ANNEX 23

Beneficiary Estimation Methodology

Ghana

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List of acronyms and abbreviations

Acronym	Explanation
CEMC	Community Environmental Management Committees
CRA	Climate Resilient Agriculture
DEMC	District Environmental Management Committees
DSS	Decision Support System
EbA	Ecosystem-based Adaptation
FBO	Farmer-based Organisation
GCF	Global Climate Fund
GEMP	Ghana Environmental Management Project
REMC	Regional Environmental Management Committee
VSLA	Village Savings and Loan Associations

1. Description of methodology for estimating project beneficiaries

1.1. Project Background

The proposed project, titled 'Climate-resilient Landscapes for Sustainable Livelihoods in Northern Ghana', will improve the resilience of vulnerable smallholder farming communities to the effects of climate change in the Upper East, Upper West and North East Regions of Ghana. Despite the country having achieved lower-middle-income status within the last decade, spatial disparities in poverty remain, with the three northernmost regions still having the highest poverty rates in the country (see Annex 2: Feasibility Study, Table 7 and Figure 11)[1]. This disparity results in part from historical underinvestment, limited infrastructure and insufficient access to finance. These regions are among the most environmentally and socio-economically affected in the country, characterised by widespread food insecurity, land degradation and limited access to basic services.

Northern Ghana comprises approximately 40% of Ghana's total land area (~100,000 km²)[2,3], surrounded to the west by Côte d'Ivoire, to the east by Togo and to the north by Burkina Faso. The landscape is predominantly savanna, characterised by grassy plains that range between 180 and 300 m above sea level[4], with fire-resistant deciduous trees and grasses. The region includes two agro-ecological zones: the Sudan Savanna and the Guinea Savanna. The Sudan Savanna, located in the northeast, has sparse vegetation and receives ~940 mm of rainfall annually. The Guinea Savanna, Ghana's largest ecological zone, is more wooded and receives ~1,100 mm of rainfall annually.

The northern regions of Ghana are characterised by high evapotranspiration, seasonal drought, land degradation and erratic rainfall patterns. These climatic and ecological conditions decrease agricultural productivity and increase food insecurity. Most smallholder farmers in northern Ghana depend on rain-fed agriculture as irrigation infrastructure is limited[5,6], making them highly vulnerable to climatic changes. A climate vulnerability assessment as well as participatory stakeholder consultations at national, regional and district levels were used to select districts within the northern region of Ghana for project implementation. The eight districts selected for the project — Jirapa, Lambussie, Lawra and Wa West (Upper West); Binduri and Garu (Upper East); and East Mamprusi and Yunyoo-Nasuan (Northeast) — will each implement project activities in 15 communities over a three-year support cycle, reaching a total of 120 communities over the seven-year project lifespan. Project activities are based on the results of the climate vulnerability assessment and district-specific vulnerabilities, enabling interventions to be tailored to the needs of each district.

The five core components of the project are outlined below.

1. **Strengthen planning and budgeting for climate resilience,** at the district and community levels, by increasing institutional capacity, providing climate adaptation grants and integrating adaptation priorities into development plans.

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[1] Poverty data extracted from: Ghana Statistical Service – 2015 – Ghana Poverty Mapping Report.
[2] Mosello B, Adamtey R, Obuobie E (eds). 2017. *Making water infrastructure investment decisions in a changing climate. A political economy study of river basin development in Ghana*. Overseas Development Institute. London.
[3] Alhassan SI, Shaibu MT, Kuwornu JKM, Damba OT. 2018. Factors influencing farmers' awareness and choice of indigenous practices in adapting to climate change and variability in northern Ghana. *West African Journal of Applied Ecology* 26: 1-13.
[4] The World Bank 2010. Project appraisal document on a proposed grant from the Global Environment Facility Trust Fund in the amount of US$8.15 million to the Republic of Ghana for a sustainable land and water management project. Sustainable Development Department, Africa Region.
[5] Wossen T, Berger T, Swamikannu N, Ramilan T. 2014. Climate variability, consumption risk and poverty in semi-arid Northern Ghana: Adaptation options for poor farm households. *Environmental Development* 12: 2–15.
[6] Bawa A. 2019. Agriculture and food Security in northern Ghana. *Asian Journal of Agricultural Extension, Economics & Sociology* 31: 1-7.

2. **Expand early warning and climate information systems** by increasing the accuracy, accessibility and relevance of forecasts and advisories, particularly for farmers and vulnerable groups.
3. **Promote climate-resilient agriculture and Ecosystem-based Adaptation (EbA)** by restoring degraded landscapes, adopting drought- and flood-resilient crops and supporting sustainable land management practices.
4. **Support diversified, climate-resilient livelihoods** including the development of value chains, improved access to finance and training for women and vulnerable groups to strengthen economic resilience.
5. **Generate and share adaptation knowledge** by capturing lessons learned, facilitating peer-to-peer exchanges and enabling the upscaling of successful adaptation practices across regions.

A main component of the project is the promotion of EbA and climate-resilient agriculture (CRA). These approaches are cost-effective, context-specific and offer benefits such as improved soil fertility, biodiversity increases, water conservation and climate resilience. Agroforestry systems — a primary EbA intervention — and restoration initiatives will increase productivity, control erosion and provide alternative income sources, including fuelwood, timber and non-timber forest products.

Institutional implementation will be coordinated by the Regional Environmental Management Committees (REMCs), District Environmental Management Committees (DEMCs) and Community Environmental Management Committees (CEMCs), which were established under the Ghana Environmental Management Project (GEMP). These committees will coordinate training, supervision and monitoring across districts and communities, and support knowledge dissemination and the long-term ownership and sustainability of adaptation investments.

1.2. Beneficiary Background

Adaptation interventions within the project will have both direct and indirect beneficiaries. Direct beneficiaries are defined as individuals who experience an immediate and sustained reduction in vulnerability, as a result of GCF investments, and improvements in: i) resilience of physical and natural assets; ii) economic and social well-being; and iii) climate-adaptive capacities. The project will target 691,125 direct beneficiaries across the eight districts (**Table 1**). Indirect beneficiaries will include individuals who do not directly participate in or use project interventions but nonetheless experience positive impacts from their implementation. These indirect impacts include, *inter alia*: i) increased household or community financial resilience because of greater household incomes; ii) improved adaptive capacity through knowledge sharing within households and communities; iii) increased resource availability resulting from reduced pressure on existing resources; and iv) reduced competition over resources as a result of increased resource availability. The project is projected to indirectly benefit 2,861,674 individuals in northern Ghana (**Table 2**).

Given the recommended adaptation interventions outlined in Annex 2 (Feasibility Study, Section 12, Table 2), the project is expected to deliver considerable benefits to communities within the target districts, with neighbouring districts benefiting indirectly from interventions such as the development of Early Warning Systems (EWS). By improving EWS, providing training and employment opportunities and implementing EbA and CSA, individuals living both within and around the target districts will experience greater agricultural productivity, household income, economic stability and climate resilience.

Under Output 1, the project will further develop Ghana's EWS through targeted interventions designed to strengthen climate risk management. These interventions include enhancing access to precise climate information on floods and droughts (Activity 1.1), expanding hydrometeorological and groundwater monitoring networks (Activity 1.2) and establishing a

national framework for disseminating climate hazard information to neighbouring communities (Activity 1.4). A data and information management system, integrated with an upgraded hydrometeorological service delivery platform, will enable cross-sectoral use of real-time climate data, shifting from reactive to proactive disaster risk management. For direct beneficiaries, such as rural crop farmers in the target districts, EWS will inform proactive measures — *inter alia,* optimising planting schedules for higher yields, adopting drought-resistant crops and relocating agricultural activities to reduce losses — to reduce the loss of life, property damage and disruptions to livelihoods that are associated with climate hazards. Indirect beneficiaries in adjacent communities will gain access to early warning data through the expanded dissemination framework, enabling better planning for climate risks. The project will initiate implementation and validation of the EWS in the target districts, alongside developing a national web-based platform, a mobile application and communication mechanisms, complemented by capacity building and awareness campaigns. These efforts will initiate the scaling up of climate data access and early warning services nationwide, supporting broader resilience and mitigating disaster impacts. In doing so, the project will support the improvement of environmental conditions, food security, resource availability and economic stability across Ghana.

The implantation of EWS requires integrating hazard monitoring and early warning services into the Decision Support System (DSS) platform, as well as developing a mobile-based crowd-sourcing application for early warnings nationwide. Ground-truthing and validation activities will take place within the eight target districts, ensuring that the DSS platform services are technically sound and meet stakeholder needs. This process will include technical testing and feedback from target communities. Training will be provided for extension officers, staff and local farmers within these eight districts, enhancing their skills in climate-resilient farming practices and the use of DSS tools.

Northern Ghana contains populations with high poverty rates. These constraints particularly influence women's capacity for adaptation. Only 20% of households in the region are headed by women[7], who have limited access to land ownership, credit, training and participation in decision-making processes. Efforts to diversify livelihoods will improve economic stability by creating employment opportunities during project implementation and promoting sustainable income-generating activities — including non-timber forest product collection, small-scale food processing and climate-resilient livestock management. Higher household incomes will result in strengthened local markets, increased employment opportunities and improved financial security for indirect beneficiaries.

Agricultural productivity improvements, through the adoption of CSA techniques, will enable farmers within each district to increase crop yields and diversify their income sources. This will also increase household incomes within the district. CSA practices in Ghana have demonstrated favourable cost-benefit ratios and economic returns in multiple studies and land management programmes — including SWLMP[8] and GSIF[9] — in the savannas of northern Ghana. For example, in the Lawra, Jirapa and Nandom districts, crop-livestock integration practices achieved a benefit-cost ratio of 1.48 (~US$ 614 revenue versus ~US$ 414 costs) while improving soil fertility and reducing climate risks[10], making it an effective, economically viable practice. As more farmers implement these techniques, the increased market

[7] Ghana Statistical Service. 2014. Ghana Living Standards Survey Round 6.
[8] The World Bank. 2010. Project appraisal document on a proposed grant from the Global Environment Facility Trust Fund in the amount of US$8.15 million to the Republic of Ghana for a Sustainable Land and Water Management Project. Available at: http://projects.worldbank.org/P132100?lang=en.
[9] Environmental Protection Agency 2011: Ghana Strategic Investment Framework (GSIF) for Sustainable Land Management (SLM). Republic of Ghana, Ministry of Environment, Science and Technology.
[10] Agyeman, B., & Ashley, R. (2024). Climate-smart agriculture utilisation and financial viability in climate-risk areas of Guinea Savannah agro-ecological zone of Ghana. Ghana Journal of Agricultural Science, 59(1), 1–15. Retrieved from https://www.ajol.info/index.php/gjas/article/view/202988

availability of food, reduced competition for arable land and expanded agricultural opportunities will benefit the surrounding districts.

The project will actively support gender-transformative actions by increasing women's access to credit through Village Savings and Loan Associations (VSLAs) and promoting leadership roles within Farmer-Based Organisations (FBOs). Project activities will incorporate gender-sensitive considerations throughout the implementation phase. Training on post-harvest handling and agro-processing — particularly for women — will further improve food security and income diversification. Youth face similarly high levels of unemployment and limited livelihood options. The project will provide targeted support for climate-resilient enterprises suited to youth engagement, including beekeeping, dry-season gardening, renewable energy and shea butter processing.

Communities will co-develop Climate Action Plans tailored to local conditions. Using a menu of interventions — including drought-tolerant crops, restoration, soil conservation, agroforestry and small-scale water harvesting — communities will be encouraged to select and implement measures best suited to their challenges. Support and oversight will be provided by REMCs, DEMCs and CEMCs, which will be revitalised and trained to lead participatory discussions on planning, budgeting, implementation and monitoring. These governance structures will ensure accountability, capacity-building and institutionalisation of climate resilience at all levels.

2. Project beneficiaries

The explanations and calculations of how many direct and indirect beneficiaries will benefit from each of the project interventions are detailed in **Table 1** and **Table 2**, respectively. The estimated total of direct and indirect beneficiaries across the three target regions of northern Ghana is 2,861,674 individuals. Of which, approximately 691,125 individuals in the target eight Districts are expected to benefit directly from project activities. . These benefits will result from the implementation of CSA, agroforestry and restoration and EWS, and raising awareness and disseminating knowledge.

2.1. Direct beneficiaries

Table 1. The number of direct beneficiaries projected to benefit from project interventions.

Project intervention	Explanation of Direct Beneficiaries	Calculation of Direct Beneficiaries	Total Direct Beneficiaries
Output 1: Early Warning Systems	For individuals in the target districts, EWS will inform proactive measures — *inter alia*, optimising planting schedules for higher yields, adopting for drought-resistant crops and relocating agricultural activities to reduce losses — limiting the loss of life, property damage and disruptions to livelihoods that are associated with climate hazards. Accordingly, direct beneficiaries have been calculated by summing the population estimates for the eight target districts.	91,279 + 51,118 + 58,433 + 96,957 + 76,679 + 71,774 + 188,006 + 56,879 = 691,125[11]	691,125
Output 2: Climate Resilient Agriculture	13,840 ha of agricultural land will be made more resilient to climate change through the implementation of climate-resilient agricultural practices. Estimating an average farm size of ~2 ha[12], 6,920 farms would receive CSA benefits from the project. The owners of these 6,920 farms are the direct beneficiaries of this interventions. 6920 farmers represents an average of 2% population in the 8 Districts.	13,840 ÷ 2 = 6,920	6920
Output 3: Agroforestry and landscape Restoration	During the project lifespan, agroforestry and restoration interventions will be implemented in 120 communities. Estimating ~1000 people per community, the direct beneficiaries of these interventions have been calculated by assuming that all 1000 individuals in each of the 120 target communities will benefit.	1000 x 120 = 120,000	120,000
Output 4: Increased access to financial	The project will establish two Farmer-based Organisations (FBOs) in each of the 120 communities targeted by the project, i.e. a total of 240 FBOs. Eight districts will be targeted by the project, engaging an average of 15 communities per district. Average FBO members per FBO is estimated at 35 individual farmers.	35 x 240 = 8,400	8,400

[11] Ghana Statistical Service. (2021). Ghana 2021 Population and Housing Census: General Report Volume 3A: Population of Regions and Districts. Accra: Ghana Statistical Service.
[12] de Jager, I., Giller, K. E., Brouwer, I. D., & Biesbroek, S. (2022). Nutrition-sensitive farming in rural Northern Ghana: Ensuring year-round availability of a nutrient adequate diet. *Food Security*, 14(6), 1341–1357. https://doi.org/10.1007/s12571-022-01325-5

resources and engagement with private sector			
Output 5: Knowledge and awareness of climate threats and available adaptation options increased	The project will generate and disseminate awareness and knowledge products capturing best practice and lessons learned to inform the upscaling of climate change adaptation across northern Ghana and nationally, using various communication methods (e.g. radio, audio-visual, Apps). It will also conduct district awareness and training workshops with District Assemblies to integrate CCAPs and EbA. Accordingly, direct beneficiaries have been calculated by summing the population estimates for the eight target districts.	91,279 + 51,118 + 58,433 + 96,957 + 76,679 + 71,774 + 188,006 + 56,879 = 691,12511	691,125
Project totals:	**As the direct benefits of EWS will be experienced by the entire population of the eight target districts, some individuals will benefit from multiple interventions. To prevent double-counting of beneficiaries, we have reported the total number of direct beneficiaries as the total population of the eight districts, not the sum of direct beneficiaries for the three interventions.**		**691,125**

In the Upper West Region, project activities will include strengthening the capacity of district-level institutions, improving climate data and EWS, and implementing climate-resilient agricultural practices, EbA and alternative livelihoods. Community members will directly benefit from improved knowledge and skills in climate-resilient agriculture, access to information regarding drought and flood preparedness, diversified income sources through alternative livelihoods and increased access to financial resources and markets.

In the Upper East Region, the project will target districts such as Binduri and Garu. Project activities will strengthen local institutions, improve climate information and EWS and promote the adoption of climate-resilient farming techniques, EbA measures and alternative livelihood options. Community members will directly benefit through improved agricultural productivity, greater resilience to climate shocks, diversified income opportunities and better access to financial services and markets.

Project activities in the Northeast Region of Ghana will focus on building the capacity of local and district-level institutions, strengthening climate information and EWS and supporting the adoption of climate-resilient agricultural practices, EbA strategies and alternative livelihoods. Through these interventions, community members will directly benefit from improved agricultural productivity, greater resilience to climate variability, diversified and expanded livelihood opportunities and improved access to financial resources and markets.

2.2. Indirect beneficiaries

Table 2. The number of indirect beneficiaries projected to benefit from project interventions.

Project intervention	Explanation of Direct Beneficiaries	Calculation of indirect Beneficiaries	Total indirect Beneficiaries
Output 1: Early Warning Systems	Individuals in adjacent communities will gain access to early warning data through the expanded dissemination framework, enabling better planning for climate risks. The proposed EWS trials will lay the groundwork for scaling up climate data access and early warning services nationwide, supporting broader resilience, mitigating disaster impacts and improving environmental conditions, food security, resource availability and economic stability across Ghana. Accordingly, indirect beneficiaries have been calculated by summing the population estimates for the three target regions in northern Ghana.	658,946 + 1,301,226 + 901,502 = 2,861,674[13]	2,861,674
Output 2: Climate Resilient Agriculture	Taking an average of 6.18 household size, the indirect beneficiaries calculated. This is conservative as we expect the project to change the way that agriculture is supported by MOFA the rest of the 8 Districts.	6940*6.18 = 42,765	42,765
Output 3: Agroforestry and landscape restoration	Agroforestry and restoration initiatives will improve ecosystem services for the entirety of the target communities through upscaling of the project approach through the District planning and budgeting reform carried out in Output 1. Accordingly, indirect beneficiaries have been calculated by summing the population estimates for the eight target districts.	91,279 + 51,118 + 58,433 + 96,957 + 76,679 + 71,774 + 188,006 + 56,879 = 691,125[14]	691,125
Output 4: Increased access to financial resources and engagement with private sector	The project will establish two Farmer-based Organisations (FBOs) in each of the 120 communities targeted by the project, i.e. a total of 240 FBOs, with an average of 35 members per FBO. Assuming, 6.18 people per household to calculate the indirect beneficiaries resulting from individual FBO members. This is conservative as we expect the project supported FBO to influence other FBOs and VSLAs with the Districts and within the target to adopt project measures.	8,400 * 6.18 = 51,912	51,912
Output 5: Knowledge and awareness of climate threats and available adaptation options increased	The awareness and knowledge products capturing best practice and lessons learned to inform the upscaling of climate change financing and adaptation will be disseminated across northern Ghana and nationally, using various communication methods (e.g. radio, audio-visual, Apps), Accordingly, indirect beneficiaries have been calculated by summing the population estimates for the three target regions in northern Ghana.	658,946 + 1,301,226 + 901,502 = 2,861,67414	2,861,674
Project totals:	**As the indirect benefits of EWS will be experienced by the entire population of the three target regions, some individuals will benefit from multiple interventions. To prevent double-counting of beneficiaries, we have reported the total number of**		**2,861,674**

[13] Ghana Statistical Service. (2021). Ghana 2021 Population and Housing Census: General Report Volume 3A: Population of Regions and Districts. Accra: Ghana Statistical Service.
[14] Ghana Statistical Service. (2021). Ghana 2021 Population and Housing Census: General Report Volume 3A: Population of Regions and Districts. Accra: Ghana Statistical Service.

	indirect beneficiaries as the EWS indirect total, not the sum of indirect beneficiaries for the three interventions.		

Neighbouring communities across the Upper West, Upper East and Northern Regions of Ghana will benefit indirectly from the project activities through improved environmental conditions, EWS, the spread of CSA practices and enhanced regional food and water security. As gender-sensitive agricultural programmes, land restoration efforts and climate-resilient farming techniques are implemented, surrounding areas and local communities will experience benefits such as increased access to shared natural resources and greater economic opportunities — particularly for women — and the replication of effective environmental and agricultural strategies. These outcomes will be further supported by inter-community collaboration and knowledge exchange, developing broader resilience to climate and environmental challenges across northern Ghana.

3. Conclusion

The proposed adaptation interventions, primarily focused within eight vulnerable districts in northern Ghana, involve the implementation of CSA practices, EbA measures and alternative climate-resilient livelihoods, which will directly benefit participating districts through enhanced food security and a strengthened agro-based rural economy. Moreover, the project will strengthen technical and institutional capacity at the district level and improve climate data and EWS. This will indirectly benefit neighboring districts by enhancing their climate change adaptation planning and proactive management of climate-related hazards. Greater access to financial resources and engagement with the private sector among smallholder farmers in the target districts are also expected to promote wider economic stability and expand opportunities for market participation throughout northern Ghana. Lastly, the knowledge and awareness raising activities of the project will facilitate broader uptake of climate change adaptation strategies across northern Ghana, thereby contributing to enhanced climate resilience throughout the region.