased understanding of recent anthropogenic impacts, the changing states of biodiversity since the rise of these pressures are mostly unknown and might be seriously underestimated (Pimm, et al., 2014). In most developing countries like Ghana, a lot of stakeholders are still excluded from biodiversity monitoring. At the same time, the data from these monitoring schemes remain scattered, suffer from geographic and taxonomic bias (Costello et al., 2010); Hoffmann, A. et al., 2014), making biodiversity data difficult to access, to assemble and to analyze over large spatial and temporal scales. The majority of biodiversity monitoring schemes are conducted at small geographical scales (Schmeller et al., 2012), so that opportunities to assess past states of biodiversity at global, regional or even national scales remain limited. In addition to limited spatial and temporal coverage, inconsistencies and biases in taxonomic coverage are known limitations that also inhibit comprehensive assessment of the biodiversity status (Costello et al., 2010). Research shows that both the inconsistencies and biases in taxonomic coverage or biological organisation levels that are the focus of monitoring schemes are much less frequently reported. Also, data collected in biodiversity monitoring schemes disproportionately document only two EBV classes ('Species Populations' and 'Community Composition').

Ultimately, research points to the fact that limited temporal coverage only allows a limited subset of the changing state of biodiversity needed to represent the full impact of anthropogenic pressures to be documented (Butchart, S. H. M. et al., 2010). Besides, the majority of available biodiversity information remains inconsistent and incomplete for accurate and consistent estimates of past impacts (Lotze & Worm, 2009), or in some cases for present understanding of intensity of anthropogenic pressures. Therefore, additional mobilization and digitization of biodiversity data is recommended to ensure consistent available data over large spatial extents (Edwards, 2004). At the same time, a consistent integration of fragmentary information across disciplines is critical in setting temporal and/or spatial baselines for biodiversity that reflect past states of biodiversity before the rise of major anthropogenic pressures. We discovered that in Ghana, about 200 trained monitors collect evidence about compliance

with social responsibility agreements, logging in forests, compensation and other aspects through community-based real-time monitoring of forestry activities and governance by means of smartphones. The monitoring system exists in approximately 150 communities in five regions. However, so far the focus has been only on forest illegalities in the High Forest Zone. Savannah areas such as the Mole National Park and Wetlands such as the Lake Bosomtwe Biosphere Reserve and Keta Ramsar Complex Site have so far been neglected.

Local Capacity Mainstreaming Through New Toolkits

Currently, Remote Sensing/GIS technology has been used widely for spatial and temporal change detection analysis. However, GIS tools still require ground verification and validation in order to make the change detection analysis relevant for on-the-ground decision making. Mobile applications like TIMBY provides a cost effective fit to addressing this gap. TIMBY provides various functionalities that enables stakeholders to instantly search various issues/reports and filter by date, sector, company and person and verification status. TIMBY also enables stakeholders to triage important issues and track until a solution is reached and communicate back with monitors on the ground.

The data generated will be shared on the TIMBY online database (in the form of geo-referenced pictures, video alerts, audio alerts or written reports) which will be accessed and used by all stakeholders especially the Environmental Protection Agency, Forestry Commission, Water Resources Commission, sector ministries (Ministry of Environment Science, Technology and Innovation, Ministry of Lands and Natural Resources), District Assemblies, Development Partners and Civil Society Organisations who work to translate policies into action. The data will be co-generated by 30 trained community-based Monitors working in collaboration with Park Managers, Range Officers and Agricultural Extension Service Officers to verify, validate and share the data in the form of written report, video or audio reports.

Government Designated Authorities such as Environmental Protection Agency, Forestry Commission, Water Resources Commission and District Assemblies will also be able to receive the geo-referenced pictures, video alerts, audio alerts in real time, i.e., immediately the communities identify any incident. Following the alert, our team will work with the Park Managers, Range Officers and Agricultural Extension Service Officers to verify and validate the incident and determine the necessary remedial actions.

It was further noted that, time sensitive data is essential for reliably measuring changes in biodiversity over time. Also, ground verified data helps to frame conservation objectives, identifying the biodiversity priorities in time and mapping the feasibility and efforts required to reach the Post-2020 Biodiversity Framework of the Convention on Biological Diversity by 2030; to achieving the strategic objectives 1 and 4 of Ghana's National Biodiversity Strategy and Action Plan as well as the SDGs - goals 14 and 15 by 2030. However, a Rapid Response Mechanism (RRM) equipped to provide urgent assistance to communities if an emergency situation is reported by the monitors which require immediate response is essential to this process.

Expanding the Limits of Ground Verification, Validation And Review: Based on the recommendations from the outcome mapping stage, it is essential to design and deploy community-based monitoring and reporting toolkit outlining a grid of anthropogenic factors and their impact dimensions (ecological, social, economic), as well as the *"dos and don'ts"* of community-based monitoring. The monitoring and reporting toolkit needs to equip communities with the adequate information on current drivers of biodiversity decline including poor agricultural practices, illegal activities (poaching, bush burning, charcoal burning) habitat loss, pollution, invasive alien species introduction and the tools and platforms that they can use

to properly mobilize, negotiate and advocate for systems change. Using field-based demonstration approach, we trained and engaged 30 resident monitors from (15 in Mole National Park, 15 in Keta Ramsar Complex Site) on how to use the TIMBY application to capture and share data on human activities that affect biodiversity status including unsustainable agricultural practices, illegal activities (poaching, bush burning, charcoal burning) habitat loss, pollution, invasive alien species introduction, etc.
Between 01/08/2022 – 30/10/2022, following community learning workshops, community monitors have sent 48 reports on observed incidents including poor agricultural practices, illegal activities (poaching, bush burning, charcoal burning) habitat loss, pollution, invasive alien species introduction. Leading among these were observations related to coastal erosion within the Keta Lagoon Ramsar Complex Site. Between August, 2022 and April 3023, the RST monitored the Mole landscape for various drivers of biodiversity loss/decline. The most observed drivers included bush fires, charcoal burning, cattle grazing and poor farming practices. A total of 230 incidents were observed and reported for the period. Out of these, 18.3% were cases of Bush fires, 25.7% were cases of charcoal burning, 33% were cases of cattle grazing and 23% were cases of Poor farming practices.

Between August, 2022 and April 3023, the RST monitored the conservation practices in the Mole landscape, observing building cases of for crop-livestock integration, agroforestry (in shea landscapes), agro-waste valourization, biointensive agriculture[8] and integrated pest management. A total of 118 farm plots were observed. Out of the of the total observations, 39% were practiced crop-livestock integration, 29.7 % practiced agroforestry, 19.5% practiced agro-waste production and use, 4.2% practiced biointensive agriculture of and 7.6% practiced integrated pest management. It was noticed that most of these practices were still rudimentary, requiring technical guidance.

Mainstreaming Geoethics Into Protected Area Management: Reports from the selected sites (Keta Lagoon Ramsar Complex Site, the Mole National Park and Lake Bosomtwe Biosphere Reserve) indicated that the extraction of geological resources is emerging as a major threat to biodiversity conservation. Following the mining exploration rights government granted to a mining company in 2021 to explore gold near the Mole National Park, there are still treats and vested interest of gold prospecting near the Mole National Park. Mining gold near the Mole National Park will degrade the land after the minerals are extracted with toxic materials. In Keta Lagoon Complex Ramsar Site, the threat of a new oil and gas project called the Keta Delta Oil Block has become a massive threat to the ecologically or biologically significant values within the Keta Ramsar Complex Site and a livelihood threat for about 600,000 people within the affected districts. In Lake Bosomtwe Biosphere reserve, recent reports still indicated there are illegal small scale mining activities ongoing, with serious negative externalities on the riparian vegetation of the biosphere reserve.

Given the increased threat of resource extraction in Keta Lagoon Ramsar Complex Site, the Mole National Park and Lake Bosomtwe Biosphere Reserve, coupled with the high level of unsustainable human interaction, there is an urgent need to place emphasis on geoethical thinking as a holistic approach to biodiversity conservation in Ghana. Simply, geoethics is a tool to influence the awareness of society regarding problems related to geo-resources and geo-environment. Geoethics is framed by the following four fundamental characteristics: a) human agent-centric, b) geoscience knowledge-based, c) shaped as virtue-ethics of society, d) with space-time context dependent approaches. Again, given the cultural, spiritual, environmental and social relevance of key biodiversity areas, it will be expedient to adopt

[8] Grow Biointensive:
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiG1q7VlIz_AhVSh1wKHeN2AI4QFnoECA4QAQ&url=http%3A%2F%2Fwww.growbiointensive.org%2FPDF%2FBiointensiveAgricultureAGreenerRevolution_English.pdf&usg=AOvVaw1OCRXgZjNHJ0gXOyhInic4

'geoethical thinking'as a new approach to promoting the conservation of biological diversity, sustain cultural diversity, traditional knowledge systems and practices while maintaining its ecosystem services (including, water, soil, and carbon sequestration) within Keta Lagoon Ramsar Complex Site, the Mole National Park and Lake Bosomtwe Biosphere Reserve. Our observations indicate that the TIMBY mobile application is a more community friendly mobile application due to its adaptable video and audio recording functions. The TIMBY application package facilitate human-centred design, joint monitoring, review, verification and validation of biodiversity data, and therefore a far best-fit toolbox for facilitating a community-based geoethical dialogue into the Post-2020 Biodiversity Framework of the Convention on Biological Diversity as well as the SDG implementation frameworks.

Formulating Participatory Methodologies for Climate Induced Loss and Damage: Currently, 15 community members have been trained on community-based independent reporting using TIMBY mobile application in the Keta Lagoon Complex Ramsar Site in Ghana. This is providing various functionalities that enables stakeholders to instantly search various issues/reports and filter by date, sector, company and person and verification status. As a result of this project, there is increased media attention which has improved youth and community voices on the relationship between fossil fuels, climate change and sea level rise and its resultant impact on coastal communities in Ghana (See recent media articles)[9]

From long form interviews (with video and audio recording) it is clear that even the most effective adaptation measures cannot prevent all losses and damages, which are a present-day reality for community members in in Keta, Angloga and Blekusu. Ghana needs to define and establish clear pathways for financing to address climate induced loss and damage. As observed, schools are already being washed away and more than 50 houses have already been destroyed. As a consequence, community members have already relocated for 5 times to a safer site, and some are being forced to relocate again. Already available science shows that climate-induced loss and damage are here to stay and will keep increasing, so it will be essential to ensure that the world's most vulnerable have the necessary resources in times of crisis. Still, more research, advocacy and policy dialogue is needed. In this regard, we propose the development of participatory toolkits to foster citizen participation in demanding and the consolidation of funding arrangements at in addressing climate induced loss and damage at the community level while supporting international political lobby and advocacy moments and advocate for proportionate resource mobilization and distribution to address climate induced loss and damage.

Promoting Socially Innovative Models in Biodiversity Conservation: The successful scaling up the outputs of Community-Based Independent Reporting in the Keta Lagoon Ramsar Complex Site, the Mole National Park and Lake Bosomtwe Biosphere Reserve using the TIMBY mobile application helped to discover certain conservation opportunities. The intricate relationships between biodiversity loss, climate change and agricultural practices or agricultural intensification needs to be addressed holistically in order to ensure ecological connectivity. Existing evidence indicates that ecosystems with low biodiversity are less resilient and more vulnerable to the effects of climate change[10], and that agriculture is at the intersection of biodiversity loss and climate change. Using community-led approaches, local communities can become change agents for *ecological Restoration,* Resilience and ecological Connectivity in Ramsar Sites and

[9] November 13, 2022: https://gna.org.gh/2022/11/sandbar-blocks-anyanui-ada-foah-channel-communities-appeal-for-help/
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[10] https://www.wur.nl/en/show/biodiversity-loss-and-climate-change-two-mutually-reinforcing-crises.htm

National Parks. This requires reinforcement of the existing community-based tools such as agro-forestry, establishment of woodlots, agroecology and the combination of Remote Sensing/GIS technology with the TIMBY Mobile application to advance spatial and temporal change detection, ground verification, validation and analysis in Ramsar Sites and National Parks.

A long term capacity for realtime monitoring requires focusing attention strategically on connecting and building alliances between local communities, research community and grassroots civil society organisations to promote systemic policy shifts, placing emphasis on radical system change, integrated biodiversity conservation and community-led action guided by socially innovative models (SIM) or human-centred design (HCD). HCD builds upon participatory action research as a creative problem-solving process that focuses on people's practices, needs and preferences. From these field observations, we recommend recognizing biodiversity conservation as deeply social challenge which requires the centralization of local communities and mainstreaming the socio-technical challenges, opportunities and capacities that shape everyday conservation practices of farmers and fringe communities into policy implementation including the Post-2020 Biodiversity Framework and the SDGs 14 and 15. Such socially innovative models of biodiversity conservation will help connect a range of academic and third-sector stakeholders including local communities, civil society networks, grassroots and community-based organisation, women's associations, youth groups, community resource management associations, and local government authorities in Ghana link their capacities to implementation processes of the Post-2020 Biodiversity Framework and the SDGs 14 and 15. It will also help connect the technical aspects of realtime monitoring of biodiversity loss with social aspects, providing an interdisciplinary socio-technical understanding of conservation, based on knowledge exchange between local communities towards effective policy implementation, particularly, the Post-2020 Biodiversity Framework and the SDGs 14 and 15. In spite of the potentials of Community-Based Independent Reporting, the community action learning platforms revealed logistical, socio-technical, -political, -environmental, -economic and -cultural limitations remain major threats.

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