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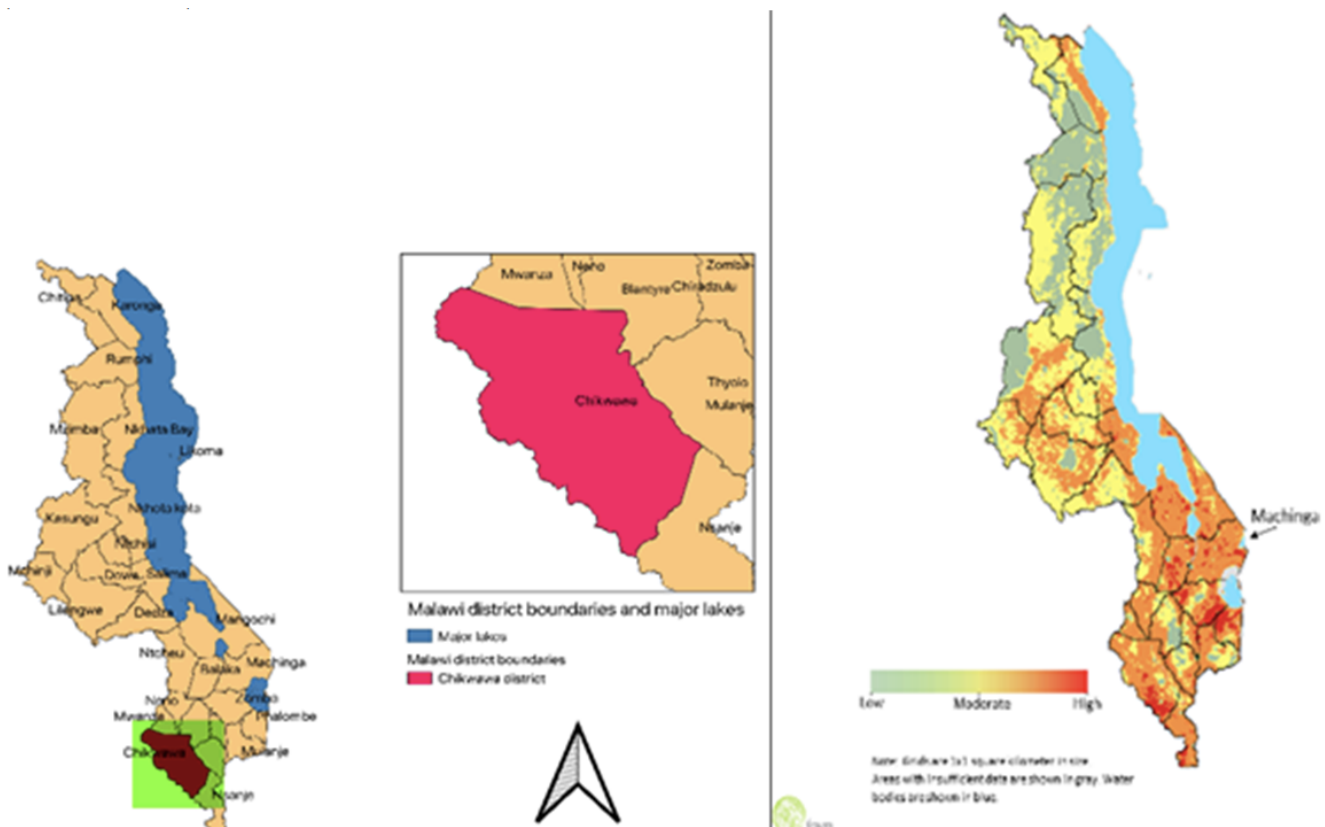
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Abstract

Geographically, Malawi is a landlocked country in southern Africa bordering Mozambique, Tanzania, and Zambia (Masi 2017). The country has a total area of 118,484 km² of which 20% is covered by Lake Malawi. The country's topography is varied. In the mountainous sections of Malawi surrounding the Rift Valley, plateaus rise generally 800 m to 1,200 m above sea level, although some rise as high as 3,000 m in the north. Malawi experiences sub-tropical climate conditions and annual changes between wet and dry seasons. The wet season generally occurs between November and April and the dry season between May and October. Average temperatures range between 18° and 27°C, and the wet season can bring average monthly rainfall in the order of 150 mm to 300 mm (Masi 2017). Annual rainfall ranges from 500 mm in low-lying areas such as the Shire Valley to above 3,000 mm in the northern highlands (USAID 2017a).



Left panel: District map of Malawi. Source: doi: <https://doi.org/10.1371/journal.pone.0242226.g001>;
Right panel: Malawi Climate Vulnerability Map. Source: https://fraym.io/malawis-adaptive-capacity-to-climate-change/final_map/

Malawi is characterized by widespread poverty, and a rapidly growing population with high population density, putting pressure on land, fisheries, water and other natural resources (Masi 2017). Malawi is already experiencing some of the effects of climate change with observed rising temperatures and changes in the variability of rainfall (Masi 2017). Adverse impacts have already resulted in considerable damage, disrupted economic activity and adversely affected the lives of large number of people, particularly the poor who are the most vulnerable to weather related shocks (Masi 2017). Challenges resulting from climate change include (Masi 2017): dry spells and seasonal droughts linked to crop failures, food security and nutrition availability; intense rainfall associated with severe riverine and flash floods and damaging infrastructure including roads, bridges, schools and health facilities; soil erosion due to intense rainstorms combined with ongoing degradation of upstream catchments causing high sediment deposition loads in rivers hence massive siltation in Lake Malawi that adversely affects hydropower energy generation; heat stress and outbreaks of livestock diseases like Newcastle disease in chickens and African Swine Fever in pigs; degraded grazing fields resulting to low fodder availability and quality; competition for resources like water and grazing land; denudation of forests and woodlands driven by biomass energy demand also causing biodiversity loss; increase in disease incidence and transmission of cholera, schistosomiasis and malaria.

Executive Summary

Malawi is experiencing climate related hazards and extreme events which are increasing vulnerability of the communities to climate change across all sectors (Irish Aid 2018) with reports of extreme weather events (that is, droughts, heavy rains, and floods) increasing from just one during the 1970s to nineteen between 2000 and 2006 (Hughes et al. 2019). Mean temperatures have risen by an average rate of 0.21°C per decade, with comparative increases in evapotranspiration (Hughes et al. 2019). Extreme weather events that occur frequently in the country include dry spells, seasonal droughts, intense rainfall, riverine floods and flash floods (Masi 2017). Impacts include the Phalombe flash floods in 1991 that killed over 1,000 people, and wiped out villages, crops, livestock and property (REF) and an intensive 2015 flood event in XX area that left many lives and livelihoods destroyed (Irish Aid 2018). The effects of the climate changes and extreme weather events are compounded by a number of other factors. Extensive land use, including the massive cutting down of trees on the Middle and Upper Shire Valleys, has resulted in severe land degradation and soil erosion, leading to siltation of the Shire River and its tributaries, seriously affecting hydro-electric power generation, human health and fisheries (UNFCCC 2006). Soil degradation which is a major challenge in Malawi has soil losses averaged at 20 T/ha/year translating to a 4% - 25% annual yield loss (Irish Aid 2019). The average annual national soil loss rates were estimated at 29 tons per hectare in 2014, with soil erosion and nutrient depletion reported to affect more than 60% of Malawi's land area. Unsustainable farming practices, an increased demand for agricultural land and wood fuels associated with a growing population have all been attributed to cause this degradation with chemical land degradation, including soil pollution and salinization/ alkalization, leading to 15% loss in the total arable land in Malawi in the last decade alone. Between 2008 and 2016, majority of urban households relied on biomass energy with a 35% increased charcoal demand worth more than USD 66 million in 2016 providing employment opportunities for over 235,000 people (Hughes et al. 2019). This has a huge impact on agriculture which is the main economic activity of the country contributing to over 80% of the country's GDP.

Malawi is among the dozen most vulnerable countries globally in terms of adverse effects of climate change, especially drought, but also floods/heavy rains. Heavy dependence on rain-fed agriculture of both the national and local economies, and for the livelihoods of the majority (85%) rural population

makes Malawi particularly vulnerable. The rains can start as early as October, especially in the south of the country and can end as late as May, especially in the north of the country (Malawi, 2015). This early rains and extended rains disrupt the agricultural cycle hence having a negative impact on food production in the country. Factors including high population density and poverty, small landholding sizes, and the low-input low-output farming systems exacerbate farmers' vulnerability and reduce the resilience of agricultural systems and adaptive capacity of farming communities to effectively respond to adverse CC impacts or take advantage of emerging opportunities (Zulu 2017). Malawi, with a 3.06% annual growth rate (Masi 2017), has high incidences of poverty, violence, unemployment, malnutrition, HIV and AIDS, high illiteracy rates, poor health, and psychological disorders which characterize the country's young population (MDGS II 2011-2016) (Irish Aid, 2018). About 85% of the people live in rural areas and derive their livelihoods from natural resources and agriculture (from small land holdings of between 1.0 and 5.0 ha per household of five people), with the remaining 15% residing in urban areas (Malawi Vision 2020). The changes in climate and land cover and use are exacting significant adverse impacts on the economy of Malawi. A 1-in-10 year drought event would have an estimated adverse impact of 4% on the annual GDP of Malawi, with even larger impacts for 1-in-15 and 1-in-25 year events (Malawi 2015). The Government of Malawi (GoM) has estimated that 29 metric tons of soil per hectare are lost each year, costing the country an estimated 8% of its annual gross domestic product (GDP) (GOM 2001) (USAID 2017b) and for the period 2001 to 2009, the annual costs of land degradation have been estimated at USD 244 million per year, an amount equivalent to 6.8% of Malawi's country's GDP. There has been migration from rural to urban areas (at the rate of 3.6% per year), and from densely populated to sparsely populated areas or districts over the decades from areas adversely affected by climatic hazards (especially floods and drought) to safer upland areas or other districts (MoECCM 20181) and in search of income earning opportunities (Malawi Vision 2020).

National Adaptation Plans (NAPs) are generally important in several ways. For instance, if countries fail to build resilience of people, places, ecosystems and economies to the impacts of climate change, they risk losing the hard won sustainable development gains. The most unfortunate part is that poor countries are more vulnerable to the devastating impacts of climate with Malawi being one of the poorest countries in the world, ranked 170 of 188 countries on the global United Nations Development Programme's HDI. Given the climate related challenges faced by Malawi, a NAP will identify and provide a roadmap on key adaptation measures required to address key adaptation needs and processes to ensure that these measures are mainstreamed into the national planning and development processes and programmes across systems and sectors. The country's Intended National Determined Contribution INDC noted the need to enhance resilience of productive sectors like rain fed agriculture to the associated negative impacts of climate change. The 2016 Malawi National Climate Change Policy noted the need to effectively manage the impacts of climate change through interventions that build and sustain the social and ecological resilience of all Malawians; with the regulation of greenhouse gas emissions to the atmosphere at a level that would prevent dangerous human-induced interference with the climate system within a timeframe that enables social, economic and environmental development to proceed in a sustainable manner. It notes that climate change needs to be integrated into planning, development, coordination and monitoring of key relevant sectors in a gender sensitive manner and through an appropriate institutional framework. The 2006 NAPA sought to increase the adaptive capacities of vulnerable communities to adverse effects of climate change through a number of initiatives, such as: improving community resilience to climate change by the development of sustainable rural livelihoods; restoring forest in Upper, Middle and Lower Shire Valleys catchments to reduce siltation and the associated water flow problems; improving agricultural production under erratic rains and changing climatic conditions; improving Malawi's preparedness to cope with droughts and floods, and; improving climate monitoring to enhance Malawi's early warning capability and decision making and sustainable utilization of Lake Malawi and lakeshore areas resources. The NAP process seeks to reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience while

integrating climate change adaptation into relevant new and existing national development policies, programs and activities.

Framework for the NAP

As indicated in the introduction section above, Malawi's geographical characteristics and the prevailing socioeconomic conditions among the majority of its population, makes it one of the most vulnerable countries to the impacts of climate change globally. The country has been experiencing unpredictable weather patterns characterized by poor distribution of rainfall, causing dry spells, droughts and floods. Devastating droughts and floods witnessed in recent years and high temperatures cause food insecurity affecting millions of its population through low agricultural yields as a result of reduced soil moisture and inflated food prices. Drought lowers hydroelectric power production in the Shire River by reducing the flow rates in the river as a result of complete drying up of some of the tributaries that feed into Lake Malawi. Lake Chilwa, a notable wetland, is drying up. These have made agricultural production and the country's agro-based economy extremely vulnerable. Land degradation and loss of soil fertility, decreasing availability of safe water for humans and livestock as water tables recede, forest fires, floods resulting in severe crop loss and infrastructure damage including roads and the only rail line that links the south to the centre, all result in serious socio-economic disruptions, food and water insecurity, and diseases such as diarrhoea, cholera and malaria. Increased temperatures, droughts, and floods will also result in a range of direct and indirect impacts to health, with malaria being of particular concern to Malawi because as temperatures becomes warmer, it will become more suitable for breeding of mosquitoes even at higher altitudes, which historically have not been exposed to the disease. All these changes among others are depressing economic activities, with significant impact on national GDP, and diminishing the wellbeing of the large population of rural dwellers (85%) whose livelihoods depend on wetlands, livestock and natural resources, as well as the urban poor who have to contend with unemployment and inequality

The National Adaptation Planning process which was initiated during the seventeenth session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) is today an essential component of planning at all levels because climate change is an issue that has to be addressed over the long-term. The process enables developing and least developed country (LDC) parties to assess their vulnerabilities, mainstream climate change risks, and to address adaptation across all key sectors that are impacted by climate change (LEG, 2012). Further, it is essential that developing country and LDC parties integrate adaptation planning in the broader context of sustainable development planning² because climate change risks disproportionately magnify development challenges in these countries as compared to developed countries (LEG, 2012). The national adaptation plan (NAP) process was, therefore, established by the COP as a pathway by which effective adaptation planning in LDCs and other developing countries can be facilitated. The Government of Malawi embarked upon the National Adaptation Plan (NAP) process to adopt a medium-term approach for reducing vulnerability to climate change impacts, and to facilitate the integration of climate adaptation into ongoing planning processes at national and subnational levels.

The agreed objectives of the national adaptation plan process are (LDC-EG, 2012): (a) To reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience; (b) To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

The implementation of the NAP process is intended to:

- build on existing CCA planning processes and initiatives in order to provide continuity with previous planning efforts;
- build on past implementation successes;
- eliminate duplication of effort; and
- avoid repetition of implementation failures.

Essential functions of the NAP process

The NAP for Malawi will serve the following functions:

1. Enhanced institutional coordination- Provision of oversight on climate change activity implementation by NSCCC and the NTCCC providing a platform for efficient and effective implementation of national, regional, and global partnerships on climate change.
2. Strengthen the capacity of Malawi's government at all levels to implement a NAP process. MDAs will provide the data and information needed at various stages of the NAP process.
3. Nationally agreed adaptation targets that are mainstreamed into sectoral strategies like the MGDS III and policies which will provide for building of climate change resilience through regular development budgets. National Climate Change Investment Plan will assist the NAP process in resource mobilization.
4. A timetable and a work-plan to harmonize the main policy inconsistencies across Malawi's policy and legal frameworks that are relevant to climate change adaptation, which again will provide for building of climate change resilience through regular development budgets.
5. Incentivized government technical officers through professional development strategies. Capacity development will entail holding regular working group meetings and developing training programs for working groups based on prior training needs assessment. Working group meetings will come up with terms of reference and a training program for climate risk and vulnerability assessments, economical appraisal and design of adaptation pathways.
6. Tools and mechanisms established to promote iterative adaptation planning. Relevant institutions, individuals and organizations involved in CCA will be encouraged to adopt and use this CCA blueprint to build climate change resilience and contribute to the sustainable socioeconomic development of the country.
7. Enhanced access to adaptation finance that delivers the country's adaptation targets effectively. The National Climate Change Investment Plan and the National Climate Change Fund both have stipulated how they will manage fiduciary risks in dealing with the financial resources. Financial integrity in the NAP process will be further assured by adhering to government operating procedures on financial management and procurement as contained in Malawi's Financial Management Act. In addition, the NAP budget will be tabled by the Minister of Finance to the National Assembly during presentation of the annual government budget for approval. All NAP work-plans will be presented to the National Technical Committee on Climate Change and the National Steering Committee on Climate Change for endorsement and approval. This will ensure accountability and transparency.

8. A promotion of private sector engagement in businesses that will meet market demand for adaptation technologies and services. This will be achieved through the engagement of the Malawi Confederation of Chambers of Commerce and Industry (MCCCI) as a go-between to coordinate and facilitate private sector engagement. There will have to be a clear plan/structure for regular and sustained engagement.
9. Identify and address capacity gaps and needs to ensure that adaptation strategies are properly designed and implemented.

The NAP as the umbrella programme for adaptation

The National Adaptation Plan (NAP) addresses the effects of climate variability and climate change in Malawi with a systems approach – a departure from a sectoral approach. The framework prioritizes transformative investments for addressing the impacts of climate change on the national economy with a focus on building the resilience of vulnerable communities. The NAP evolves from a background of experience in the National Adaptation Plan of Action (NAPA). Contrastingly, the NAPA was designed to address urgent and immediate needs of the country, created to act as a channel through which the country could access support quickly and take advantage of win-win measures that would avoid increased damages and be more expensive to implement in the future. The NAPA was designed more than 10 years ago, when the country was experiencing heightened levels of vulnerability to floods, drought, and other adverse effects of climate change. With emerging and additional science and knowledge about climate change and its impacts, this NAP provides a framework for awareness and capacity for medium- and long-term adaptation in the various systems which support national socio-economic development. The current Malawi Vision 2063 (MW2063) – aspires to embrace ecosystem-based approaches in managing the environment. With climate change, Malawi has made commitment to develop systems to break the cycle of environmental degradation and increase resilience, sustainable development and planning as well as the promotion of climate change adaptation, mitigation, technology transfer and capacity building for sustainable livelihoods through Green Economy measures. The NAP framework is a direct contribution to the UNFCCC commitment and the MW2063.

There are several development programmes and activities that are taking place in Malawi at national and local governments under national government ministries and parastatals or through bilateral arrangements and partnerships with private sector entities, which need to be buttressed to be resilient to the impacts of climate changes in order to be able to effectively contribute to targeted development outcomes. Among many others, these include, for example:

- Lilongwe Water and Sanitation Project Malawi by Lilongwe Water Board jointly with Lilongwe City Council to increase access to improved water services and safely managed sanitation services in Lilongwe City;
- the Shire Valley Transformation Program in Chikwawa and Nsanje Districts in the south of Malawi to increase agricultural productivity and commercialization for targeted households and to improve the sustainable management and utilization of natural resources.
- The Social Cash Transfer (SCT), locally known as Ntukula Pakhomo Programme by the Ministry of Gender, Children, Disability and Social Welfare to cushion the poor and marginalized;
- The Public Works Programme (PWP) implemented by the Ministry of Local Government and Rural Development through the National Local Government Finance Committee (NLGFC) it provides regular payments to individuals in exchange for work, with the objective of decreasing chronic or shock-induced poverty and providing social protection.

- The School Feeding Program implemented by the Ministry of Education to improve child nutrition, increase children's ability to concentrate in class, promote enrolment and regular attendance'
- The Fertilizer Input Subsidy Programme (FISP) implemented by the Ministry of Agriculture to reduce poverty and ensure the country's food security by fostering an increase in agricultural productivity levels.
- The Cement and Malata Subsidy Programme that seeks to provide affordable access to building materials by the poor.
- The Increasing Access to Clean and Affordable Decentralized Energy Services (IACADES) Project under the Ministry of Energy with funding from UNDP and GEF among other sources.
- Community Energy, an energy company funded by the Scottish government aims to help support energy-inefficient countries and to implement new energy-based programs to provide electricity to rural areas, focusing on personal electricity and solar projects, as well as hydro and cooking stoves for communities in rural areas, with 104 rural communities benefitting so far from the installation of install personal renewable energy units. Twelve districts of Malawi have so far received direction and access to these units, and each will begin to produce and regulate their own energy, with Community Energy's support.

Given its cross-cutting nature which includes, inter alia, considerations of adaptive capacity and resilience at systems level while considering also the individual, institutional, and systemic factors, and its mainstreaming into governance and development planning structures, the NAP offers an appropriate umbrella under which national programmes for adaptation can be jointly framed, coordinated and implemented. The NAP will present an aggregate national adaptation plan that will link to appropriate local, subnational, national, and sectoral activities and action plans, maximise on efficiencies, minimise duplication of efforts, and leverage on cost constraints to programme implementation. The NAP process shall also add value to past and current activities by identifying capacity gaps, especially for the design and implementation of medium-term climate change adaptation priorities, as well as by accessing opportunities for international funding to develop more effective climate responsive planning and budgeting. The Malawi NAP coalesces all the discrete climate change adaptation plans and programmes that are or shall be implemented in the country. It comprises of collated, synthesised and analysed data of climate change trends and its impacts, aggregated from local level and downscaled from regional analyses, as well as related peculiar vulnerabilities at scale within and across regions and systems, and identifies gaps and capacity needs that should be addressed. This information will be used to identify and prioritise adaptation options, and to put in place plans to implement the proposed adaptation options, as well as how to finance them. Finally, a monitoring and evaluation framework is determined for the different programmes to track progress and to make adjustments where necessary. Periodic updates (every four years) shall be undertaken to ensure that the NAP is responsive to new and emerging needs and offers an effective mechanism for climate change adaptation at scale.

Coherence with national development context, SDGs, Sendai and other relevant frameworks

The Malawi Vision 2020 is anchored on six pillars, namely; Good governance and a capable state, Human resource development and a knowledge-based economy, Private sector-led development, Infrastructure development, Productive high value and market-oriented agriculture, and Regional and international integration. The vision noted that air pollution and climate change issues though then relatively small could become serious challenges if unchecked. The vision hence identified the strategic challenges to prevent air pollution and climate change issues as: monitoring emissions of

hydrocarbons nitrogen oxides and carbon monoxides; proper management of hazardous substances and wastes; use of ozone friendly technology; establishing regulations and enacting legislation on air pollution; and promoting education on climate change issues. The Malawi vision statement highlights Malawi as an ‘environmentally sustainable,’ ‘self-reliant with equal opportunities for and active participation by all,’ and ‘having social services, vibrant cultural and religious values and being a technologically driven middle- income country.’ This aligns with the vision of the NAP vision for Malawi of “a country with people, ecosystems and infrastructure that are resilient and have adaptive capacity to the impacts of climate change.”

The government of Malawi developed the National Climate Change Management Policy 2017-2027, to assist the country achieve its long term goal for climate change management, which is to reduce the socio-economic impacts of adverse effects of climatic change. The NCCM policy is in line with other national strategies and plans. For example, the Malawi Growth Development Strategy II 2011-2016 recognizes that climate change, environment and natural resources management as key priority areas that needs to be responded to using appropriate approaches because it contributes to lower land quality, heightens extreme weather conditions (e.g. recurrent droughts, heavy rain falls and floods) which sometimes lead to emergency relief efforts that divert much needed finances from development projects, and has significant adverse consequences for agriculture, food security, poverty and vulnerability. The process of developing the MGDS III 2017-2022 considered all the international commitments that Malawi made which include the SDGs, African Union Agenda 2063, SADC RISDP, and other regional treaties. The government advocated for alignment of the SDG to all sector and institutional programming. This guaranteed that all development intervention from the cooperating partners are well aligned towards the SDG timely tracking and reporting of all the agreed indicators. On the other hand, Malawi is also committed to implement the Sendai Framework for Disaster Risk Reduction 2015-2030 as it strives to achieve various SDGs since Malawi is suffering the impacts of disasters both from climate change as well another natural causes. The commitment goes beyond the 2030 agenda as it is clear that resilience building is paramount importance if the development gains being achieved in all the national efforts should be sustained. Malawi is therefore well placed to enact and mainstream a NAP to operationalize its approach to adaptation to climate change and to monitor progress towards desired outcomes.

Approach and Methodologies

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National Context

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Vision, Goals and Objectives of the NAP

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Climate Change Adaptation Assessment

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National Adaptation Priorities

XXXX XXXX

Implementation Strategy for the NAP

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Alignment with the GCF Country Programme

XXX

Mobilization of other Sources of Finance

XXX

Monitoring and evaluation of adaptation actions and process

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Reporting

XXX

Further development of the programme to support future NAPs

XXX

Annex I: NAP Outputs

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Annex 2: Country Profile

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Annex 3: Data and information system to support the NAP

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References
