

Adapting Together, Thriving Tomorrow



Guidelines for Monitoring and Evaluation Processes within the Ghana National Adaptation Plan (NAP) Framework



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Acronyms

AdCom	Adaptation Communication
CCA	Climate Change Adaptation
EPA	Environmental Protection Agency
GSS	General Social Survey
I/NGOs	International Non-Governmental Organization
KPIs	Key Performance Indicators
M&R	Monitoring, and Reporting
MEST	Ministry of Environment, Science, Technology and Environment
MMDAs	Metropolitan, Municipal and District Assemblies
MoF	Ministry of Finance
MTDPF	Medium-Term Development Policy Framework.
NAP	National Adaptation Plan
NAPKs	National Adaptation Plan Key actors
NDPC	National Development Planning Commission
SDGs	The Sustainable Development Goals
SWOT	Strength weakness opportunity and threat analysis
UNFCCC	The United Nations Framework Convention on Climate Change

STEP-BY-STEP USER MANUAL/GUIDELINE

1. Defining Monitoring, Review and Reporting

Monitoring, and reporting (M&R) involve the ongoing gathering, assessment, and presentation of information. When consistently and systematically implemented, M&R enables stakeholders to monitor whether or not a project is meeting its objectives and, if it is not, to make adjustments. Simply put, M&R continuously monitors performance against plans by collecting and analyzing data on pre-established indicators. It updates progress on three levels, outputs, outcomes/effects, and impacts—thereby enabling a project to make decisions, to use feedback for decision-making and introduce timely corrections before issues become critical.

M&R ensures three things: (i) that inputs, whether financial, technical, human, technological, physical, ideological, or otherwise, are delivered as specified in the work plan, (ii) that processes and activities are initiated, conducted, and completed according to schedule, and (iii) that quantity and quality of outputs are as outlined in the plan. When carried out systematically in collaboration with stakeholders, M&R aids in understanding and learning from changes, informing strategic decisions, reporting to national and international entities, facilitating dialogue and exchange, and updating political leaders and partners. It also supports adaptation, promotes transparency and accountability, strengthens new partnerships and collaborations, and facilitates the adjustments and corrections needed to improve results.

A. About the M&R guideline

Making the leap between having a theoretical appreciation of M&R and being able to actually put it into practice is not easy. This guideline is designed to help M&R practitioners through step-by-step approach.

B. Necessity of the Step-by-Step Guideline

Having a systematic guideline written in straightforward, clear language facilitates the challenging task of carrying out the M&R of climate change adaptation (CCA) projects. This guideline provides a general overview of M&R, including its fundamental concepts, indicators, tools and techniques, to orient readers to the theory and instructions for using the online platform to facilitate data collection, review, and reporting. Users should apply only those steps that are relevant to their specific contexts. The guideline itself should be periodically revised to incorporate new best practices and insights gained while implementing projects based on the National Adaptation Plan (NAP).

C. Who is this Guideline for?

This guideline is intended for (i) mid- to high-ranking officials at the federal, provincial, and local government levels who are tasked with the M&R of CCA projects, (ii) M&R staff employed by development and humanitarian agencies, and (iii) researchers, professionals, and academics with an interest in M&R, particularly in the context of CCA.

D. How was it Prepared?

This guideline is based on the M&R framework outlined in the NAP document from the Six (6) Sector Adaptation Plans. It is based on four sources of information: (i) pertinent documents such as policies, guidelines, and frameworks, and existing data sources; (ii) CCA action plans; (iii) secondary information accessible at from the sectoral ministries, United Nations agency development partners, and I/NGOs; and (iv) the insights and perspectives of national and sub-national stakeholders.

E. How is it Structured?

This guideline has three chapters. The first chapter provides background information and introduces theoretical concepts, the second elaborates each of the seven steps, while the final chapter focuses on putting theory into practice outlining the indicator matrices for the six (6) sectors.

2. M&R Framework Steps

Theoretically, M&R has seven steps: (i) articulating the purpose and scope of the M&R framework, (ii) identifying the M&R audience, (iii) formulating M&R questions, (iv) identifying indicators and data sources, (v) designating someone (staff or consultant) to be responsible for data collection and establishing timelines, (vi) designating someone to be responsible for assessing and reporting on data, and (vii) periodically reviewing the M&R plan. Each step is explained below.

Step 1: Purpose and scope of the M&R framework

The primary purpose of Ghana's Monitoring and Reporting (M&R) framework for the National Adaptation Plan (NAP) is to:

- a) **Track the progress and effectiveness of adaptation actions** across all priority sectors and governance levels.
- b) **Ensure accountability and transparency** in the implementation of climate adaptation interventions.
- c) **Inform decision-making and policy adjustments** through evidence-based assessments of outcomes and impacts.
- d) **Support learning and knowledge sharing** to enhance the design and implementation of future adaptation measures.
- e) Facilitate national and international reporting obligations, including contributions to:
 - o The United Nations Framework Convention on Climate Change (UNFCCC)
 - o The Sustainable Development Goals (SDGs)
 - o The Paris Agreement's Global Stocktake and Adaptation Communication (AdCom)
 - o The Adaptation Component of the Biennial Transparency Reports (BTRs)
 - o The Global Goal on Adaptation (GGA)
- f) **Strengthen coordination across stakeholders**, aligning national, sub-national, sectoral, and development partner actions within a coherent framework.

Scope of the M&R Framework

- a. The scope of Ghana's NAP Monitoring and Reporting (M&R) framework is comprehensive, encompassing multiple dimensions essential for effective adaptation tracking and management. **Geographically**, the framework spans national, regional, and district levels across the country, with a strong emphasis on ensuring adaptation actions are context-specific and responsive to local climate vulnerabilities.
- b. In terms of **sectoral coverage**, the framework includes six priority sectors—**Agriculture, Water, Cities, Ecosystems, Health, and Youth**—while also integrating cross-cutting themes such as **gender equality, climate finance, and governance**. This ensures that adaptation is mainstreamed across both technical and policy domains.
- c. The **time horizon** for monitoring spans the **short (5 years), medium (15 years), and long term (35 years)**, aligning with the overall implementation timeline of the NAP and Ghana's national development planning cycles. This allows for the tracking of progress and outcomes over time, providing flexibility and continuity.
- d. **Stakeholder involvement** is central to the framework's design. It includes a wide range of actors, from government institutions such as **MEST, NDPC, EPA, GSS, MOFA, MoF, sector ministries, and MMDAs**, to **civil society organizations, academia, the private sector, and development partners**. The system is deliberately inclusive, engaging both implementers and beneficiaries of adaptation actions to ensure relevance, accountability, and shared ownership.
- e. The **content focus** of the M&R framework is broad, capturing the full results chain from **inputs and outputs to outcomes and impacts**. It also includes the tracking of **financial flows** and assessments of **institutional readiness**, alongside core indicators measuring **vulnerability reduction, resilience-building, and adaptive capacity**.
- f. Finally, the framework is designed with robust **reporting functions**. These include mechanisms for **internal learning and policy review** at both national and sub-national levels, as well as **external reporting** to regional and international frameworks such as the UNFCCC. Additionally, public-facing tools like **dashboards and national adaptation reports enhance transparency, communication, and accountability**.

Step 2: M&R Audience

The significance of M&R lies in the optimal utilization of its outcomes. It applies to all priority sectors (Agriculture, Cities, Ecosystems, Health, Youth, Water) and covers those institutions, coordination bodies, and partners involved in adaptation M&R, from national ministries to district assemblies, civil society, private sector, and development partners.

Roles & Responsibilities

Stakeholder	Core M&R Responsibilities
MEST (Lead Coordination)	• Oversee national M&R framework implementation • Validate and consolidate reports for UNFCCC/SDGs
NDPC	• Integrate adaptation indicators into development planning • Align M&R outputs with the Medium-Term Development Policy Framework (MTDPF)
EPA	• Lead impact assessments • Provide technical guidance on indicator methodologies
MoF	• Track adaptation finance against KPIs • Link budgets to performance
GSS	• Collect, harmonize and quality-assure M&R data • Support digital data platforms
Sectoral Ministries	• Define sector-specific indicators • Coordinate data collection and reporting
Ministry of Local Government	• Guide MMDAs on policy implementation and programming
MMDAs	• Conduct local data gathering • Engage communities in participatory M&R
Civil Society & Academia	• Validate data • Conduct independent reviews and research
Development Partners	• Provide technical and financial support • Align project-level M&R with national framework
Private Sector	• Report climate-resilience investments • Participate in data-sharing platforms

Step 3: M&R Process Overview

i. Framework Setup

- Establish governance structure (Steering Committee, Technical Working Groups)
- Finalize Theory of Change and Results Chain (Inputs → Outputs → Outcomes → Impacts)

ii. Indicator Definition (see Annex 1 - 6)

- Select harmonized KPIs per sector
- Specify baselines, targets, units, data sources, and frequencies

iii. Capacity Building

- Conduct M&R training for national, regional, district teams
- Develop user manuals and data-quality check protocols

iv. Pilot Testing

- Run pilot M&R cycles in selected districts
- Refine data collection templates and workflows

v. Full-Scale Roll-Out

- Launch quarterly local and bi-annual sectoral reporting
- Integrate feedback from pilots into standard operating procedures

vi. Review & Adaptive Management

- Convene annual learning workshops
- Adjust indicators, targets, and budgets based on evidence

vii. Reporting & Communication

- Produce annual National Adaptation Report for NDPC & EPA
- Submit biennial reports to UNFCCC and update the Public Dashboard

Step 4: Indicators and their Data Sources

One crucial component of M&R is the identification of indicators and their data sources. Without them, data gathering will fail to be effective. Indicators are specific, observable, and measurable variables that assist in evaluating the current status of a project, monitoring changes in that status over time, and establishing if the project is progressing towards a specific outcome. Since indicators are observable signs of progress, meaning they can indicate whether a project is advancing towards its overall objectives.

The development of specific, measurable, achievable, relevant, and time-bound (SMART) indicators involves seven essential steps: (i) becoming familiar with the project context by reviewing project documents, targets, (ii) collaborating with stakeholders and experts to understand the agreed-upon indicators, (iii) generating ideas for data collection based on these indicators, (iv) confirming that data each selected indicators is easily obtainable and beneficial for management decisions, (v) identifying indicators for each level of the result chain—outputs, outcomes, and impacts, (vi) ensuring that indicators are SMART, and (vii) adopting proxy indicators if direct indicators cannot be developed or measured or if they are too costly to assess. Indicators can be sourced from published or unpublished data, secondary sources, national data, and primary data, notably, information from the project's progress reports.

See Annex 1-6 for the full view of the indicators for the six (6) sectors.

Step 5: Institutional Arrangements

Preceding Tasks & Requisite Steps

5.1 Institutional & Governance Arrangements

- 5.1.1 Constitute a National M&R Steering Committee under MEST
- 5.1.2 Form six Sectoral M&R Technical Committees, one per priority sector
- 5.1.3 Define TORs, meeting schedules, and decision-making protocols

5.2 Indicator & Data Architecture

- 5.2.1 Review existing sectoral indicator lists (Annexes 1–6) and align with SDGs/NDCs
- 5.2.2 Develop an indicator registry in a centralized database, with metadata fields
- 5.2.3 Standardize data-collection templates (Excel/mobile) for consistency

5.3 Capacity Development

5.3.1 Train national and sub-national staff on:

- Indicator methodology

5.3.2 Develop an online M&R knowledge portal with guidance documents

5.4 Stakeholder Engagement

5.4.1 Convene multi-sectoral workshops to finalize M&R procedures

5.4.2 Establish Public-Private Reporting Platforms to capture private-sector resilience investments

5.4.3 Launch a Civil Society Review Forum for data validation and advocacy

The officers responsible for timely data collection according to a predetermined timeline, typically monitoring and evaluation (M&E), data, or data review officers, must be designated and their roles and responsibilities spelled out. They will also need capacity-building training. Instruments and tools for data collection must also be finalized. Although the specific nature of these tools will vary according to factors such as sampling procedures and data availability, all tools must consider (i) the extent of data that exists and (ii) how much of it can be utilized for M&R. Participatory tools for data collection include key informant interviews, participant observation, semi-structured interviews, questionnaires, strength weakness opportunity and threat (SWOT) analysis, focus group discussions, and the recording of case studies.

Once tools are settled on, the M&R team should develop formats and checklists, and test them out before they are actually put to use. Data collection may be either paper- or device-based. An M&R work plan and matrix that clearly delineate responsible individuals, timelines, and the frequency of data collection must be drafted before any data is collected. Assigning responsibilities to M&R team members provides all with a clear understanding of who is accountable for collecting which data and which tool she or her will use. Data should be monitored systematically every quarter.

Step 6: Detailed Action Steps

Merely collecting data does not reveal any results; data must also be systematically tabulated, synthesized, and analyzed. To be enlightening and to facilitate effective communication, data must be transformed into information. Staff need to be assigned to execute this task as a whole or its various parts, including coding, tabulation, and synthesis. They also may need instruction in focuses such as policy, institutional, gender analysis, and cost-benefit analysis. The selection of tools for analysis depends on the nature, type, and quantity of data. Thematic analysis is useful for qualitative data, while statistical analysis is generally applied to quantitative data. Visualization software can be employed to present graphical analysis. Data management is crucial. To effectively manage and utilize the data collected, it needs to be stored securely.

M&R findings can be effectively communicated through workshops, exchange visits, seminars, conferences, after-action reviews, and other channels. Quarterly reviews serve as crucial learning opportunities to share and receive feedback and suggestions for improvement. In tandem with managing human resources (M&R, data, and data review officers), it is beneficial to optimize financial resources by allocating a specific budget for M&R. This budget should be determined during the project design phase to ensure that funds are adequate. Usually, 5 percent of the total project budget is considered ideal for the systematic implementation of M&R initiatives. The M&R budget can be utilized to build the capacity of M&R staff through a series of training programs; cover the costs of instrument design, data collection and analysis; and/or produce and disseminate reports to the project team, partner organizations, development partners, target communities, and other stakeholders.

Step	Task	Lead	Timeline
1	Issue formal mandate letter to M&R Steering Committee	MEST	Month 0
2	Develop and approve detailed M&R Implementation Plan	Steering Committee	Months 1–2
3	Finalize and disseminate Indicator Registry and Data-Collection Templates	NDPC / GSS	Month 3
4	Deploy digital M&R platform; conduct end-user acceptance testing	IT Unit (EPA)	Months 3–5
5	Conduct Sectoral and District-Level M&R training workshops	NDPC / Sector Mins	Months 4–6
6	Launch pilot M&R cycle in 3 districts and 2 sectors	MMDAs / Sector Mins	Months 6–8
7	Review pilot results; update SOPs and guidelines	Steering Committee	Month 9
8	Full roll-out of quarterly local and bi-annual sectoral reporting	All National Adaptation Plan Key actors (NAPKs)	Month 10 onward
9	Convene first Annual M&R Learning Workshop; publish National Adaptation Report	NDPC / EPA	Month 12
10	Submit first biennial UNFCCC adaptation performance report	MEST / UNFCCC team	Month 24

Step 7: Reporting Cycles and Templates

To ensure the effective implementation and continuous improvement of Ghana's National Adaptation Plan (NAP), a structured system of reporting and adaptive management has been established. This includes clearly defined reporting cycles, standardized templates, and designated responsibilities at local, sectoral, national, and international levels. These reporting mechanisms form the backbone of the M&E framework, enabling consistent data collection, performance tracking, and communication of progress. In parallel, regular review and learning processes are built into the system to support adaptive management. Through annual learning workshops, policy adjustments, and feedback loops, the M&E framework promotes evidence-based decision-making and strengthens the responsiveness of adaptation efforts across all levels of governance.

Level	Frequency	Responsible	Template
Local (District/Municipal)	Quarterly	MMDAs	District M&R Template
Sectoral Reviews	Bi-annual	Sector Ministries	Sector M&R Template
National Adaptation Report	Annual	NDPC & EPA	NAP Annual Report
International (UNFCCC)	Every 2 yrs	MEST	UNFCCC Adaptation Template

Review, Learning & Adaptive Management

i. Annual Learning Workshop

- Present data analyses across sectors
- Identify gaps, successes, and lessons learned

ii. Policy Adjustment Memo

- Steering Committee issues recommendations to MoF and sector ministries
- Update targets, budgets, and procedures accordingly

iii. Continuous Feedback Loops

- Integrate stakeholder feedback via the online portal
- Publish quarterly briefs on improvements implemented

Annexes – Six (6) sector M&R frameworks

The indicators presented in this framework are derived from the priority adaptation actions identified through the National Adaptation Plan (NAP) process and are intended to track implementation progress and results at output and outcome levels. These indicators represent recommended and ideal measures for monitoring adaptation under the NAP. Achievement of the associated targets is contingent on the availability of adequate financial, technical, and institutional resources to support implementation of the identified actions.

In line with adaptive management principles, the indicators may be refined during NAP updates and implementation reviews to reflect evolving climate risks, implementation experience, and alignment with national development priorities and planning frameworks. The indicators may also be applied by adaptation projects and programmes to support alignment with national adaptation priorities and to enable aggregation and reporting of results at sectoral and national levels.

Annex 1: Agriculture Theory of Change Indicators and Targets

1). Crop Sub Sector

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Women's Legal Rights to Land	Number of communities supported with legal aid & mobilization	<50	≥200 communities	Gender elements integrated into customary land tenure systems	Few cases documented	≥100 documented community frameworks	% of rural women owning or co-owning productive land	~13% nationally (GSS)	≥35% by 2040	Women's participation in land governance bodies (%)	~10%	≥40% representation
2. Climate-Smart Extension Services for Women	Budget allocated for women-targeted extension (USD/year)	<\$500,000	≥\$2M/year	Number of women extension officers recruited	~200	≥1,000 officers	% of women accessing ICT-based extension services	~20%	≥65% by 2040	% of trained women adopting climate-smart practices	~25%	≥70%
				Number of ICT extension centers deployed	<100	≥300 centers						
3. Women's Leadership in Agricultural Decision-Making	Awareness campaigns and leadership trainings conducted	Few pilots	≥150 community-level sessions	Number of women in leadership roles in FBOs or agriculture councils	<15%	≥40% by 2028	% increase in women-led agribusiness initiatives	Unknown baseline	≥50% increase over baseline	Community-wide adoption of sustainable land/resource management practices	Fragmented adoption	≥60% of target communities adopting
4. Gender Integration in Planning & Budgeting	Gender protocols developed & distributed	None standardized	≥1 national protocol, 5 regional adaptations	Revised climate-agriculture policies with gender lens	Few documents	≥10 revised policies/programmes	Number of gender & climate trainings conducted	<20/year	≥100 by 2038	Gender-responsive budget allocation in agriculture sector	<10% of relevant projects	≥40% projects gender-responsive by 2060

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
5. Employ rainwater harvesting systems for irrigation during dry periods	% of MoA budget allocated to rainwater harvesting and irrigation projects	2%	10%	Number of rainwater harvesting systems installed	TBD	2,000 units nationwide	% increase in soil moisture levels in areas with rainwater harvesting systems	TBD	+25%	% increase in average crop yield during dry seasons in intervention zones	TBD	+30%
6. Promote the adoption of drought- and pest-resistant crop varieties	Number of drought- and pest-resistant crop varieties officially approved	3	10	Number of farmers trained on pest management and resistant seed use	TBD	15,000 farmers	% of farmers adopting drought- and pest-resistant varieties	15%	70%	% reduction in crop losses due to pests and diseases	TBD	50%
				Number of pest-resistant seed packs distributed	TBD	250,000 packs	% reduction in pesticide use in areas with resistant crop adoption	TBD	-40%			
7. Promoting Integrated Crop Pest Management Practices	Number of workshops/ resources distributed on biocontrol methods	Few scattered trainings	100+ workshops across all target regions	Number of farmers trained in IPM	< 20% of local farmers	80% trained in target districts	Increase in use of natural predators/ biocontrol agents	10% usage	60% adoption	Reduction in pest outbreaks and pesticide use	High pesticide reliance	40% reduction in pesticide applications
8. Adoption of Efficient Irrigation Systems	Amount of funding allocated for irrigation support and training	<\$250,000	≥ \$3 million	Number of farmers adopting water-efficient irrigation technologies	~15% of target group	≥ 70% of target group	% reduction in water wastage from irrigation	Minimal tracking	≥ 40% reduction	Increase in average income of farmers using irrigation systems	~\$350/year	≥ \$900/year
9. Livelihood Diversification	Number of climate and weather advisory sessions conducted	<50/year	≥ 500/year	% of farmers using weather data for crop decisions	~25%	≥ 80%	% of households with more than one reliable income source	~30%	≥ 75%	Reduction in income losses after climate shocks	High vulnerability	≥ 50% reduction
10. Planting of Drought-Resistant Varieties	Number of seed packs and demo plots distributed	<1,000	10,000	Percentage of farmers adopting drought-resistant seeds	10%	75%	Stability of crop yields across seasons	High volatility	25% increase in yield stability	Improvement in food security and household income	60% food secure	90% food secure
11. Adjustment of Farming Schedules to Align with Climate Patterns	Number of climate forecast trainings conducted	Minimal (<10/year)	200+ community sessions	% of farmers receiving and understanding forecast data	25%	85%	% of farmers adjusting planting/ harvesting schedules accordingly	10%	70%	Increase in seasonal crop productivity	Low/variable	30% increase in seasonal yields

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
12. Promotion of Vertical Gardening Techniques	Number of pilot/ demo sites in urban areas	<5 sites	50+ active pilots	Produce harvested per square meter in vertical gardens	<2 kg/m ²	≥5 kg/m ²	Households adopting vertical gardening in urban areas	Very low (<5%)	40% of targeted households	Improved food access in urban households	Low	50% increase in home-grown produce
13. Use of Pest and Disease-Resistant Crop Varieties + Mulching	Number of mulching kits distributed/ training conducted	Very limited	10,000 farmers supported	% of farmers applying mulching techniques	15%	70%	Increase in soil moisture and decrease in erosion	Minimal	40% improvement in soil moisture	Reduction in crop losses due to pest/ drought stress	High	50% decrease in dry-season losses
14. Crop Diversification	Number of training sessions on diversified cropping	<15/year	200+ across regions	% of smallholder farmers adopting multiple crop systems	20%	75%	Increase in total household crop yield and diversity	Low	35% increase	Reduced vulnerability to climate shocks (drought/ floods/pests)	High	50% reduction in seasonal losses
15. Use of Improved Seeds	Number of improved seed packs distributed	<50,000/year	500,000+ packs/year	% of farmers using improved seed varieties	30%	90%	Increase in average yields per acre	1.5 tons/ acre	3.5 tons/acre	Increase in farmer income and food security	Low/medium	60% increase in income
16. Use of Climate-Smart Agricultural Practices	Training sessions and incentives provided	Minimal	Programs in all districts	% of farmers adopting CSA practices (e.g., crop rotation, cover crops)	20%	85%	Increase in soil fertility and water retention	Low	40% improvement	Decrease in GHG emissions from farms, increased resilience	Unmeasured	CSA mainstreamed in all regions
17. Farming Practices to Restore Degraded Ecosystems	Community training and materials for restoration practices	Limited	5,000+ farmers trained	% of land under conservation agriculture or restoration techniques	10%	60% of degraded land rehabilitated	Increase in soil fertility and vegetation cover	Declining	40% improvement	Long-term ecosystem regeneration, improved land productivity	Low	60% recovery of ecosystem functions
18. Provision of Technical Services to Farmers	Number of extension agents trained and deployed	<1000	3,000+ across target regions	% of farmers receiving regular technical support	25%	90%	Increase in sustainable practice adoption and yields	Moderate	50% improvement	Increased climate resilience and adaptive capacity	Low	High adaptive capacity index
19. Implementation of Conservation Agriculture Techniques	Training workshops and demonstration farms established	<20	200+ in different agro-zones	% of farmers using conservation techniques (no-till, mulching, etc.)	15%	75%	Improvement in soil structure, moisture retention, and fertility	Low	40% improvement	Enhanced food system stability in climate-prone areas	Fragile	Resilient
20. Crop Insurance Schemes	Awareness campaigns and insurance subsidy programs launched	Very few	100% coverage of risk-prone areas	% of farmers enrolled in crop insurance schemes	<10%	70%	Reduced economic losses after climate-related events	High loss rates	60% less post-disaster income loss	Improved recovery rates aftershocks and stable rural economies	Low	Highly resilient farming systems

2). Livestock Sub Sector

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Gender-Sensitive Training & Capacity Building	Budget allocated for livestock training (USD/year)	<\$300,000/year	≥\$1M/year	Number of men and women trained	~1,200/year (30% women)	≥5,000/year (≥50% women)	Knowledge gain (avg. score increase in pre/post-tests)	+15%	≥35% increase	% of trainees adopting sustainable livestock practices	<25%	≥70% within 1 year of training
2. Heat-Tolerant Livestock Breeds	Number of heat-tolerant breeds developed or imported	2–3	≥8 breeds in use by 2030	Farmers accessing heat-tolerant breeds (%)	~10%	≥60%	Livestock survival rate during heat stress (%)	~70%	≥90%	Average productivity (litres milk/day or weight gain/kg/month)	Cattle: 5L/day	≥7L/day
3. Drought-Resistant Forage & Pasture	Drought-resistant varieties developed	<5	≥10 varieties by 2028	Farmers using drought-tolerant forage crops (%)	~15%	≥60%	Dry season yield of forage crops (tons/ha)	~1.5 tons/ha	≥3 tons/ha	Frequency of feed shortages (months/year)	~4 months/year	≤1 month/year
4. Silvopastoral Systems Integration	Technical trainings on silvopastoral systems	~50 events/year	≥200 events/year	Number of farms with silvopastoral systems	<1,000	≥5,000 farms by 2030	Soil organic matter content (%)	~1.8%	≥3.0%	Reduction in erosion (tons/ha/year)	~15 tons/ha	≤5 tons/ha
5. Rotational Grazing Strategies	Budget for extension support (USD/year)	<\$100,000	≥\$500,000/year	Farmers practicing rotational grazing (%)	~10%	≥50% nationwide	Grazing area soil health index (1–10 scale)	~4.5	≥7.5	Reduction in overgrazing incidents reported	Frequent (weekly)	≤1 incident/month
6. Climate-Resilient Animal Housing	Number of upgraded housing systems subsidized	<500/year	≥5,000 by 2028	% of farms with ventilated, shaded structures	~15%	≥70%	Heat stress incidence (e.g., panting, reduced intake)	Common (esp. March–May)	≥50% reduction	Farmer satisfaction rate with housing systems (%)	~40%	≥85% satisfaction (survey-based)
7. Portable Shade Structures	Number of structures procured/distributed	~500	≥5,000 by 2028	% of farms with portable shade	<10%	≥60%	Heat stress reduction (symptoms incidence drop)	Common in 60% of herds	≤20% of herds affected	Farmer satisfaction with shade structures (%)	~40%	≥85%
8. Precision Livestock Farming (PLF)	Farmers trained on digital systems	~1,000	≥6,000	% of adopters using digital tools	~5%	≥40% by 2030	Reduction in health-related productivity losses	20% average loss	≤5% loss	Increase in productivity (milk, growth)	10% gain	≥25% gain among adopters
9. Water Harvesting & Management	Number of water harvesting systems installed	~300 nationwide	≥2,500 systems	% of grazing areas with permanent troughs	~15%	≥70%	Average water availability (months/year)	~8 months	Full 12-month availability	Livestock mortality due to water scarcity (%)	~15% in dry zones	≤5%
10. Breathable Animal Gear	Number of gear units distributed	0 (new action)	≥10,000 units	% of farmers using climate-sensitive gear	~0%	≥50%	Reduction in thermal stress behaviors	Frequent (panting, inactivity)	≥50% reduction	Increase in average daily gain or milk yield	Weight: +0.5kg/month	≥+1.0kg/month
11. Livestock Insurance Schemes	Farmers sensitized and eligible	<2,000	≥15,000	Farmers enrolled in insurance (%)	<5%	≥40%	Timely payouts during climate events (%)	<30% on-time	≥90%	Satisfaction rate with scheme (%)	~35%	≥80%

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
12. Climate-Adaptive Livestock Management	Farmers trained in CSA livestock techniques	~3,000	≥15,000	% of adopters of CSA techniques	~20%	≥60%	Productivity improvement (milk/livestock unit)	6L/day avg.	≥8L/day	Climate-related livestock losses (%)	~25%	≤10%
13. Mobile Veterinary Services & Early Warning	Mobile vet units deployed	~15	≥60 units	Farmers reached by mobile services	~5,000/year	≥25,000/year	Disease outbreak frequency	~2/year per district	≤0.5/year	Livestock survival rate	~70%	≥90% in serviced areas
14. Fodder Banks for Dry Seasons	Regional fodder banks established	~5	≥25 banks	Tons of fodder stored/year	~500 tons	≥3,000 tons	Livestock mortality in dry season (%)	~20%	≤8%	Farmer participation in fodder programs	~10%	≥60%
15. Localized Disease-Resistant Breeding Programs	Investment in disease-resistant breed development (USD)	<\$250,000/year	≥\$1M/year by 2030	Number of disease-resistant breeds developed	~2	≥6 breeds developed	Adoption rate of disease-resistant breeds	<15% of farmers	≥60% by 2040	Livestock mortality from endemic diseases (%)	~20%	≤8%
16. Early Warning Systems for Livestock Health	Number of early warning systems established	~3 regional pilots	≥10 regional systems	% of farmers subscribed to alert systems	<10%	≥50%	Accuracy rate of forecasts (verified vs. actual events)	~60%	≥85%	Reduction in climate-related livestock losses (%)	~25%	≤10%
17. Community-Based Animal Health Workers	Number of health workers trained	~100	≥1,000 workers by 2028	% of districts with mobile veterinary coverage	~25%	≥75%	Average vet response time (days)	5–7 days	≤2 days	Livestock survival rate post-health intervention (%)	~70%	≥90%
18. Market Linkages for Climate-Resilient Livestock	Farmers trained in climate-resilient marketing practices	~1,000	≥6,000	Number of livestock value chain partnerships formed	<10	≥50	% of farmers with access to new markets	~20%	≥70%	Increase in farmer income from sustainable livestock (GHS/month)	~GHS 900	≥GHS 1,300
19. Weather Forecasting & Advisory Access	Budget for weather tech & farmer outreach (USD/year)	<\$300,000	≥\$1M/year	Farmers receiving regular forecasts (%)	~25%	≥80%	Forecast accuracy rate	~65%	≥90%	Farmer satisfaction with forecast services (%)	~45%	≥85%

3). Fisheries Sub Sector

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Capacity Building and Training	Number of gender-sensitive training programs developed	0 in 2023	15 by 2026	Number of men and women attending training (gender disaggregated)	None tracked	500 (50% women) by 2026	% of trained participants applying sustainable practices	<10% in 2023	≥70% within 1 year post-training	Increased access to resources (gear, credit, markets) for both genders	Low access	50% increase in access by 2028
2. Implement Marine Protected Areas	Number of advocacy/ community engagement initiatives	2 in 2023	10 by 2026	Number of marine protected areas (MPAs) established	3 MPAs	8 MPAs by 2026	Reduction in illegal fishing activities in MPAs	~40 cases/ year	<10 cases/ year	Increase in fish populations in protected areas	Baseline survey 2023	25% increase by 2028
3. Promote Aquaculture and Diversify Fish Species	Training and funding provided to aquaculture farms	Limited support	GHS 5 million by 2026	Number of farms adopting diverse and resilient fish species	20 farms	100 farms by 2026	% reduction in wild fish stock dependency	80% reliance on wild	50% reliance by 2027	Improved resilience in fish production	Low resilience	High resilience by 2028
4. Climate-Adaptive Fish Breeding Programs	Investment in research for temperature-resistant species	Minimal funding	GHS 10 million by 2028	Number of temperature-resistant fish species developed	0	5 by 2028	% of aquaculture sites adopting new breeds	5%	60% by 2040	Fish survival during temperature extremes	High mortality	50% reduction in mortality by 2060
5. Establish Fish Gene Banks	Number of gene banks established	0	3 regional facilities by 2030	Quantity of genetic material stored	Basic collection only	1,000 samples by 2028	Accessibility of genetic resources to researchers	Low usage	Access by 5+ research centers	Genetic diversity in breeding programs	High risk of loss	Diversified and secured by 2060
6. Marine Ecosystem Restoration	Funding allocated to marine ecosystem projects	GHS 1M/ year	GHS 10M/year by 2027	Hectares of marine ecosystem restored	100 ha	500 ha by 2028	Increase in species richness	Low diversity	30% increase in biodiversity index	Improved fish breeding success	Low success rates	Double current success by 2060
7. Vulnerable Fish Species	Number of community campaigns and regulatory actions	Few ongoing	15 programs by 2026	Number of vulnerable species protected	5 species	15 species by 2028	Extinction risk for targeted species	High	50% reduction in risk	Community involvement in conservation	Limited	70% of coastal communities engaged
8. Establish Community-Based Fish Breeding and Restocking Programs	Number of community programs initiated	0 in 2023	30 programs by 2026	Number of community-based breeding programs implemented	5 pilot programs	25 fully operational by 2026	Community participation in fish management activities	Low involvement	70% local participation by 2026	Increase in fish population in restocked areas	Depleted stocks	50% population increase by 2060

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
9. Enhancement of Biodiversity in Aquatic and Marine Ecosystems	Habitat restoration strategies implemented	Limited efforts	Full-scale implementation by 2026	Increase in species diversity indices	Low biodiversity index	30% improvement by 2028	Reduction in habitat degradation	Severe degradation	50% reduction in key zones	Enhanced ecological health of marine ecosystems	Poor condition	High ecological integrity by 2060
10. Develop Advanced Marine Monitoring Systems	Investment in monitoring systems and tools	Low investment	Full systems in 10 zones by 2026	Number of operational marine monitoring systems	2 systems active	10 operational systems by 2026	Accuracy of fish population and environmental data	Limited accuracy	80% accuracy improvement	Ecosystem health reporting and informed decisions	Rare reporting	Annual data-driven policy updates
11. Create Climate-Resilient Aquaculture Technologies	Investment in R&D and training on climate-resilient tech	Minimal	GHS 5M investment by 2026	Number of technologies adopted by fish farmers	<10 systems	100 systems adopted by 2027	Increase in fish yields under resilient systems	Low productivity	40% yield increase in 3 years	Farmer satisfaction and system sustainability	Low satisfaction	≥80% satisfaction by 2028
12. Implement Precision Aquaculture Technologies (Satellite & Drone Monitoring)	Satellite/drone tech deployed with training programs	Very limited	50 farms equipped by 2026	Number of farms using satellite and drone technologies	5 farms	50 farms by 2026	Improved water quality and fish health monitoring	Poor monitoring	75% improvement in precision data	Increased productivity and resource efficiency	Low efficiency	30% productivity gain by 2060
13. Introduce Fish Tracking and Migration Technologies	Number of tracking devices deployed	None	200 devices by 2026	Number of species monitored with tracking data	Few monitored	10 key species by 2026	Detailed migration reports produced	Infrequent	Annual reports for all species	Reduction in overfishing of migratory species	High overfishing	50% reduction by 2060
14. Develop Early Warning Systems for Marine Temperature Changes	Upgraded early warning system with advanced tech	Outdated systems	3 new systems by 2026	Timely dissemination of temperature alerts	Irregular alerts	Real-time alerts to 100% of users	Stakeholder preparedness to act on early warnings	Poor response	80% of stakeholders act timely	Reduced mortality of marine species during extreme temperatures	High die-off risk	60% reduction in mortality by 2060
15. Advanced Coastal Zone Management	Annual coastal protection budget (USD)	<\$2M	≥\$5M/year	Number of coastal protection initiatives	2 national-level projects	≥5 initiatives by 2030	Coastal species diversity index (Shannon)	~2.0	≥2.5	Habitat degradation index (scale 1–5)	4.0 (severe)	≤2.8 (30% reduction)
16. Innovative Fish Processing Technologies	Funding for fish processing upgrades (USD)	<\$500K/year	≥\$2M/year	% of processors trained in modern techniques	<20%	≥80%	Post-harvest fish losses (tonnes/year)	92 tonnes (Tema)	≤55 tonnes (40% reduction)	Average processor income (GHS/month)	~GHS 700	≥GHS 910 (30% increase)
17. Sustainable Fishing Gear Technologies	Number of sustainable gear units procured	~1,000 units/year	≥10,000 units (cumulative)	% of fishers using sustainable gear	~25%	≥80%	Bycatch rate (kg/100kg catch)	35 kg	≤25 kg (29% reduction)	Marine ecosystem health score (scale 1–10)	7.5 (degraded)	≤5.5
18. Climate-Smart Fishing Practices	Fishers trained in CS practices	~1,500	≥10,000	% of fishers adopting CS methods	~25%	≥60%	Environmental impact index (1–10 scale)	7 (high)	≤5 (moderate)	Increase in sustainable fishing communities	<20% of total	≥60% by 2060

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
19. Enforcement Against Overfishing	Enforcement & surveillance budget (USD)	~\$1M/year	≥\$2.5M/year	Illegal fishing prosecutions/year	~50	≥200	% of overfished stocks	>40%	<25%	Compliance with fishing laws	~50%	≥85% compliance
20. Water Quality & Pollution Control	Water quality monitoring sites	~10% coastal towns	≥60% coverage	Participation in training sessions	<40%	≥90% of invitees	Nitrate concentration (mg/L) in key sites	>50 mg/L	≤35 mg/L	Reduction in waterborne health risks (proxy)	High in 3/5 regions	≥50% reduction in hotspots
21. Artificial Reefs & Habitat Restoration	Investment in reef development (USD)	<\$200K	≥\$2M total	Number of artificial reefs installed	~10	≥50	Fish biomass around reefs (kg/ha)	50–80 kg/ha	≥120 kg/ha	% of fishers reporting improved catches	<30%	≥80% satisfaction

Annex 2: Cities Theory of Change Indicators and Targets

1). Urban and Rural Flood Risk Management and Resilience

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Community-Based Flood Risk Mapping	No. of mapping workshops conducted	0	≥ 100	No. of validated community flood risk maps developed	Few or none	≥ 50	% of communities using risk maps for local planning	<10%	≥ 70%	Reduction in disaster losses in mapped zones	High	≥ 40% reduction
2. Hydrological Model Development	No. of data sources integrated into hydrological models	Fragmented	≥ 10 sources	No. of functional predictive models developed	0	≥ 5 models	% accuracy of flood forecasts	<40%	≥ 80%	Reduction in flood-related fatalities in pilot regions	Frequent deaths	≥ 60% reduction
3. Flood Risk Management Committees	No. of committees established	Very few	≥ 100	No. of quarterly meetings conducted	Sporadic	≥ 4/year/committee	% of action points implemented from meetings	<20%	≥ 70%	% increase in community-led flood solutions	Limited capacity	≥ 50% increase
4. Zoning Regulation Enforcement	No. of planners and inspectors trained	<200	≥ 1,000	% of inspected buildings compliant with zoning laws	<30%	≥ 90%	% decrease in new constructions in flood-prone zones	High rate	≥ 70% reduction	Reduction in flood damages to infrastructure	Frequent damage	≥ 50% reduction
5. Drainage System Upgrades	% of drainage systems assessed for upgrade	<20%	100%	No. of drainage systems upgraded	Few	≥ 200	% reduction in urban flooding incidents	Frequent	≥ 60% reduction	% reduction in flood-related displacement in cities	High	≥ 70% reduction
6. Retention Basins and Green Infrastructure	No. of feasibility studies for basin locations	None	≥ 30	No. of functional basins/wetlands constructed	<5	≥ 50	% increase in water retention capacity in target areas	Low	≥ 60%	Reduction in peak floodwater levels in targeted cities	High	≥ 50% reduction

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
7. Early Warning Systems for Floods	No. of flood monitoring stations established	<20	≥ 100	% of target communities receiving timely alerts	<30%	≥ 90%	Average response time to flood warnings	>2 hours	≤ 30 minutes	% reduction in flood-related fatalities and losses	High	≥ 70% reduction
8. Community Evacuation Training and Drills	No. of facilitators trained in evacuation techniques	Few	≥ 500	% of communities with active response teams	<10%	≥ 80%	% of households familiar with evacuation procedures	Low	≥ 85%	% reduction in casualties during flood emergencies	High	≥ 80% reduction

2). Improving Water Supply and Sanitation in Communities

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Assess and document water resource vulnerability under climate change	Number of GIS tools and technical staff deployed	Limited GIS usage	10 fully operational GIS teams	Number of vulnerability reports published	0	At least 10 reports	% of planning processes integrating vulnerability data	<10%	80%	Level of resilience in water access in urban plans	Low	High integration in all urban MMDAs
2. Upgrade and expand urban water distribution networks	Amount of funding allocated to water infrastructure (USD)	\$10M	\$60M	Number of kilometers of pipelines installed/ upgraded	<100 km	>1,000 km	% increase in water access in underserved areas	35%	90%	Reduction in reported water shortages in slum areas	High	Near-zero complaints

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
3. Strengthen monitoring and enforcement against galamsey	Number of trained enforcement officers	50	500	Number of galamsey-related arrests/prosecutions	Sporadic	80% increase	% decrease in illegal mining hotspots	Minimal change	60% reduction	Improvement in surface water quality index	Poor	Good to excellent (WHO standards)
4. Promote community-led water source protection	Number of workshops held	5/year	50 total	Number of active community water protection groups	10	200	% of communities reporting improved water source protection	20%	85%	Reduced pollution events at community water points	Frequent	Rare (<10 incidents/year)
5. Rehabilitate degraded watersheds and critical water sources	Number of seedlings procured	100,000	5 million	Area (hectares) of land reforested	200 ha	5,000 ha	% improvement in watershed health score	Low	70%+ improvement	Increase in water availability during dry seasons	Scarce	Reliable supply year-round
6. Conduct public awareness on galamsey and sanitation	Number of education materials distributed	0	500,000	Number of people reached by campaigns	20,000	3 million	% behavior change in sanitation and galamsey attitudes	Limited	75% of population reached report improved behavior	Sustained reduction in pollution and sanitation violations	Ongoing issues	>80% compliance sustained
7. Enforce housing laws on toilets and expand public toilet	Number of building inspectors trained	50	500	Number of public toilets built	150	2,000	% decrease in open defecation	45%	<5%	Improvement in sanitation-related health indicators (e.g., cholera)	High incidence	80% reduction in cases

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
8. Develop emergency water storage and disaster-ready systems	Number of emergency reservoirs constructed	0	100	Volume of emergency water storage capacity (litres)	1 million	100 million	% of urban population with access to emergency water	<10%	90%	Water supply continuity during droughts/ disasters	Disrupted	Continuous access for all
9. Partner with private sector for sustainable infrastructure	Number of investment forums hosted	0	12	Volume of private investment mobilized (USD)	\$5M	\$150M	Number of PPPs implemented	2	30	% of water/ sanitation infrastructure sustained via PPPs	10%	75%

3). Strengthened Disaster Preparedness and Emergency Response

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Conduct Vulnerability Assessments for Critical Infrastructure and Populations	Number of GIS tools deployed	Limited use (2 tools)	20 GIS tools in use	Vulnerability maps developed	0	At least 10 regional maps	% of urban/rural plans using assessment data	<10%	75% of MMDAs using data	Reduction in disaster impact in mapped areas	No baseline	30% reduction in loss reports

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
2. Develop Hazard and Risk Profiles	Number of analysts trained	<20	100 trained analysts	Hazard profiles published	0	50 profiles (district-level)	% of hazard data integrated into plans	<15%	80% of MMDAs	Improved planning and budgeting for risk	Low	Integrated into national resilience index
3. Build Resilient Shelters	Budget allocated to shelter construction	GHS 2M	GHS 30M	Number of resilient shelters built	5	100 shelters	% of population within 5 km of shelter	<10%	60%	Mortality during climate events	High	50% reduction
4. Equip GNFS with Modern Fire Tenders	Number of new fire tenders procured	10	100 tenders	Fire personnel trained on equipment	50	500	Avg. response time to fire incidents	>30 mins	<10 mins	Property loss in urban fires	High	40% reduction
5. Build/Maintain Fire Hydrants	Budget for hydrant maintenance	GHS 500,000	GHS 10M	Functioning hydrants in urban centers	200	2,000	Avg. time to access water during fire	>15 mins	<5 mins	Fire containment rate	Low	90% containment within 20 mins
6. Expand Ambulance Services	Number of ambulances available	100	500	Ambulance stations built	20	100	Avg. emergency medical response time	>1 hr	<15 mins	Survival rate during disasters	Low	90% survival post-disaster
7. Establish Dedicated DRR Fund	Capital raised for fund	GHS 0	GHS 200M	DRR initiatives funded	0	At least 50 projects	% of DRR plans implemented	<10%	85%	Disaster risk exposure index	High	Reduced by 40% nationally
8. Create Local Disaster Management Committees	Number of committees established	20	250 (all MMDAs)	Community drills conducted	Rare	Twice annually per MMDA	Community readiness score	Low	80% readiness	Speed of coordinated emergency response	Slow	Immediate activation (within 1 hr)
9. Implement Coastal Protection (e.g. Mangroves, Seawalls)	Hectares of mangroves targeted	100 ha	2,000 ha	Length of seawall constructed	5 km	50 km	Coastal households protected	5,000	100,000	Coastal erosion rate	High	Reduced by 60%

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
10. Install Coastal Monitoring & Early Warning Systems	Number of monitoring stations	3	30	Personnel trained to operate systems	10	300	Warning lead time before hazard	<1 hr	>6 hrs	Fatalities from coastal disasters	High	75% reduction

4). Climate-Resilient Housing and Infrastructure

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Assess the vulnerability of existing housing and infrastructure	Number of GIS tools and survey equipment acquired	0 (assumed)	100% equipment needed procured	Number of vulnerability assessments conducted	<10 communities (assumed)	100 priority urban communities assessed	Number of intervention plans developed	0	Plans in place for all high-risk areas	Reduction in unplanned housing damage due to extreme weather (%)	Unknown	30% reduction by 2060
2. Enforce building codes for climate-resilient construction	Number of inspectors trained in climate-resilient techniques	<100 (assumed)	500 trained nationwide	% of building projects reviewed for code compliance	25%	90% of new constructions	% reduction in climate-related structural failures	Unknown	40% by 2040	Increase in public confidence in infrastructure safety (%)	Unknown	60% increase (via surveys)
3. Retrofit public buildings (schools, hospitals)	Budget allocated for retrofitting projects (GHS)	Minimal	GHS 50 million secured	Number of buildings retrofitted	<50 (assumed)	500 buildings (nationwide)	% of critical public buildings meeting resilience standards	<10%	70% by 2040	Reduced disruption of health/education services during climate events	Unknown	80% functional continuity

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
4. Rebuild housing destroyed by disasters using resilient designs	Number of local builders trained	Few (assumed)	1,000 trained	Number of disaster-affected homes rebuilt to resilient standards	Very few	10,000 homes rebuilt	% of rebuilt homes withstanding subsequent climate events	Unknown	90% durability rate	Improvement in quality of life for disaster survivors (survey-based)	Low satisfaction	High satisfaction (80%+)
5. Enforce zoning regulations to prevent construction in waterways	Number of officers trained/enforcement operations conducted	Few	200 officers trained; 100 operations conducted	Number of illegal structures removed from waterways	Unknown	90% of identified structures removed	% increase in public adherence to zoning laws	Low	70% compliance rate	Reduction in urban flood incidents	Frequent flooding	50% reduction in key cities by 2060

5). Sustainable Transport Systems for Urban and Rural Mobility

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Assess vulnerability of transport networks to climate hazards	Number of climate experts engaged	<10 (assumed)	50+ experts	Number of vulnerability assessments conducted	<5 regions	16 regions covered	% of high-risk zones identified with adaptation plans	0%	80%	Reduction in transport infrastructure failures during extreme weather	Unknown	40% by 2060
2. Build elevated roads and bridges in flood-prone areas	Budget allocated for elevated infrastructure	GHS 0 (assumed)	GHS 100 million	Km of elevated roads/bridges constructed	0 km	200 km	% decrease in flood-related transport disruptions	High (baseline)	70% reduction	Improved year-round access in flood-prone regions	Poor	90% accessibility maintained

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
3. Reconstruct damaged roads using resilient materials	Number of engineers trained in resilient materials	Few	500	Km of roads reconstructed with resilient materials	<50 km	1,000 km	Reduction in road closures due to weather events	Frequent closures	60% reduction	Increased economic activity due to reliable roads	Low	30% increase in affected areas
4. Enhance transport systems for urban/rural mobility and resilience	Number of resilience assessments completed	<5 cities	20 urban/rural hubs	Number of key mobility routes improved	Few	100 routes	% increase in transport reliability during weather events	Low	80%	Public satisfaction with climate-resilient transport	Low	75% satisfaction (via surveys)
5. Expand public (bus/train) transport systems	Funding secured for public transport expansion (GHS)	Minimal	GHS 300 million	Number of new bus/train routes created	Few	50 new routes	Increase in public transport ridership	Low usage	60% increase	Decrease in private vehicle use and emissions	High	30% reduction in emissions
6. Maintain drainage along roads to prevent flooding	Number of cleaning equipment procured	Few	100+ units	Km of drainage maintained regularly	Few	5,000 km per year	% reduction in flooded road sections	Frequent flooding	70% reduction	Traffic flow during rains (average speed)	<10 km/h	25 km/h+
7. Develop energy-efficient and resilient public transport (e.g., electric buses)	Number of electric buses procured	0	1,000 buses	Number of charging stations built	<10	200	% of public fleet using low-emission vehicles	<1%	50% by 2040	Annual CO ₂ emissions from public transport	High	40% reduction

6). Drought Resilient Agricultural Practices and Urban Food Security

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Access to irrigation, improved seeds, and storage	Number of irrigation systems and storage facilities supplied	<100 units	1,000 units	% of farmers with access to drought-resilient inputs	20%	80%	Post-harvest loss reduction (%)	30%+	10%	Yield increase in drought-prone areas (%)	Low (varies)	50% increase
2. Drought vulnerability maps and early warning systems	GIS and satellite systems deployed	Limited	100% national coverage	Drought maps and warning systems in place	None	Operational in all regions	Average response time to water shortages	Delayed	<48 hours	Reduction in drought impact severity	High	40% reduction
3. Small-scale irrigation and water storage infrastructure	Number of small reservoirs constructed	<20	200	Irrigated farmland (hectares)	<10,000 ha	100,000 ha	% of farmers using improved irrigation	Low	75%	Reduction in crop loss during dry seasons	High	60% reduction
4. Promote drought-resistant crops and agroforestry	Volume of seeds and agroforestry kits distributed	Minimal	Nationwide supply	% of farmers adopting drought-resistant crops	<15%	70%	Crop yield during drought (% change)	Low	40% increase	Soil fertility and biodiversity index	Declining	30% improvement
5. Establish drought contingency funds	Capital raised for fund (GHS)	0	GHS 200 million	Time to disburse relief post-drought	Months	<1 month	% of affected farmers supported	<10%	90%	Speed and efficiency of drought recovery	Poor	High satisfaction (surveyed)
6. Water storage infrastructure (reservoirs, tanks)	Number of reservoirs and tanks built	Few	1,000 units	Volume of water stored (m³)	Low	10 million m³	Days of water availability during drought	<5 days	30+ days	Reduced household/ agriculture water stress	High	70% reduction
7. Solar-powered cold storage for perishable goods	Number of solar cold storage units deployed	0	500 units	% of perishable goods stored safely	<20%	80%	Farmer income from reduced spoilage	Low	50% increase	Food loss (perishables) reduction	50%	20% loss max
8. Urban food banks and distribution hubs	Number of hubs/ food banks built	0	100 nationwide	Households served during crises	None	500,000+	% increase in emergency food access	0%	80%	Urban food insecurity during shocks	High	60% reduction

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
9. Agroforestry and soil conservation programs	Hectares enrolled in programs	Low	500,000 ha	Area with agroforestry cover	Sparse	Extensive cover	Soil fertility index (regional avg.)	Depleting	40% increase	Land productivity and biodiversity	Low	50% improvement
10. Farmer training in climate-smart agriculture	Number of training sessions delivered	Few	5,000	Number of farmers trained	<20,000	1 million	% adopting climate-smart practices	<10%	70%	Yield and food security resilience	Weak	Strong, 50% yield gain
11. Rehabilitate damaged farmlands and infrastructure	Budget for rehabilitation (GHS)	Low	GHS 100 million	Hectares of farmland restored	Minimal	200,000 ha	% recovery of productivity post-disaster	<30%	85%	Speed of return to pre-disaster output	Slow	<6 months
12. Support farmer cooperatives and risk-sharing orgs	Funding for cooperatives (GHS)	Low	GHS 50 million	Number of active cooperatives	<500	5,000	% using cooperative risk strategies	<20%	80%	Farmer resilience to market/climate shocks	Low	High resilience index (qualitative)
13. Pest and disease early warning systems	Number of systems installed	None	100	Early warnings issued annually	0	1,000+	Pest/disease losses reported by farmers	High	60% reduction	Food availability & farmer confidence	Weak	Strong; 70% trust in system
14. Promote climate insurance schemes	Climate insurance products offered	Few	Nationwide portfolio	Farmers enrolled in insurance schemes	<5%	60%	% of insured farmers recovering losses	Low	90%	Financial resilience during climate events	Weak	Strong; <1 month recovery time

7). Ecosystem-Based Adaptation (EbA) for Urban and Rural Communities

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Conduct Ecosystem Vulnerability Assessments & Mapping	Number of experts/ consultants engaged	~10 per region	≥30 per region	Number of ecosystem vulnerability assessments completed	<5 (major cities)	≥16 (across all MMDAs)	% of planning decisions informed by ecosystem maps	<10%	≥75%	Reduction in critical ecosystem degradation (Ha/year)	~500 ha/year	≤100 ha/year
2. Awareness Campaigns for Ecosystem Restoration	Budget allocated for campaigns (GHS/year)	<GHS 500,000	≥GHS 3 million	Number of public awareness events/media engagements	<50/year	≥300/year	% of population aware of EbA benefits	~30% urban	≥80%	Increase in community-led ecosystem projects	<20	≥200 projects nationwide
3. Restore Degraded Ecosystems (Wetlands, Forests, Mangroves)	Funds allocated to urban ecosystem restoration (USD/year)	<\$1M	≥\$10M/year	Area of wetlands/urban forests restored (Ha)	~200 Ha/year	≥2,000 Ha/year	% increase in vegetation cover in urban areas	~2% (net loss in last decade)	+10% net gain	Urban temperature reduction in hot zones (°C)	N/A	≥1.5°C reduction
4. Community-led Conservation with Incentives	Number of funded community projects/year	<10	≥150	Number of youth/women trained in sustainable conservation	~500/year	≥5,000/year	% of conservation projects sustained 3+ years	<20%	≥80%	Biodiversity recovery index (species richness/ urban site)	No benchmark	+50% improvement over baseline

8). Coastal Resilience Against Sea-Level Rise and Erosion

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Coastal Protection Measures (Sea Walls, Mangrove Restoration, Buffer Zones)	Budget allocated (USD/year)	<\$10M/year	≥\$100M/year	Km of sea walls/barriers built or rehabilitated	~20 km	≥100 km	% of coastline covered by natural/built buffers	<15%	≥50%	Annual coastal erosion rate (m/year)	~1.5–2.0 m/year	≤0.5 m/year
				Hectares of mangroves restored	<1,000 ha	≥10,000 ha						
2. Promote Resilient Building & Infrastructure Design	Number of trained engineers/architects in coastal resilience	<100	≥1,000	Number of new coastal buildings certified resilient	<50/year	≥1,000 by 2030	% of new structures complying with resilient standards	<25%	≥90%	% reduction in flood-related property loss (GHS/year)	N/A	≥70% reduction from 2022 baseline
3. Relocate Vulnerable Communities in High-Risk Areas	Budget allocated for resettlement (GHS)	Very limited	≥GHS 500M total	Number of vulnerable communities relocated	<5	≥100	% of relocated households with secure tenure	<20%	≥95%	% of resettled populations with improved well-being index	N/A	≥75% satisfaction by 2060
4. Increase Construction & Maintenance of Coastal Defences	% of national climate budget allocated to coastal defenses	<5%	≥20%	Number of new tidal barriers built	<5	≥30	% of critical infrastructure at reduced flood risk	<30%	≥85%	Reduction in annual storm-related infrastructure damage (GHS)	N/A	≥70% reduction from 2022 levels

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
5. Research into Nature-Based Coastal Solutions	Research funding allocated (USD/year)	<\$500K	≥\$5M/year	Number of peer-reviewed studies published	<10	≥100	Number of pilot nature-based projects launched	Few pilots	≥50 nationwide	% increase in biodiversity and carbon capture in coastal wetlands	Baseline unknown	≥50% gain from 2023 values
6. Community Awareness and Engagement on Sea Erosion	Awareness budget allocated (GHS/year)	<GHS 1M	≥GHS 10M/year	Number of community campaigns and workshops held	<50/year	≥300/year	% of coastal population aware of sea erosion risks	~30%	≥90%	% decrease in harmful practices (e.g., sand mining, mangrove cutting)	N/A	≥70% reduction

Annex 3: Ecosystems Theory of Change Indicators and Targets

1). Forestry

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Reforestation and Afforestation Programs	Budget allocated for reforestation (\$ million/year)	\$2M	\$10M	Hectares of forest land reforested per year	5,000 ha	50,000 ha	% increase in forest cover in Ashanti, Western, Bono	2%	20%	Tonnes of CO ₂ sequestered	100,000 tCO ₂ e/year	1 million tCO ₂ e/year
2. Sustainable Forest Management Practices	Number of trainings conducted for sustainable harvesting	20/year	100/year	% of forest areas under sustainable management	15%	50%	Reduction in illegal logging incidents (reported cases/year)	3,000	500	Biodiversity index (species per hectare)	0.4	0.8
3. Community Forest Conservation Programs	Funds disbursed to community programs (\$/year)	\$500K	\$5M	Number of community forest reserves established	10	100	% of community members engaged in forest governance	10%	60%	Area of forests under community conservation (ha)	1,000 ha	20,000 ha
4. Forest Ecosystem Services Enhancement	Investments in PES and REDD+ programs (\$ million/year)	\$1M	\$8M	Watershed areas protected or restored (ha)	2,000 ha	30,000 ha	Water flow regularity in targeted basins (months/year)	6	12	Carbon sequestration from PES and REDD+ (tCO ₂ e/year)	150,000	1.2 million
5. Forest Education and Awareness Campaigns	Media campaigns funded and rolled out per year	5	30	Educational materials distributed	10,000	500,000	% of population with improved knowledge of forest value	25%	80%	Behavioral change: % reduction in illegal wood use	Negligible	40%

2). Wetlands

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Restore and conserve degraded wetlands	Funding allocated to wetland restoration (\$/year)	\$1M	\$10M	Area of wetlands restored (hectares)	500 ha	10,000 ha	% increase in biodiversity index (flora & fauna count)	+2%	+25%	Increase in ecosystem service provisioning (e.g., water quality index improvement)	Low	60% improvement
2. Strengthen wetland management policies	No. of policy workshops conducted	2/year	20 by 2030	No. of wetland regulations enacted or revised	1	6	% of wetlands under sustainable management	10%	70%	Compliance rate with wetland regulations (%)	<20%	85%
3. Promote sustainable wetland-based livelihoods	Financial investment in training and enterprise support	\$500K	\$5M	No. of people trained in wetland-based livelihoods	1,000	10,000	% reduction in wetland exploitation incidents	Negligible	50%	% of income generated from sustainable wetland activities	5%	30%
4. Develop and expand Ramsar sites	No. of proposals funded for new Ramsar sites	0	5	No. of Ramsar sites designated or expanded	6	12	% of critical wetlands with Ramsar status	25%	60%	Improved ecosystem integrity (score/index)	40/100	80/100
5. Implement flood management in wetlands	Funding for flood infrastructure in wetlands (\$/year)	\$0.5M	\$8M	No. of flood management structures built or rehabilitated	2	20	% decrease in flood events in targeted wetlands	–	70%	Damage cost avoided per year (USD)	\$500K	\$5M
6. Raise public awareness and education	No. of awareness campaigns conducted/year	5	50	No. of educational materials distributed	5,000	200,000	% increase in awareness among target populations	30%	80%	% behavioral change in wetland-friendly practices	10%	60%
7. Monitor wetland health and biodiversity	Budget for monitoring systems and technologies	\$200K	\$2M	No monitoring stations installed	3	20	Frequency of wetland health reports published	Every 2 years	Annually	% detection and timely mitigation of adverse trends	<10%	>80%

3). Marine

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Establish Marine Protected Areas (MPAs)	Budget allocated to MPA creation and enforcement (USD)	\$500,000	\$10 million	No. of MPAs established and operational	2	10	% of Ghana's EEZ under protection	<1%	10%	Reduction in illegal fishing activities in MPAs	20%	80%
2. Promote Sustainable Fishing Practices	No. of fishers trained and supported	1,500	15,000	% of trained fishers adopting sustainable gear/practices	10%	75%	% reduction in IUU fishing reports	Baseline IUU: High	60% decrease	Stabilization or increase in target fish stocks (e.g., sardinella biomass)	Declining	Recovered to sustainable yield levels
3. Restore Degraded Coral Reefs	Investment in reef restoration projects (USD)	<\$100,000	\$2 million	Area of coral reefs restored (hectares)	<1 ha	100 ha	No. of local participants in restoration initiatives	<50	1,000	Increase in species diversity in restored reef zones	Low	+50% biodiversity index
4. Develop and Expand Aquaculture	No. of aquaculture farms financed or supported	20	200	% of farmers trained in sustainable aquaculture	15%	90%	Production volume from aquaculture (tons/year)	55,000	150,000	% reduction in pressure on wild fisheries	Baseline dependence: 90%	Reduced to 60%
5. Strengthen Marine Pollution Control	No. of awareness campaigns conducted	5	50	No. of waste management systems installed in coastal towns	3	25	% reduction in marine litter in surveyed beaches	High plastic load	70% decrease	Improvement in marine water quality (WQI index score)	Poor (WQI < 40)	Good (WQI > 75)

4). Aquatic

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Improve water quality in rivers and lakes	Budget allocated to riparian buffer development and water quality monitoring (USD)	\$1M	\$8M	Km of riparian buffer zones restored	<50 km	500 km	% increase in monitored water quality index (WQI)	WQI avg. 45	WQI avg. >75	% reduction in pollution levels (e.g. nitrates, phosphates)	–	60% decrease
				No. of community monitoring groups established	5	100						
2. Enhance sustainable fishery management	No. of co-management schemes introduced	<5	100	% of fishing communities under co-management	10%	75%	Reduction in IUU fishing reports in freshwater zones	High	60% decrease	Stabilization/ increase in freshwater fish stocks (tilapia, catfish)	Declining	Recovered to 2010 levels
				No. of enforcement actions against destructive practices	50/year	300/year						
3. Restore aquatic habitats	Budget for wetland and fish migration infrastructure (USD)	\$500K	\$5M	Hectares of wetlands rehabilitated	100 ha	5,000 ha	Connectivity of aquatic habitats improved (connectivity index)	Low	70% improvement	Return of migratory species and improved ecosystem function	Poor	Good
				No. of fish passes/ladders installed	0	30						
4. Promote sustainable use of artificial reservoirs	No. of aquaculture systems financed/ established	50	500	% using native species in aquaculture	10%	80%	% of reservoir communities adopting sustainable practices	15%	70%	Reduction in overfishing pressure on wild stocks	High	50% reduction
				No. of community training sessions on IWRM	10	200						
5. Combat water pollution	No. of wastewater systems financed	3	50	No. of functional wastewater treatment systems	<5	40	% decrease in agro-industrial pollution discharge	High	70% reduction	Aquatic biodiversity recovery index	30/100	75/100
				No. of pollution awareness campaigns	20	200						

Annex 4: Health Theory of Change Indicators and Targets

1). Leadership and Governance

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Establish multi-sectoral CC&H Steering Committee	No. of stakeholder consultations held	0	10	Steering committee officially established	Not existing	Established	% of sectors represented	<20%	90%	Improved inter-sectoral coordination index (qualitative)	Low	High
2. Assign regional OEH focal persons	Budget allocated for focal persons' support	None	\$2M	No. of regions with CC&H focal persons	4	16	% of climate-health activities coordinated regionally	<10%	≥75%	Resilience of regional health programs (score)	Weak	Strong
3. 3. Integrate HNAP into overall NAP and NDCs	No. of policy review meetings held	1	10	HNAP formally included in NAP/ NDC documents	Partial	Full integration	% of NDC health indicators tracked	10%	80%	Health sector alignment with national climate goals	Low	High
4. 4. Incorporate CC&H into development policy	No. of technical inputs submitted to policy bodies	0	≥8	CC&H included in national development documents	No	Yes	% of health sector plans with CC focus	10%	≥60%	CC risk reflected in sectoral budgeting	Rare	Common
5. 5. Develop standalone Health & CC Policy	Budget allocated for policy development	\$100K	\$1M	National CC&H Policy developed	No	Yes	Level of stakeholder ownership (survey score)	Low	High	Policy implementation rate	–	80% by 2060
6. 6. Revise Public Health Act to integrate CC risks	No. of legal review sessions held	0	5	Revised Public Health Act passed	Draft only	Enacted	Provisions for climate risks included	No	Yes	Legal preparedness for CC risks (index)	Weak	Strong

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
7. 7. Conduct public education on legal frameworks	No. of campaigns conducted	2/year	20 by 2030	Educational materials developed	Few	≥100,000 copies	Public legal awareness index (score)	Low	Moderate–High	Improved public compliance with CC laws	Low	≥70%
8. 8. Integrate CC&H into Medium-Term Policy Framework	No. of MoH strategy sessions held	0	≥6	CC&H reflected in MTP 2026–2029	Not included	Fully integrated	% of MoH agencies planning for CC&H	15%	80%	Institutional resilience to CC in MoH	Low	High
9. 9. Allocate budgets to CC&H focal points	Amount allocated to focal desks	Negligible	GHS 10M	No. of functional CC&H desks	<3	16	% of budget lines spent on CC&H	<5%	≥30%	Increased capacity for response coordination	Low	High
10. 10. Sponsor CC&H capacity building	No. of training sessions held	1–2/year	≥40	Health professionals trained on CC&H	~50	≥1,000	% of trained staff applying CC knowledge	<10%	≥70%	Technical readiness for climate shocks	Weak	Strong
11. 11. Collaborate with CC-sensitive health programs	Coordination meetings with program leads	Sporadic	Quarterly	No. of integrated CC-health programs launched	<5	≥20	Increase in CC-aware service delivery	Limited	70% of programs	Improved health system climate resilience	Weak	Strong
12. 12. Strengthen partnerships for CC&H finance	Funding applications submitted to GCF/others	<2	≥10	International grants secured	\$2M	≥\$50M	% of projects financed externally	10%	≥50%	Health sector access to global finance	Minimal	Substantial
13. 13. Include health in carbon markets framework	No. of MoH technical reps in carbon discussions	0	≥5	Carbon programs with health co-benefits	None	≥5	% of carbon projects linked to health outcomes	0%	≥30%	Dual gains in climate mitigation & health	Not tracked	Tracked & reported
14. 14. Promote inter-country knowledge sharing	Health sector representatives attending CC events	<5/year	≥20/year	No. of shared health-CC knowledge products	Few	≥50	Joint regional health-CC programs started	0	≥5	Improved regional CC response capacity	Low	High

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
15. 15. Sponsor MoH/GHS representation at COP/ UNFCCC	Representation sponsored by government	Irregular	Annually	No. of policy contributions to global forums	0	≥10	National visibility in CC-health discussions	Limited	Recognized voice	Health sector influence on global CC policy	Absent	Strategic presence
16. 16. Mainstream CC&H into sector MTDPs	Sector guidelines revised to include CC&H	No	Yes (2026–2029)	No. of MMDAs using updated guidelines	Few	≥200	% of local plans reflecting CC&H	~10%	≥80%	Localized resilience planning	Weak	Robust
17. 17. Review existing CC policies to include health	No. of climate policies reviewed for health	0	≥10	CC policy updates with health sections	None	≥10	% of CC policies with health integration	<10%	≥70%	Coherence between health and climate action	Fragmented	Integrated

2). Health Workforce

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Workforce Planning for Size, Skill Mix, and Distribution	Budget allocated for strategic workforce planning	None	GHS 10M	Planning documents updated with CC-sensitive needs	0	3 national + 16 regional	% increase in rural/ underserved CC-skilled staff	Very low	≥40%	Improved health service access for climate-vulnerable populations	Poor	Good (≥80% coverage)
2. Use HR Portal for Equitable Posting	IT resources allocated for portal expansion	Partial	Fully implemented	% of new recruits posted via system	~30%	≥90%	Rural–urban disparity in key CC health cadres	High	Reduced by 60%	Reduced vacancy rates in remote zones (%)	>50%	<20%
3. Develop CC-Specific Capacity-Building Plans	No. of training plans developed for climate-health topics	0	≥10 regional + 1 national	No. of CC-health training sessions delivered/year	<10	≥100	% of trained health workers applying CC knowledge	~10%	≥70%	Climate-responsive service delivery coverage	Limited	≥80% of districts

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
4. Integrate CC into Health and School Curricula	Technical working groups formed	0	≥3	No. of training schools with CC-integrated curricula	0	≥50 institutions	% of health graduates exposed to CC issues	0%	≥85%	Increased health sector preparedness among new professionals	Minimal	High
5. Introduce CPD Modules on CC by Professional Bodies	MOUs signed with medical and allied councils	0	≥5	No. of CPD modules delivered/year	0	≥20	CPD participation rate among professionals	Low	≥70%	Consistent knowledge refresh in climate-health topics	Rare	Institutionalized
6. Institutionalize Training in Vulnerability and Impact Assessment	Trainers trained (ToT) across Ghana	<20	≥200	No. of vulnerability assessment trainings/year	Few	≥40/year	% of public health workers skilled in climate risk tools	<5%	≥60%	Health system readiness to predict and manage CC impacts	Low	High
7. Develop Database of CC-Knowledgeable Staff	Budget and software allocated for database system	None	GHS 2M	Database platform developed and operational	No	Yes	% of facilities using database for staffing decisions	0%	≥75%	Efficient deployment of CC-competent staff	Disjointed	Strategic
8. Contingency Plans for Emergency Staff Deployment	No. of contingency plans funded and approved	0	17 (1 national + 16 regional)	% of regions with health emergency deployment protocols	<10%	100%	Avg. deployment time in CC-related disasters	>5 days	≤2 days	Faster response to CC-driven emergencies	Delayed	Timely
9. Train and Implement CC Communication Strategy	Communication materials developed (sets)	1	≥20 sets (print, TV, radio, digital)	No. of health workers trained in CC communication	<100	≥5,000	% of facilities with communication plans	Few	≥80%	Improved public awareness of CC-health risks	Low	High (≥75% of surveyed households aware)

3). Climate and Health Financing

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Mobilize resources for CC&H policies and strategies	Funds mobilized annually for CC&H planning (USD)	<\$500K	≥\$20M	No. of CC&H programs funded through new sources	<5	≥25	% of HNAP activities with dedicated budget lines	<10%	≥70%	Increased resilience of public health services	Low	High
2. Develop CC&H investment plans	Technical teams formed for investment planning	0	≥5 teams	National and regional investment plans finalized	0	17 (1 national, 16 regional)	% of NAP priority actions costed and scheduled	<20%	100%	Streamlined CC-health investment and coordination	Fragmented	Integrated
3. Develop a CC&H expenditure tracking tool	Budget allocated for tool development	None	GHS 1M	Tool developed and piloted	No	Yes in ≥6 pilot agencies	% of MoH budget that is climate-tagged	<5%	≥30%	Increased transparency and accountability in CC&H spending	Low	High
4. Develop CC&H screening tools for proposal assessment	No. of proposal reviewers trained	0	≥200	No. of screened investment proposals (annually)	0	≥100	% of funded projects aligned with CC&H safeguards	Not tracked	≥80%	Increased climate-health compatibility of funded development projects	Low	High
5. Institutionalize CC&H risk screening in key sectors (e.g., WASH, nutrition)	No. of sectors adopting CC&H screening criteria	0	≥5	Sectoral investment frameworks reviewed with MoH input	<5	≥20	% of climate-determining investments with health co-benefits	~10%	≥60%	Improved intersectoral planning and risk reduction	Weak	Robust

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
6. Monitor CC&H impacts in funded sector programs	No. of M&E focal points trained	<10	≥100	Monitoring templates distributed to key sectors	0	≥500	% of sector programs reporting health outcomes linked to CC	Not reported	≥75%	Timely adaptation of programs to emerging CC&H risks	Rare	Frequent
7. Diversify CC&H funding sources (trusts, PPPs, green finance)	No. of funding proposals submitted to non-traditional sources	<3/year	≥10/year	Amount leveraged from innovative CC&H finance (USD)	<\$2M	≥\$30M	% of health sector budget supported by non-core financing	<5%	≥25%	Sustainable CC&H program scale-up and longevity	Limited	Secured
8. Build technical capacity to access global CC&H funding	No. of training sessions on global climate finance	0	≥15	No. of MoH/ GHS staff trained on funding access	<20	≥300	No. of successful international funding applications/ year	1–2	≥10	Increased flow of external CC&H funds to Ghana	Minimal	Substantial and predictable

4). Climate resilient and sustainable technologies and infrastructure

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Revise siting/ construction specs for climate risks	No. of technical reviews completed	0	≥16 regions	New siting/ construction guidelines published	Draft	Finalized & enforced	% of new HCFs built to revised standard	<20%	≥90%	Resilience of new HCFs to climate shocks	Low	High
2. Promote green/ climate-proof infrastructure	No. of green building designs developed	2	≥50	No. of new facilities using green tech	<5	≥100	% reduction in cooling/energy needs	N/A	≥30%	Decreased health facility emissions	High	50% reduction
3. Conduct V&A assessments of HCFs	Budget allocated (GHS)	None	≥GHS 5M	No. of facilities assessed	0	≥300	% of priority facilities climate-audited	0%	100%	Early risk detection & retrofitting plans developed	Rare	Standard
4. Accredit climate-safe hospitals	Safety accreditation criteria developed	No	Yes	No. of hospitals accredited as climate-safe	0	≥50	% of referrals to climate-certified facilities	N/A	≥40%	Decreased patient disruption from climate events	Frequent	Rare
5. Develop drug information system for climate-sensitive meds	Platform development budget	0	≥GHS 1.5M	Digital system piloted	None	Nationwide	% reduction in drug stock-outs (e.g., anti-allergens)	Frequent	<10%	Improved treatment continuity during CC events	Inconsistent	Reliable
6. Accelerate HCF infrastructure planning	Planning framework finalized	Draft	Endorsed	No. of district-level infrastructure plans developed	Few	≥200	Climate-informed planning coverage (%)	~15%	≥90%	Equitable facility distribution across climate zones	Poor	Improved

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
7. Develop heat stress management guidelines	Drafting committees convened	0	≥3	National guidelines published	None	Approved	% of facilities implementing guidelines	0%	≥80%	Reduction in heat-related staff/patient incidents	High	Low
8. Promote WASH, vaccine cold chain, and conservation tech	Budget for cold chain and WASH upgrades	Low	≥GHS 10M	No. of facilities equipped with WASH/vaccine upgrades	<100	≥1,000	% reduction in vaccine spoilage due to heat	Moderate	<5%	Continuity of immunization in extreme weather	Risky	Assured
9. Report flood-affected HCFs	Reporting templates disseminated	0	Standardized	% of regions submitting quarterly flood reports	<10%	100%	Real-time decision-making enabled	Limited	Available	Faster facility recovery post-floods	Weeks	Days
10. Train estate officers on flood risk	No. of officers trained	<50	≥1,000	Regional risk manuals developed	No	Yes in all regions	Facilities with flood emergency SOPs (%)	Few	≥90%	Lower flood-related service disruptions	Frequent	Rare
11. Participate in NADMO disaster meetings	Annual engagement budget	None	Allocated	No. of health-NADMO joint plans	Few	≥16	Health sector roles clearly defined	Vague	Integrated	Enhanced emergency response coordination	Weak	Strong
12. Apply DPC/DPM insulation in facilities	No. of retrofitting projects funded	Few	≥200	Facilities with mold/damp-proofing (%)	<5%	≥80%	% reduction in fungal/mold-related conditions	High	Moderate	Indoor environmental quality in HCFs	Poor	Safe
13. Use non-incineration waste tech	No. of facilities with non-incineration units	<10	≥150	GHG emissions from medical waste (tCO ₂ e/year)	High	Reduced by ≥50%	% of waste processed in low-emission tech	<5%	≥75%	Lower climate and air pollution risks	High	Low

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
14. Community tech for CC disease alerts	No. of mobile/digital tools deployed	2	≥100	Communities with active disease hotlines	<10%	≥75%	Average outbreak response time (days)	>5	≤2	Lives saved via early alerts	Untracked	≥80% alert effectiveness
15. Use climate-informed early warning tools	No. of predictive models integrated	1	≥10	% of regions using climate-health EW tools	<10%	≥90%	Disease forecasting accuracy (%)	Low	≥80%	Reduced outbreak size/severity	Severe	Mitigated
16. Promote solar energy in HCFs	No. of solar installations funded	Few	≥500	% of HCFs with solar backup	<5%	≥60%	Power outages affecting care (per year)	Frequent	Rare	Operational continuity in disasters	Low	High
17. Use digital health/eHealth systems	No. of eHealth tools rolled out	<20	≥100	% of HCFs using electronic records	<10%	≥85%	Average patient data access time	Days	Minutes	Efficiency in CC-responsive service delivery	Poor	High
18. Promote awareness of waste segregation	No. of waste trainings conducted	<20	≥200	% of facilities with waste segregation systems	<15%	≥85%	Volume of improperly treated waste	High	Reduced by 70%	Public/environmental exposure to CC risks	High	Low
19. Assess carbon footprint of health sector	Carbon audit framework finalized	None	Approved	Annual GHG reporting for sector	No	Standard	% reduction in health sector carbon emissions	Not tracked	≥40%	Environmental impact of health ops	Unmeasured	Reduced
20. Update green procurement uidelines	Draft guidelines developed	No	Finalized	Procurement staff trained (%)	0%	≥80%	% of tenders with CC-sensitive clauses	<5%	≥50%	Greener health supply chain	Unsustainable	Low-impact
21. Intensify tree planting (windbreaks)	No. of seedlings distributed to HCFs	<5,000	≥100,000	HCFs with functioning green belts (%)	<5%	≥50%	% reduction in dust/heat intrusion	Moderate	≥60%	Microclimate resilience of facilities	Low	Enhanced

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
22. Inspect structural integrity of HCFs	Inspection protocols adopted	No	Yes	No. of HCFs inspected annually	<100	≥1,000	% of facilities with preventive maintenance plans	<20%	≥80%	Reduced climate damage to infrastructure	Frequent	Rare
23. Develop evacuation contingency plans	No. of evacuation drills funded	None	≥100	% of facilities with updated evacuation plans	<5%	≥90%	Avg. time to evacuate staff/ patients	Unmeasured	<30 minutes	Safety outcomes during extreme events	Unpredictable	Reliable

5). Vulnerability, capacity, and adaptation assessment

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Comprehensive health vulnerability & adaptation (V&A) assessment	Budget allocated for national V&A	GHS 0	GHS 10 million	# of national-level V&A assessments conducted	0	1	% of climate-sensitive health programs informed by V&A results	<10%	80%	Increased health system resilience index (scale 1–5)	2	4
2. Strategic-level health impact assessment (HIA) of future risks	# of trained HIA professionals	5	50	# of HIAs completed for major health policies	0	5	% of new health policies integrating climate risk	<10%	75%	Reduced risk exposure in climate-sensitive health areas	High	Moderate
3. Develop/update vulnerability maps	# of GIS experts trained	0	30	# of districts with updated vulnerability maps	0	100	# of programs using maps for planning	0	60	% of vulnerable populations with improved service access	20%	70%
4. V&A assessment at health facility level	Tools developed for facility-based V&A	None	Complete toolset	% of HCFs assessed for V&A	0%	75%	% of assessed HCFs with adaptation plans	0%	60%	Reduction in service disruption during climate events	Frequent	Occasional

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
5. Develop integrated health-climate information systems	Budget for system integration	GHS 0	GHS 5 million	# of systems integrated (health + climate)	0	1 national platform	% of real-time data streams in system	0%	70%	Timely response to climate-related outbreaks	Delayed	Rapid
6. Data-sharing agreements across sectors	# of stakeholder consultative meetings	0	5	# of formal data-sharing MoUs signed	0	10	% of agencies sharing data in real-time	5%	60%	Improved cross-sectoral coordination	Low	High
7. Develop online climate-health portal	ICT infrastructure readiness score	30%	90%	# of users accessing portal quarterly	0	5,000	% of MDAs actively uploading data	0%	70%	Increased transparency and information access	Low	High
8. Use V&A results to develop HNAP	# of consultation workshops held	0	10	Revised HNAP reflecting V&A findings	No	Yes	% of health sector plans aligned with HNAP	15%	85%	Stronger integration of evidence in adaptation planning	Weak	Strong
9. Establish review mechanism for HNAP & regional plans	# of staff trained in M&E	10	100	Review reports submitted biennially	0	4	% of recommendations implemented	0%	80%	Improved adaptability of national/regional plans	Low	High

6). Management of climate sensitive health outcomes

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Expand IRS, LSM & Malaria vaccination	% of budget allocated to vector control programs	2%	8%	# of communities covered by IRS/LSM	50	200	% of households with mosquito protection	40%	90%	Malaria incidence per 1,000 population	180	<100

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
2. Maximize population-based ITN campaigns	# of ITNs procured annually	1 million	3 million	% of households receiving ITNs	45%	95%	ITN usage rate among children under 5	35%	85%	Under-5 malaria mortality rate	9/1,000	<4/1,000
3. Develop vector control preparedness plan	Existence of national plan	No	Yes	# of regions with vector preparedness plans	2	16	% of outbreaks managed with contingency plan	10%	100%	Time to respond to vector-borne outbreaks	>14 days	<5 days
4. Intensify advocacy and inter-sectoral collaboration	# of sectoral workshops held	0	10	# of MoUs signed for climate-health collaboration	1	10	Level of stakeholder participation (index)	Low	High	Integration of climate-health priorities into sector policies	20%	80%
5. Improve awareness on emerging zoonotic threats	% of zoonotic response funds utilized	30%	90%	# of campaigns on emerging zoonotic diseases	2	20	Public knowledge of zoonotic threats (survey-based)	Low	High	Time to detect/respond to zoonotic outbreaks	>10 days	<3 days
6. Conduct regular stratification on disease transmission	Frequency of epidemiological stratification exercises	1 every 5 years	Annual	# of districts with updated transmission maps	20	261	% of interventions tailored to local transmission patterns	30%	90%	Change in malaria burden in re-stratified zones	No change	≥30% reduction
7. Improve access to free prophylactic ARV vaccination	% of rabies control budget allocated to vaccines	15%	50%	# of prophylactic ARVs administered annually	3,000	15,000	% of exposed persons receiving timely vaccination	40%	95%	Rabies case fatality rate	30%	<5%

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
8. Vaccinate at-risk populations against Meningitis	# of vaccines procured for at-risk groups	100,000	500,000	% coverage of Men A vaccine in high-risk areas	35%	90%	Incidence of meningitis in target districts	60/100,000	<20/100,000	Case fatality rate from meningitis	12%	<5%
9. Complete National Strategic Plan to defeat Meningitis	Status of national plan	Draft	Approved & funded	# of districts implementing strategic plan	5	100	% of key activities in plan completed	20%	90%	Reduction in national meningitis cases	0%	≥40%
10. Intensify public education on Meningitis	% of health promotion budget for meningitis	3%	10%	# of sensitization events conducted	50	300	Public knowledge on meningitis symptoms (survey)	30%	85%	Delay in seeking care (avg. days post-symptom)	5 days	≤1 day
11. Enforce regulations on mining to protect food security	% of EPA budget for environmental enforcement in mining areas	5%	15%	# of illegal mining operations closed	50	300	Area of farmlands restored (hectares)	200 ha	2,000 ha	% of food-secure households in affected zones	60%	90%
12. Raise awareness on climate and food security links	# of awareness materials developed	10	100	# of community outreach events held	25	200	% of farmers aware of climate risks to food production	20%	85%	Change in adoption of climate-smart agriculture practices	5%	50%
13. Build surveillance system for climate-sensitive respiratory diseases	Existence of surveillance guidelines	No	Yes	# of health facilities reporting on respiratory diseases	25	500	Completeness rate of surveillance data	35%	95%	Detection time of respiratory outbreaks	>10 days	≤3 days
14. Continue sentinel surveillance on viral influenza	# of sentinel sites supported by MOH	8	25	% of districts submitting influenza reports	15%	90%	Frequency of data sharing with WHO	Quarterly	Monthly	Influenza epidemic response time	>14 days	≤5 days

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
15. Raise awareness on climate and allergic diseases	% of IEC budget allocated to allergy-climate communication	2%	10%	# of campaigns targeting asthma and allergic diseases	5	50	Public awareness level on climate-allergy links (survey-based)	Low	High	Reduction in emergency visits for asthma during dusty seasons	0%	40%
16. Develop plan for allergic disease surveillance	Existence of national strategic plan on allergic disease	No	Yes	# of facilities implementing allergy surveillance	0	200	% of allergy cases reported through DHIMS	0%	70%	Time to detect climate-triggered allergy surges	Not measurable	≤5 days
17. Raise awareness on pollution and cardiovascular diseases	# of public education campaigns funded	3	25	% of population exposed to messages on air pollution risks	15%	75%	Public knowledge of air pollution-CVD link (survey)	Low	High	Reduction in CVD-related outpatient visits during Harmattan	0%	30%
18. Promote use of cleaner fuel and stoves	# of stoves distributed through government programs	5,000	100,000	% of households using clean cookstoves	20%	70%	Reduction in indoor air pollution in rural households	Minimal	Substantial	CVD hospitalizations due to indoor smoke	25% of NCD cases	<10%
19. Strengthen surveillance on foodborne illnesses	# of trained FDA surveillance officers	20	200	# of foodborne outbreak reports submitted to DHIMS	30/year	300/year	Completeness of foodborne illness data	45%	95%	Reduction in reported foodborne illness incidence	0%	50%
20. Train food vendors on IPC practices	# of IPC training sessions conducted annually	10	100	% of registered vendors trained in IPC	25%	90%	Compliance rate with hygiene standards (inspections)	40%	85%	Incidence of foodborne outbreaks in urban centers	High	Low

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
21. Improve hospitality industry hygiene monitoring	# of FDA/EPA/EHD inspectors assigned to hospitality sector	15	100	# of inspections conducted annually	150	1,000	% of facilities compliant with sanitation standards	45%	95%	Incidence of sanitation-related illness in tourists	Moderate	Minimal
22. Implement WASH-fit program in HCFs	# of HCFs trained on WASH-Fit methodology	30	500	% of HCFs implementing WASH-Fit standards	10%	90%	Improvement in WASH score (national audit tool)	Average	Excellent	Reduction in health facility-acquired infections	Moderate	Substantial
23. Promote clean drinking water harvesting	# of communities supported with water harvesting infrastructure	50	500	% of households with alternative clean water sources	15%	75%	Reduction in use of contaminated water sources	Low	High	Incidence of water-borne diseases in supported communities	High	Low
24. Improve DHIMS reporting on mental health disorders	# of mental health indicators integrated into DHIMS	2	10	% of facilities regularly submitting mental health data	25%	85%	Completeness and timeliness of reports	Low	High	Policy response time to mental health trends	>12 months	≤3 months
25. Provide post-disaster mental health counselling	# of trained psychosocial support teams	5	50	# of post-disaster counselling sessions delivered	10/year	250/year	% of affected persons receiving timely counselling	10%	80%	Reduction in post-traumatic symptoms after disasters	Unknown	≥50% reduction
26. Strengthen injury surveillance from extreme weather	# of facilities with injury surveillance tools	50	300	% of districts reporting injury data linked to climate events	10%	80%	Quality score of injury surveillance system (MOH tool)	Low	High	Response time to injury trends from disasters	>30 days	≤7 days
27. Develop multisectoral climate information sharing portal	Existence of online portal for climate-health data	No	Yes	# of MDAs uploading data to the portal	2	15	Frequency of data updates (per year)	Annual	Quarterly	Integration of portal data into health planning and decision-making	Rare	Routine

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
28. Improve ASV supply chain and access	# of ASV doses procured annually	5,000	25,000	% of health facilities with adequate ASV stock	30%	90%	Time from snakebite to treatment	>24 hours	<6 hours	Mortality rate from venomous snakebites	15%	<2%
29. Promote preventive strategies for snake bites	# of education campaigns in high-risk communities	10	100	% of population aware of snakebite prevention methods	25%	85%	% reduction in reported snakebite cases in peak season	0%	50%	Hospitalizations due to snakebites	High	Low
30. Promote WASH in vulnerable communities	# of WASH facilities constructed or upgraded	100	1,000	% of households with access to improved water and sanitation	45%	95%	% of children practicing handwashing at critical times	30%	85%	Incidence of water-washed diseases (Yaws, Scabies, etc.)	High	Low
31. Raise awareness on water-washed disease prevention	# of IEC materials developed on water-washed disease prevention	10	100	# of community education sessions conducted	20	250	% of population aware of preventive measures (survey-based)	30%	85%	Incidence of preventable water-washed diseases (e.g. Yaws, Scabies)	High	Low
32. Setup surveillance for heat-related illnesses	# of health facilities collecting heat-related illness data	0	250	% of districts with heat illness surveillance in DHIMS	0%	75%	Time to detect heat-related illness outbreaks	Not available	<5 days	Annual cases of severe heat illness (e.g. stroke, exhaustion)	High	Reduced by ≥50%
33. Regulate outdoor work during heatwaves	# of MMDAs with heat-related work regulations	0	100	# of heat advisory notices issued per year	0	150	% of outdoor workers adjusting work schedules during heat alerts	0%	80%	Reduction in heat-related work absences or illness	No data	≥60% reduction

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
34. Educate public on heat-health risks	# of public campaigns on heat-health risks	2	50	% of population reached with public education on heat risks	10%	75%	Knowledge score on heat-related health impacts (survey-based)	Low	High	Heatwave-related health incidents reported	Frequent	Rare
35. Provide alternative livelihoods for outdoor workers	# of government-supported livelihood programs launched	1	20	# of outdoor workers enrolled in alternative employment	200	10,000	% reduction in outdoor work dependency during hot seasons	0%	≥60%	Economic resilience of vulnerable outdoor worker populations	Low	High
36. Develop guidelines on heat-related reproductive health	Existence of national guidelines on heat-related reproductive health	No	Yes	# of health facilities implementing the guidelines	0	200	% of health workers trained on heat-health reproductive risks	0%	80%	Adverse pregnancy outcomes linked to heat stress	Not tracked	≥50% reduction
37. Improve monitoring of outdoor visibility (RTAs)	# of visibility monitoring stations (GMet/EPA)	10	50	% of regions issuing visibility advisories	15%	90%	Timeliness of alerts to road safety agencies	>12 hours	≤2 hours	RTAs attributed to poor visibility	High	Reduced by ≥60%
38. Issue visibility-based weather warnings	# of meteorological staff trained in hazard communication	5	100	# of warnings issued during low-visibility events	0	200	% of population reached with timely weather warnings	20%	85%	Reduction in traffic/lake/air accidents due to poor visibility	Low	Substantial
39. Develop interagency data sharing on weather-related injuries	# of formal data-sharing agreements signed	1	10	# of climate-related injury datasets integrated into DHIMS	0	5	Frequency of cross-sectoral data analysis on injuries	Annual	Quarterly	Quality of injury prevention planning using shared data	Low	High

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
40. Monitor lake/air transport accidents due to low visibility	Existence of tracking system for visibility-related accidents	No	Yes	# of visibility-related incidents reported annually	Not consistently tracked	100	Time from incident to investigation	>10 days	≤3 days	Incidence of transport accidents linked to low visibility	High	Low

7). Integrated risk monitoring and early warning

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Strengthen H&E surveillance systems	Budget for integrated H&E platforms	Limited	GHS 20M	Integrated H&E platforms established	Fragmented	1 national + 16 regional	% of districts reporting climate-health data	<20%	≥90%	Early detection of climate-sensitive health risks	Delayed	Timely
2. Develop H&E indicators	Technical group formed	None	Yes	No. of CC-health indicators validated	0	≥20	% of indicators in DHIMS2	0%	≥80%	Better tracking of CC-related disease trends	Poor	Improved
3. Establish data sharing agreements	No. of MOUs signed	0	≥15	No. of institutions with active agreements	<5	≥30	Data harmonization across agencies (%)	<20%	≥80%	Interoperable and timely multi-sector responses	Weak	Strong
4. Design multi-hazard early warning system (EWS)	Budget secured for design (USD)	None	≥\$3M	Multi-hazard EWS design documents	0	≥3	% of diseases covered under EWS	<10%	≥75%	Predictive action taken before outbreaks	Rare	Routine
5. Inventory of existing EWS	No. of assessments commissioned	0	≥5	National EWS inventory database created	No	Yes	% of systems documented and analyzed	0%	100%	Reduced duplication and better planning	Fragmented	Coordinated

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
6. Ensure EWS interoperability	No. of system upgrades supported	0	≥10	Shared platforms across health and env. agencies	None	≥3	Interoperability index	Low	High	Multi-sector response to climate-health events	Weak	Strong
7. Establish CC-Health databases & expert rosters	No. of rosters created	0	2 (experts + systems)	Databases hosted and operational	No	Yes	Stakeholders accessing knowledge repositories	None	≥1,000/year	Evidence-informed decision-making	Low	High
8. H&E knowledge exchange workshops	No. of workshops funded/year	<3	≥20	No. of institutions participating	Few	≥100	Capacity score from pre/post assessments	Low	≥75% improvement	Stronger multi-agency collaboration	Limited	Robust
9. Analyze and disseminate H&E outputs (maps, bulletins)	No. of data analysis teams formed	<2	≥10	Risk maps, reports published annually	<5	≥25	% of stakeholders using disseminated outputs	Low	≥80%	Faster policy and programmatic decisions	Delayed	Timely
10. Update DHIMS2 to capture climate-health data	Software upgrade funding	Pending	≥GHS 10M	DHIMS2 modules with CC-health indicators	None	≥10	% of HCFs using updated DHIMS2	0%	≥80%	Real-time surveillance of climate-health events	Absent	Operational
11. Enhanced surveillance for climate-sensitive diseases	No. of staff trained on enhanced IDSR	<100	≥3,000	Facilities implementing enhanced surveillance	Few	≥1,000	Time from outbreak detection to response	>7 days	≤2 days	Reduced disease burden from CC-sensitive illnesses	High	Significantly lower
12. Early detection tools (RDTs, syndromic surveillance)	No. of RDT kits procured	Low	≥1M	% of districts using syndromic systems	<10%	≥70%	% of cases caught early using tools	Unknown	≥60%	Reduction in case fatality rates for climate-driven diseases	High	Reduced
13. Conduct supplementary surveys	No. of survey protocols developed	0	≥5	No. of surveys completed	Rare	≥50	Complementary data feeding into DHIMS2	None	Standard practice	Increased accuracy in disease forecasting	Low	High

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
14. Develop CC-health indicators in monitoring systems	% of programs with CC indicators	<5%	≥80%	Updated tools shared across regions	Few	All 16 regions	Indicator uptake in district health plans	Rare	Common	Evidence-based adaptation across levels	Weak	Strong
15. Share indicators nationally across MDAs	No. of harmonization meetings held	0	≥10	Indicator sets shared and adopted	None	≥3 sets	Cross-ministerial data integration index	Low	High	National-level consistency in adaptation tracking	Poor	Standardized
16. Periodic reviews of V&A capacity gaps	No. of V&A review workshops conducted	<2	≥16	Gap reports produced and shared	0	≥16	% of gaps addressed with training/tools	<10%	≥80%	Health system adaptive capacity score	Low	Medium-High
17. Monitor environmental risk factors (e.g. air, water)	Budget for risk monitoring labs/equipment	Low	≥GHS 20M	No. of environmental samples analyzed	Irregular	≥10,000/year	% of pollution hotspots reported	Rarely	Routinely	Reduced exposure to environmental health risks	High	Moderate
18. Feedback mechanisms to operational levels	No. of reporting formats revised	0	≥3	No. of feedback briefs sent to districts	<5/year	≥100/year	% of district teams acting on feedback	<15%	≥75%	Responsive adaptation at community level	Minimal	Common
19. Develop integrated risk communication plans	No. of sectors engaged in risk comms	2	≥10	Unified CC-health risk comm strategy	No	Yes	Consistency of messages during health events	Low	High	Public trust and adherence to advisories	Mixed	High
20. Community engagement mechanisms	Community outreach funding allocated	Limited	GHS 15M	No. of communities engaged annually	<50	≥500	% of households reached with key messages	Low	≥80%	Local resilience to CC-health threats	Weak	Strengthened
21. Health education at service delivery points	No. of facilities with daily health education	<20%	≥90%	No. of people reached/month	Few	≥1M	% of patients showing improved knowledge	Untracked	≥70%	Better preventive behaviors adopted	Infrequent	Routine

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
22. Use seasonal trends in planning communication	% of planners using seasonal forecasts	Rare	≥75%	Forecast-based communication plans/year	0	≥10/year	% of districts timing risk alerts effectively	<20%	≥80%	Timely warnings reduce health shocks	Irregular	Predictive
23. Train healthcare workers on climate-health communication	No. of training sessions conducted	<10	≥150	No. of trained professionals	<100	≥5,000	% of trained workers using info in patient education	<10%	≥70%	Informed communities on CC-health links	Low	High

8). Emergency preparedness and Management

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Develop costed emergency preparedness plans	% of regions with budgeted plans	10%	100%	# of costed plans completed	2	16	% of facilities using these plans	5%	80%	Time to deploy emergency resources	>72 hrs	<24 hrs
2. Include climate-sensitive health risks in disaster plans	# of review workshops held	0	8	# of updated national and regional DRR plans	1	10	% of DRR plans integrating climate-health	0%	80%	Reduction in unmanaged health risks during disasters	High	Low
3. Build resilient health systems for emergency response	Emergency systems budget allocation (GHS)	Minimal	GHS 50M	# of facilities upgraded with emergency capacity	10	200	% of facilities able to operate in crises	20%	90%	Health service availability during disasters	Inconsistent	Stable
4. Integrate HNAP with national disaster plans	# of MOUs between MoH & NADMO	0	5	# of integration protocols signed	0	5	% alignment between HNAP and DRR systems	Low	High	Improved coordination during emergencies	Weak	Strong

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
5. Develop post-disaster evaluation plans	# of evaluation tools created	0	3	% of emergency events evaluated	0%	90%	% of lessons integrated into planning	0%	75%	Effectiveness of future emergency response	Poor	Improved
6. Institute post-disaster evaluation interventions	# of trained evaluators	0	50	# of after-action reviews conducted	0	16	Stakeholder satisfaction with response quality	Low	High	Reduced repeat failures in emergency responses	High	Low
7. Improve early warning systems	# of new warning systems funded	5	25	% of high-risk districts with alerts	20%	100%	Time from alert to community activation	>24 hrs	<6 hrs	Fatalities from climate disasters	High	Reduced by 70%
8. Establish MOH/ GHS disaster control teams	# of staff trained in disaster management	0	200	# of regional/ district control teams formed	2	16	% of districts with functional teams	10%	100%	Emergency response coverage	Limited	Comprehensive
9. Participate in NDMICC activities	# of intersectoral meetings attended	1	20	# of joint action plans developed	0	10	% of actions jointly implemented	0%	70%	Cross-sector coordination score (index)	Low	High
10. Use risk assessments to inform plans	# of risk assessments conducted	2	50	% of facilities with updated risk profiles	5%	90%	Risk-informed planning index	Low	High	Unanticipated system failures	Frequent	Rare
11. Develop health contingency plans for extreme weather	# of contingency templates created	0	3	# of district-level plans adopted	0	100	% of districts with tested contingency protocols	0%	75%	Readiness for floods/droughts/ heatwaves	Low	High
12. Budget for reinforcement of facilities	Budget line created in MoH financial plan	No	Yes	% of risk-prone facilities with reinforcement plans	0%	70%	% of reinforced facilities completed	0%	60%	Facility damage in disasters	High	Reduced by 80%

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
13. Install backup power in key health facilities	# of generators procured	10	200	% of facilities with backup systems	10%	90%	Power uptime during outages	50%	95%	Cold chain losses (vaccine, blood, etc.)	Frequent	Rare
14. Train health workers on emergency operations	# of training sessions held	0	30	# of staff trained	0	3,000	% of trained staff retained in roles	-	80%	Speed and efficiency of emergency response	Low	High
15. Mobilize funds for emergency plans	# of funding proposals submitted	0	10	GHS mobilized for emergency preparedness	0	GHS 100M	% of emergency plans funded	0%	80%	Resource gap during health crises	High	Low
16. Build and operate new public health infrastructure	# of climate-resilient facility designs approved	0	10	# of new facilities constructed	0	10	Service capacity of new infrastructure	Low	Expanded	Lives saved during climate crises	-	Substantial
17. Upgrade district hospitals to standard level	Budget allocated for upgrades	Minimal	GHS 50M	# of district hospitals upgraded	0	20	Bed capacity increase	0	+1,000 beds	Health system surge capacity	Inadequate	Resilient
18. Establish community dialogue mechanisms	# of forums organized	2	40	# of community groups engaged	5	100	Public knowledge of health risks (survey)	Low	High	Early community action in disasters	Sporadic	Prompt
19. Train communities to assess and respond to risks	# of training materials developed	0	10	# of community leaders trained	0	500	% of communities with local emergency teams	0%	75%	Community-level emergency response effectiveness	Low	High
20. Promote local actions for hazard reduction	# of outreach events held	0	30	# of community projects implemented	0	100	Participation rate in local risk activities	10%	60%	Hazard exposure in communities	High	Reduced by 50%

9). Management of environmental determinants of health

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Conduct Health Impact Assessments (HIA)	Budget allocated	GHS 0	GHS 5 million	# of HIAs conducted	1	50	% of policies with HIA input	<5%	80%	Reduced health risks from development	Not tracked	Tracked & reduced
2. Harmonize psychosocial support systems	# of partnerships formed	2	15	# of communities with support services	0	100	% of affected individuals served	10%	75%	Reduction in untreated mental health cases	High	Moderate
3. Scale Health-Environment Strategic Alliance (HESA)	HESA chapters established	1	10	Joint activities implemented	2	50	Collaboration index	Low	High	Environment-health integration	Fragmented	Systematic
4. Enhance water quality surveillance	Surveillance teams trained	0	50	Reports generated quarterly	4/year	20/year	Districts reporting on water status	30%	100%	Waterborne disease incidence	High	↓ by 50%
5. Research climate–vector disease links	Funding allocated	None	GHS 2 million	Studies published	0	15	Policies influenced by research	0	10	Timeliness of outbreak responses	Delayed	Timely
6. Scale-up drought preparedness and recovery	Budget allocated	Minimal	GHS 30 million	Drought-prone districts with plans	5	50	% of districts implementing plans	10%	80%	Malnutrition in drought periods	High	Low
7. Early warning & SBCC for bushfires	Campaigns launched	1	10	% of target communities reached	20%	90%	Awareness index	Low	High	Bushfire-related health impacts	Frequent	Rare
8. Develop heatwave preparedness guidelines	Guidelines developed	0	1	Facilities with protocols	0	200	% of cases managed effectively	20%	90%	Heat-related mortality	High	Low
9. Develop mental health MHPSS package	MHPSS packages developed	0	1	Facilities applying MHPSS	0	150	% of climate-affected receiving MHPSS	<10%	70%	Psychosocial distress in climate events	High	Low

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
10. Improve coastal risk response	Budget for coastal protection	Low	GHS 40M	Communities with evacuation plans	Few	30	% of populations covered	10%	80%	Loss of life from tidal events	Common	Rare
11. Establish environmental monitoring systems	ICT system budget	GHS 0	GHS 5 million	Database developed	No	Yes	Agencies submitting integrated data	2	10	Coordination in environmental response	Fragmented	Integrated
12. Develop climate-resilient Water Safety Plans	Technical training held	0	10	Districts with updated WSPs	5	100	% population covered by WSP	30%	85%	Safe water coverage during climate shocks	Medium	High
13. Assess burden of environmental disease	Funding allocated	0	GHS 3 million	National and district reports published	0	20	Health priorities adjusted using burden data	No	Yes	Investment in high-burden areas	Low	High
14. Develop climate-health indicators	Indicator framework developed	No	Yes	# of indicators monitored annually	0	25	Use of indicators in reporting	0%	100%	Evidence-based climate health planning	Absent	Present
15. Build capacity for ecosystem interventions	Training sessions conducted	0	20	# of staff trained	0	500	% of facilities applying practices	0%	50%	Health gains from environmental protection	Minimal	Moderate
16. Community sensitization on sanitation	# of campaigns launched	0	15	% of target households reached	0%	75%	Hygiene behavior change index	Low	Medium	WASH-related disease incidence	High	□ by 60%
17. Mobilize funds for surveillance systems	# of proposals submitted	0	5	Funding secured (GHS)	0	20 million	% of system operational coverage	0%	100%	Gaps in environmental surveillance	High	None
18. Implement health care waste management policy	Training modules produced	0	5	Facilities trained in waste management	5	150	Compliance with waste protocols	30%	90%	Environmental contamination	High	Low
19. Establish sanitation/waste database	IT infrastructure procured	None	Yes	Waste reports submitted per quarter	0	100% of MMDAs	Data used in district planning	Rarely	Routinely	Waste overflow and public health risks	Frequent	Rare

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
20. Finalize national air quality standards	Draft legislation reviewed	No	Yes	Legislative instrument passed	No	Yes	Monitoring of air quality (districts)	2	50	Respiratory illnesses from pollution	High	↓ by 50%
21. Enforce regulations on environmental determinants	Staff trained on legal frameworks	Few	300	Regulations revised or introduced	2	10	Sectors complying with new rules	20%	90%	Exposure to health hazards (air, water, waste)	High	Low
22. Control environmental pollution from mining	Joint health-environment taskforce set up	No	Yes	Monitoring visits to mining areas	5	100	Pollution risk detected and responded to	Rare	Common	Contamination of water/food chain	High	Low
23. Address food insecurity due to climate impacts	Budget for food-health coordination	GHS 0	GHS 10M	Nutrition centers supported	5	50	Food insecurity risk index	High	Medium	Malnutrition among vulnerable groups	High	↓ by 60%
24. Improve emergency health response in poor areas	# of mobile clinics procured	0	50	Isolated districts served	Few	100	Emergency access time (hours)	>6 hrs	<2 hrs	Lives saved in floods/heat events	Low	High
25. Engage communities in land/water conflict resolution	Dialogue forums held	0	20	Conflict resolution mechanisms established	0	10 regions	% of cases resolved peacefully	Low	High	Injury and trauma from climate conflict	Common	Rare
26. Integrate climate risk into land use planning	# of planners trained in climate risk	0	100	Land use plans updated	5	60 districts	Developments in safe climate zones	Somewhat	Routinely	Exposure of new settlements to hazards	High	Low

10). Monitoring progress

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Develop HNAP with a comprehensive M&E framework	Budget allocated for M&E framework development	GHS 0	GHS 3 million	M&E framework document finalized and disseminated	No	Yes	% of HNAP activities tracked using new framework	0%	100%	Quality and frequency of national HNAP reporting	Low	High
2. Identify climate-health process, result, and impact indicators	# of indicator development workshops held	0	5	Indicator framework validated and published	No	Yes	% of health sector programs using indicators	0%	80%	Integration of indicators into policy decisions	Minimal	Significant
3. Review existing databases and create operational climate-health database	IT and technical team assigned	No	Yes	# of platforms integrated or linked	0	5	Functionality of climate-health database	Non-functional	Fully functional	Access to reliable climate-health data	Limited	Widespread
4. Mainstream HNAP indicators into DHIMS2 and health M&E systems	Budget for system upgrades and training	GHS 0	GHS 2 million	% of indicators embedded into DHIMS2	0%	100%	% of districts submitting indicator data	10%	90%	Decision-making based on routine climate-health data	Rare	Commonplace
5. Prioritize and initiate reporting on CC-health indicators	Technical committee convened	No	Yes	Annual climate-health indicator reports produced	0	7	% of key indicators reported at national level	0%	90%	Evidence used to refine climate-health programming	Rarely	Frequently
6. Establish reporting structures for sectoral, national, and international levels	Reporting framework guidelines developed	No	Yes	% of institutions with clear reporting roles	0%	100%	Timeliness of sectoral reports submitted	Irregular	Regular (Annual)	Alignment with international obligations (e.g., UNFCCC)	Weak	Strong

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
7. Strengthen institutional capacity for HNAP M&E	# of M&E staff trained at all levels	0	300	# of M&E training programs delivered	0	15	% of trained staff applying skills	0%	80%	Consistency and accuracy in climate-health evaluations	Low	High
8. Adopt innovations and technologies for M&E	Investment in digital tools and platforms	Minimal	GHS 4 million	# of digital tools deployed for M&E	0	6	% of data collection and reporting digitized	20%	90%	Efficiency and timeliness of M&E functions	Low	High

Annex 5: Youth Theory of Change Indicators and Targets

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Strengthening youth participation and leadership in climate change adaptation planning, implementation, and monitoring	% of adaptation budget allocated to youth engagement	<1%	≥5%	# of youth-led climate initiatives supported	3	50	% of NAP actions influenced by youth inputs	0%	50%	Proportion of youth reporting improved resilience to climate impacts	TBD	70%
				# of districts with youth participation in adaptation planning	0	20	% increase in youth awareness on climate adaptation (survey-based)	TBD	+60%			

Annex 6: Water Theory of Change Indicators and Targets

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
1. Restoration and conservation of wetlands	Budget allocated to wetland restoration (USD)	<\$1M/year	≥\$10M/year	No. of wetlands/ watersheds assessed and managed	<50	≥200	% increase in groundwater recharge rates (proxy)	Low	+30%	Reduced seasonal water stress in target zones	High	Low
2. Restoration of buffer zones	Hectares of buffer zones planned for rehabilitation	~100 ha	≥2,000 ha	No. of rivers without illegal mining activities (galamsey)	Few	≥80% of target rivers	Reduction in sediment load in affected rivers	High	≥60%	Improved water quality and biodiversity in buffer areas	Degraded	Restored
3. Watershed management and monitoring	Budget for watershed mapping and modeling (USD)	<\$500K	≥\$5M	No. of watershed monitoring systems operational	Few	≥50	Comprehensive geospatial water database developed	Fragmented	Centralized system	Evidence-based water policy and resource allocation	Weak	Robust
4. Promotion of indigenous knowledge in water conservation	No. of communities engaged in IWRM co-design	<20	≥150	No. of IWRM awareness and knowledge-sharing events	<30	≥200	% of communities integrating traditional knowledge into water use	Low	≥70%	Long-term behavior change in water conservation	Limited	Sustained
5. Strengthen research on water and groundwater resources	Research grants issued annually	Few	≥25/year	No. of studies on groundwater and soil moisture	<10/year	≥50/year	Real-time hydrological data coverage	Fragmented	≥80% coverage	Sustainable groundwater abstraction protocols adopted	Ad hoc	Nationwide
6. River basin management plans for flood preparedness	No. of feasibility studies on flood risk infrastructure	0	≥20	No. of river basin plans developed/ implemented	<5	≥20	% of flood-prone areas with active basin plans	<15%	≥75%	Reduced annual flood damage cost (USD)	High	≥50% reduction

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
7. Real-time monitoring of river flows	No. of upgraded hydromet stations installed	~20	≥150	% of major rivers covered by real-time flow monitoring	<30%	≥90%	Forecast warning lead time for floods (hours)	<6 hours	≥24 hours	Reduced loss of life and property from floods	High	Low
8. Climate-smart river management systems	No. of forecasting models integrated	<5	≥25	No. of forecasting products deployed with DSS	Few	≥50	Accuracy of seasonal flood forecasts (%)	<50%	≥85%	Enhanced resilience of farming and urban planning	Low	High
9. Build climate-resilient infrastructure in critical flood zones	Budget allocated for climate-proof water infrastructure	Low	≥\$50M	No. of cities with flood/ stormwater management plans	<5	≥20	% of urban areas with protected drainage systems	<20%	≥75%	Annual reduction in infrastructure flood damage (%)	High	≥70%
10. Strengthen capacity in climate-resilient infrastructure design	Budget for guidelines and master plan	Low	GHS 10M	No. of infrastructure guidelines developed	0	≥2	% of new water infra. climate-resilient	<15%	≥80%	Functionality of infra. during disasters	Unreliable	Resilient
11. Monitor extreme rainfall & flood risks	No. of early warning systems deployed	<20	≥150	No. of new flood models/ publications	Few	≥30	Forecast accuracy and coverage (%)	<50%	≥85%	Reduction in flood-related damages (%)	High	≥60%
12. Review and implement Disaster Management Plans (DMPs)	No. of DMPs reviewed or developed	<5	≥20	No. of DMP activities executed	Few	≥50	% of institutions using updated DMPs	<10%	≥70%	Response time to water-related disasters	Slow (>5 days)	Fast (≤48 hrs)
13. Raise flood hazard awareness at community level	No. of awareness programs held	<50	≥500	No. of knowledge-sharing campaigns	Few	≥100/ year	% of households aware of flood safety plans	~20%	≥80%	Lives and assets saved in flood-prone areas	Limited	Substantial

Adaptation Action	Input			Output (Quarterly)			Outcome (Annual)			Short Term Impact		
	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2030)	Indicator	Baseline (2025)	Target (2040)	Indicator	Baseline (2025)	Target (2060)
14. Harvest rainwater for domestic use	Rainwater harvesting feasibility studies completed	0	≥16 (1 per region)	No. of rainwater harvesting projects piloted	<10	≥200	% of water-stressed households with systems	<5%	≥40%	Reduced dependence on unreliable supply	High	Moderate
15. Adopt green roofing systems in urban areas	Green roofing framework developed	No	Yes	No. of cities implementing green roofing	0	≥10	% of buildings with green roofs in pilot cities	0%	≥30%	Reduction in urban surface runoff (%)	Unmeasured	≥20%
16. Expand access to safe drinking water	Investment in treatment plants (USD)	Low	≥\$100M	No. of WSPs implemented	<50	≥300	% of HHs with safe water access	~60%	≥90%	Waterborne disease incidence (proxy)	High	≥50% reduction
17. Strengthen water quality monitoring	Labs upgraded with ISO-compliant testing	<10 labs	≥50 labs	No. of parameters regularly monitored	<10	≥30	Water quality reporting frequency	Irregular	Quarterly	Improved compliance with quality standards	Low	≥90%
18. Real-time water supply monitoring	Real-time monitoring systems funded	None	≥GHS 20M	No. of real-time systems installed	0	≥100	% of water boards with real-time visibility	0%	≥75%	Faster detection and response to supply issues	Delayed	Prompt
19. Upgrade irrigation infrastructure (GIDA focus)	Irrigation budget allocation (USD)	Low	≥\$200M	Irrigation systems rehabilitated	<50	≥300	% of schemes with climate-proof upgrades	<20%	≥70%	Crop failure risk due to water stress	High	Reduced by ≥60%
20. Promote micro/solar/automated irrigation	No. of farmers trained in micro-irrigation	Few	≥10,000	No. of solar/micro systems installed	<200	≥3,000	% of irrigated land using efficient tech	<10%	≥50%	Irrigation water use efficiency (%)	<30%	≥70%
21. Integrate watershed mgmt. in hydropower planning	No. of dams with watershed mgmt. plans	<5	≥20	No. of inundation maps produced	0	≥30	% of flood-prone hydropower communities mapped	Few	≥100% of target	Disaster resilience of energy–water nexus	Low	High

Ghana NAP – District (MMDA) Quarterly M&R Template

A. District information

Region	District / MMDA	Reporting quarter & year	Focal person & unit	Contact

B. Adaptation actions implemented this quarter

Action ID	Adaptation action / project	NAP sector	Location / community	Implementing department / partner

C. Quarterly results (outputs only)

Action ID	Output indicator (from sector framework)	Planned target	Actual achievement	Data source	Remarks

D. Early outcome observations (if any)

Action ID	Outcome indicator	What change was observed this quarter?	Evidence/source

E. Beneficiaries reached

Action ID	Communities covered	Male	Female	Vulnerable groups reached

F. Climate risks addressed

Action ID	Main climate risk addressed	Affected area/community

G. Adaptation finance (district level)

Action ID	Funding source	Budget this quarter (GHS)	Expenditure this quarter (GHS)

H. Key issues and lessons

Main implementation challenges this quarter:

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Main lessons / good practices:

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I. Priority actions for next quarter

Planned action	Responsible unit/partner	Support needed

J. Validation

Prepared by	Position	Date	Approved by