

Protected Areas Resilient to Climate Change, PARCC West Africa



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Strategy and Policy Recommendations for the Best
Approaches to Plan and Manage Protected Areas for
Climate Change in The Gambia



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Kalemani Jo Mulongoy

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Tel: +44 1223 277314; Fax: +44 1223 277136
Email: protectedareas@unep-wcmc.org
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Glossary

AF	Adaptation Fund
BMISP	Biodiversity Management and Institutional Strengthening Project
BRTC	Biodiversity Research and Training Center
CBD	Convention on Biological Diversity
CBEMTA	Capacity Building Environmental Management Technical Assistance
CCA	Climate change adaptation
CFC	Community Forest Committee
DCD	Department of Community Development
DOP	Department of Planning
DPWM	Department of Parks and Wildlife Management
DWR	Department of Water Resources,
ECOWAS	Economic Community of West African Countries
EEC	Environmental Education and Communication
ESMP	Environmental and Social Management Plan
GBMIS	Gambia Biodiversity Management and Institutional Strengthening
GCCA-EU	Global Climate Change Alliance - European Union
GEAP	Gambia Environment Action Plan
GEF	Global Environment Facility
GRTS	Gambia Radio and television services
IBA	Important Bird and Biodiversity Areas
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LDCF	Least Developed Country Fund
MDG	Millennium Development Goal
METT	Management Effectiveness Tracking Tool
METT	Management Effectiveness Tracking Tool
MOBSE	Ministry of Basic and Secondary Education
MOECCWWF	Ministry of Environment, Climate Change, Water, Parks, Forestry and Wildlife
MOHERST	Ministry of Higher Education, Research, Science and Technology
NAP	National Adaptation Programme
NAPA	National Adaptation Programme of Action
NARI	National Agricultural Research Institute
NBSAP	National Biodiversity Strategy and Action Plan
NDMA	National Disaster Management Authority
NEA	National Environment Agency
NEMC	National Environmental Management Council
NEPAD	The New Partnership for Africa's Development
NGO	Non-governmental Organisation
NLO	National Liaison Officer

PA	Protected area
PAME	Protected Area Management Effectiveness (PAME)
PARCC	Protected Areas Resilient to Climate Change
POWPA	Programme of Work on Protected Areas of the Convention on Biological Diversity
PRCM	Partenariat Régional pour la Conservation de la zone Côtière et Marine en Afrique de l'Ouest
PRSP	Poverty Reduction Strategy Paper
RAMPAO	Réseau Régionale d'Aires Marines Protégées en Afrique de l'ouest
RAPPAM	Rapid Assessment and Prioritization of Protected Area Management
REDD	Reducing emissions from deforestation and forest degradation
SCCF	Special Climate Change Fund
TIPE	Training of Information Programme on the Environment
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP-WCMC	World Conservation Monitoring Center of the United Nation Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development.
UTG	University of The Gambia

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Executive Summary

The Gambia developed a protected area (PA) system to ensure conservation and sustainable use of its rich aquatic and terrestrial biodiversity for the benefit of current and future generations. To date, the system covers approximately 6.4% of the country's total surface area (0.16% of the terrestrial areas and inland waters and 7.4% of the marine and coastal areas). There are plans to increase by 2020 the PA coverage to at least 5 % of terrestrial areas and inland waters, and 15 % of coastal and marine areas. Protected areas in the Gambia are under a lot of pressure leading to the loss of biodiversity and associated ecosystem services. Climate change is considered as one of the most important drivers of biodiversity loss. The Gambia is exposed to rising sea levels and associated coastal erosion that affect Tanbi and Tanji PAs. Climate change is also affecting communities inside and at the periphery of PAs with observed changes in rainfall and temperature. For their survival and livelihoods, local communities exert harmful impacts on PAs through incursions to exploit the flora and fauna.

Although the establishment, expansion and restoration of PAs is among the adaptation measures considered by the Gambia in its National Adaptation Programme of Action (NAPA) on climate change (Government of The Gambia, 2007.), the full range of climate change impacts has not yet been taken into consideration in the PAs plans and programmes. Changes in temperature and precipitation as well as sea level rise may make PAs unsuitable for the species, habitats and ecosystem services that they are supposed to protect. Among the approaches adopted by the PARCC project for mitigating the impact of climate change, one can note the identification of species that are likely to be impacted by climate change, either through distribution modeling or trait-based analyses of vulnerability, the identification of areas resilient to climate change, and the identification of priority areas for conservation and where new PAs should ideally be situated. These analyses should be followed by recommendations of management actions, such as the establishment of new PAs, translocation of vulnerable species or more effective management of existing PAs.

In this context, the PARCC project:

- (a) Produced future climate projections for The Gambia and investigated consequences on ecosystem services;
- (b) Developed species distribution models for all species of birds, mammals and amphibians and for three future time periods (2010-2039, 2040-2069 and 2070-2099) ;

- (c) Assessed the vulnerability to climate change of all species of amphibians, mammals, birds, and freshwater fish found in The Gambia (and the rest of West Africa) and produced maps of their densities and percentages;
- (d) Identified areas of the territory naturally resilient to climate change, and the percentage of these areas already included in PAs; and
- (e) Established through a systematic conservation planning exercise, whether a wide range of conservation features (including amphibian, bird and mammal species and ecoregions) are sufficiently protected by the existing PA network of The Gambia.

All these project outputs are detailed in Section 2 of this report. In order to ensure an effective uptake and use of these outputs, strategies and policy recommendations for the best approaches to the planning and management of PAs in the face of climate change were developed for each of the five pilot countries (Chad, the Gambia, Mali, Sierra Leone and Togo) and a strategy for the whole West African region. Strategic elements and policy recommendations were thus articulated around common points for the five countries so as to facilitate their aggregation in a West African regional strategy.

The proposed elements of the adaptation strategy for The Gambia include three strategic goals, 12 objectives and 39 specific actions. The objectives and specific actions were identified taking into account ongoing, planned or completed actions in other strategies and programmes of each country. These elements were reviewed and validated during a consultation meeting held on 8 September 2015 in Banjul as a starting point for the development of a national strategy that would govern PAs planning and management in the face of climate change.

The vision of this strategy is the same as The Gambia's Vision 2020's long term objective for the environment, and the overall objective is to strengthen ongoing reactive and anticipative activities for the conservation of components of biodiversity and associated ecosystem services requiring protection and sustainable use, with a particular focus on climate change impact. The mission will address the following strategic areas: (i) ongoing conservation activities; (ii) the anticipation of climate change in

decision-making on PAs creation, expansion and connection; and (iii) the environment for a successful implementation of the strategy.

Strategic goal 1 is about strengthening ongoing conservation plans and programmes and their implementation so as to improve the performance of existing PAs, and about finalising the designation and/or regulation of areas identified as requiring protection. Without protection today, the biodiversity elements that are threatened or vulnerable will have little or no chance to survive the impact of climate change. Implementation of this strategic goal will require the following:

(a) Reviewing existing PAs and ensuring their sustainable and effective management so that they can achieve the objectives for which they were created, including by developing and implementing management plans in line with the National Plan of Action for the implementation of the Programme of Work on Protected Areas and its National Adaptation Plan;

(b) Accelerating and completing the designation and integration in the national PA system of areas identified as requiring protection such as Dankunku wetlands, Jakhaly rice-fields, Samba Sotor to Kaur wetlands and Prufu - Darsilami area. Inclusion of additional areas in the national PA system is under way as part of the project 'Gambia Protected Area Network and Community Livelihood Project';

(c) Updating the list of elements to be protected, taking into account the Sustainable Development Goals and the national strategy for poverty reduction, and conduct a gap analysis using the new list of conservation features.

Strategic goal 2 is about anticipating the impact of climate change and responding proactively to ongoing and future environmental changes, focusing on changes caused by climate change. This implies that knowledge about the observed and projected impact of climate change is increased in the Gambia, particularly at the local level, that areas naturally resilient to climate change and areas that are likely to include the future geographical distribution of species displaced by climate change are managed effectively, restored if needed, and connected.

Strategic goal 3 covers the creation or strengthening of the enabling environment for a successful implementation of the strategy, including the integration of elements of this strategy in much wider

existing strategies, plans and programmes such as the National Biodiversity Strategy and Action Plan, which is being updated, the National Adaptation Programme of Action (NAPA) on climate change as well as the National Adaptation Plan being developed under the United Nations Framework Convention on Climate Change, and the national Sustainable Development Goals that the country will soon develop following the adoption of the 2030 Agenda for Sustainable Development by the world leaders in September 2015. In addition, building on ongoing activities, including the training activities initiated within the PARCC project, the country will integrate the elements of strategic goals 1 and 2 above in its human, financial, institutional, legislative and technological capacity building programmes and in its communication, education, research and public awareness programmes. Considering the cross-cutting nature of climate change, coordination and cooperation within the country and in the region, especially across borders, will be strengthened. Synergies will be promoted among governments' organs dealing with PAs and climate change, and with relevant non-governmental organizations. The planning and management of the transboundary Niimi-Saloum complex will take into consideration the changes that are taking place or will occur in the future in the status of its different components. The planning and management of other potential transboundary PAs such as the Allahein River mouth areas and the Baobolon Wetland Reserve will be considered, having in mind the strategic elements described above.

1. Introduction

Although the Republic of The Gambia is small in size, its terrestrial, marine and other aquatic biodiversity is rich and of local, national, regional and global significance. This natural capital and the related ecosystem services are under a lot of pressure from bush burning, overgrazing, fuel wood extraction, poaching/illegal hunting, overharvesting, overfishing, illegal coastline sand mining and coastal erosion, destructive fishing practices, non-sustainable method of natural resource utilization, discharge of both solid and liquid wastes from domestic, agriculture and industrial sources. Land tenure rights and the demand for land outside traditional farming areas are also steadily leading to overharvesting of mangroves for agriculture. There is also evidence of significant pressure on species of global and regional concern such as nesting and migratory birds and marine turtles, the eggs of which are frequently collected; sharks harvested for their fins; and manatees hunted for meat.

It is increasingly recognized that climate change is exacerbating these pressures. Manifestation of the effects of climate change in the country includes rising sea level resulting in the loss of coastal habitat, sea water intrusion into estuarine and inland waters negatively impacting living organisms, erratic weather patterns and gradual fluctuation in hydrological patterns leading to reduced crop yield, pest and disease infestation and deteriorating soil quality. Climate change can compromise PA effectiveness not only by exacerbating other pressures on biodiversity and associated ecosystem services, but also by reducing the relevance of PAs when species they are supposed to protect have migrated in search of more favorable climatic conditions, or when PAs segments become so degraded that they lose the functions for which they were created.

In this document, after a brief description of (i) the situation of the PA system in The Gambia and the plans for its management and development, and (ii) climate change impact and national plans to adapt to climatic perturbations, the achievements of the PARCC project are reviewed before describing the strategic goals, specific objectives, actions and actors for PA planning and management approaches that take into account climate change. The strategic elements and policy recommendations for the best approached to plan and manage PAs in the face of climate change were developed through consultations (see Annex 4 for the terms of reference of the consultancy, Annex 5 on the consultancy process and Annex 6 listing the people consulted/contacted). The final sections of the document are devoted to ways and means to implement the strategy.

Existing protected areas

The country developed a protected area system to ensure conservation and sustainable use of its rich aquatic and terrestrial biodiversity ‘for the benefit of current and future generations’ (Department of Parks & Wildlife Management, 2014). According to The Gambia’s National Biodiversity Strategy and Action Plan (NBSAP) (2015), there are 22 wildlife protected areas in The Gambia, which occupy a total area of 76,064 hectares, covering approximately 6.4% of the country. However, up-to-date data has not yet been provided to the World Database on Protected Areas (WDPA), on the basis of which the systematic conservation planning system was established (see section 2 below). Only 0.16% of the terrestrial and inland water is protected while 7.4% of the marine and coastal areas are under formal protection, with the goal to increase terrestrial and inland water to at least 5% and coastal and marine areas to 10% by 2020. It is important to note that the country’s coastal and marine environment is defined as not only those areas along the Atlantic Ocean, but also those areas with brackish water along the River Gambia, extending 200 km inland (Department of Parks & Wildlife Management, 2014). Eight of the protected areas are reserves and national parks, while the other 14 PAs are community-based conservation areas under the mandate of the Department of Parks and Wildlife Management (DPWM). Three of the Gambia’s protected areas are recognized as Wetlands of International importance under the Ramsar convention: Tanbi Wetland National Park, Niumi National Park and Bao Bolong Wetland Reserve. Six are recognised by the Birdlife International Partnership as Important Bird Areas: Tanji, Tanbi, Abuko, Niumi, Bao Bolong and Kiang West. Gambia has 13 Important Bird and Biodiversity Areas (IBAs), 6 of which have no protection and 7 having partial protection (CBD Secretariat, personal communication).

The PA system is representative of the major habitats and ecosystems found in the country. Habitat types within the protected area network include mangrove ecosystems, tidal zones, as well as guinea savannah and dry deciduous woodlands that serve as nesting and feeding habitats for endangered and threatened species. Habitats also house several rare and endangered species of global importance.

The Gambia is committed to implementing the Programme of Work on Protected Areas of the Convention on Biological Diversity (POWPA). The involvement of relevant stakeholders, including local communities, regional governments and municipalities, the media, NGOs and central government actors

is among the country's priorities. In this view, The Gambia established a network of stakeholders referred to as 'GamPAN' for the implementation of the POWPA and has been establishing Indigenous Community Conserved Areas.

Current plans to design and establish new protected areas and their management plans

In the Action Plan for Implementing the POWPA, one objective is "to ensure that by 2020, 15% of the country's landscape and/or waterscape is transformed into a well-managed and efficient protected areas system that ensures biodiversity conservation, economic development, sustainable use and benefit sharing of returns derived from biodiversity resources used therein for the welfare of the people". The new biodiversity targets derived from the Aichi Biodiversity Targets, described in the 2014 Fifth National Report to the Convention on Biological Diversity, provide among other targets that by 2020 (i) at least 5% of terrestrial and inland water, and 15% of coastal and marine areas are conserved through systems of protected areas, (ii) all vulnerable ecosystems impacted by climate change are reduced by at least 20%, and (iii) 35% of known threatened and rare species has been prevented from extinction and 50% extinct species reintroduced or restocked.

The target for terrestrial and inland water PA coverage has already been met, but this target is far below the Aichi Target calling for 17% coverage of terrestrial and inland water areas. In this view, of the 66 forest reserves managed by the Department of Forestry, the 34 reserves which were designated as protected forests but not categorized as protected areas could be considered for inclusion in the national PA system, as well as several local community-managed forests, which are under some conservation management, but not included in the country's PA system. The country initiated a project titled "Gambia Protected Area Network and Community Livelihood Project" to consider the inclusion in the national PA system of additional areas managed by local communities. Regarding marine and coastal areas, new coastal and marine protected areas need to be established to meet the 10% coverage target.

In the Gambia, PAs mainly fall under categories II (National Park) and IV (Habitat/Species Management Area) of the IUCN management categories. Consideration of other PA management categories, in particular category V (protected area where the interaction of people and nature over time has produced an area of distinct character with significant, ecological, biological, cultural and scenic value, and where safeguarding the integrity of this interaction is vital to protecting and sustaining the

area and its associated nature conservation and other values) and category VI (Protected area with sustainable use of natural resources) could enable the designation of many areas as protected.

In an assessment of its achievements towards POWPA submitted to the CBD Secretariat in 2012, the Government of the Gambia noted that (i) activities to incorporate climate change aspects into PAs, (ii) improvement of site-based protected area planning and management (Goal 1.4), and (iii) establishment of marine protected areas were almost completed.

In concluding that assessment, the country decided on the following priorities for the period between 2010 and 2018:

- (a) Biodiversity restoration and climate change resilience (Goal 1.5)
- (b) PA governance and participation (Goal 2.1 & 2.2)
- (c) PA network and integration (Goal 1.1, 1.2 & 1.3)
- (d) Capacity building and public awareness (Goal 3.3 & 3.5), and
- (e) Community livelihood and benefit sharing (Goal 2.1)

These priorities are all relevant to this PA adaptation strategy. They include the following activities to be considered among the strategic actions: (i) ecological gap assessment and analysis, (ii) designation of at least two more national parks, biosphere reserves and corridors, (iii) negotiation for the designation of a park for peace, (iv) expansion of PAs where necessary, (v) management improvement through facilitated ESMP, Environmental Impact Assessment, Strategic Environmental Assessment, Management Effectiveness Tracking Tool (METT), and Rapid Assessment and Prioritization of Protected Area Management (RAPPAM), among others, purchase and provision of signposts, billboards, interpretation posts, vehicles and office equipment, and (vi) capacity building, including capacity need assessment, establishment of a Biodiversity Research and Training Center (BRTC), development of training modules and facilitation of courses, public awareness raising, establishment of an Advisory Committee for BRTC, and mobilization of funds for strengthening PA operation. These actions have already been budgeted.

Current and projected impact of climate change on biodiversity in the Gambia

Although relatively little research had been done in The Gambia on the impacts of climate change on biodiversity or PAs until the PARCC project (of which the results are presented in the next section), climate was already considered as one of the main natural hazard threatening the lives and livelihoods of the majority of Gambians (NAPA, 2007 and NAP process, 2015).

In terms of general ecological principles, major climate change phenomena relevant to The Gambia include increases in temperatures, sea level rise, change in rainfall patterns, and frequency of extreme events. Sea level rise and floodings, as well as salinization of fresh waters are also important along the river. Oceans also face the threat of acidification, which can weaken the shells of certain marine organisms, such as mollusks and crustaceans, and can cause coral bleaching. Based on observations, climate hazards in The Gambia include torrential rainfall, storms, drought, cold spells, intra-seasonal-drought, heat waves, and unseasonal rains. Key concerns include coastal erosion, the loss of mangroves associated with impairment of ecosystem services, and increasing food prices (particularly of fish products). Climate change is also projected to cause shifts in geographic ranges of marine organisms, affecting the distribution of marine biodiversity.

Regarding the impact of climate change on protected areas: (i) the Gambia is exposed to rising sea levels that are expected to reach 2 m in height by 2100, affecting the Tanbi and Tanji protected areas; and (ii) local communities observed a reduction in rainfall and in the number of rainy days, prolonged droughts, and violent winds just before rain, resulting in ecosystem changes and degradation around and within PAs.

Climate change is also affecting communities inside and at the periphery of PAs. For their survival and livelihoods, local communities exert harmful impacts on PAs by exploiting the flora and fauna (through poaching, illegal fishing, exploitation of timber and non-timber forest products, and the dumping of solid wastes) within protected areas that are already impacted by industrial pollution and uncontrolled urbanisation pressures that will likely be exacerbated by climate change.

National strategy for climate change mitigation and adaptation

Adaptation options and activities have been described in the NAPA and the Second National Communication to UNFCCC against the background of projected climate change for agriculture, fisheries, energy, water resources, forests and woodlands, sensitive coastal environments, and health. For PAs, the Gambia selected the following adaptation strategies to attenuate adverse climate change impacts on forest cover, its functioning and the forestry sector: (i) the establishment and expansion of community natural forests, plantations, national parks and protected areas, (ii) the restoration of forest ecosystem health and biodiversity, (iii) the expansion and intensification of agro-forestry and re-forestation activities, and (iv) the mainstreaming of climate change in forest policies and plans. Identified adaptation measures to protect the coastal zone and associated wetland ecosystems include the establishment and rehabilitation of protected wetlands in order to improve coastal zone management and protect physical infrastructure, as well as economic and ecological assets located within the territorial marine and coastal zone.

2. Overview of PARCC Project Findings of Relevance to The Gambia

Changes in temperature and precipitation as well as sea level rise may make some PAs unsuitable for the species that they currently protect. Mitigating the impact of climate change on PA networks is thus becoming a priority. Among the first steps adopted for mitigating the impact of climate change, one can note the identification of species that are likely to be impacted by climate change, either through distribution modeling or trait-based analyses. This should be followed by recommendation of management actions, such as establishing new PAs, translocating vulnerable populations or managing existing PAs to increase the population viability of target species.

In this context, the PARCC project achieved a number of goals for the West African region including (i) collating climate data and producing future regional climate scenarios; (ii) modelling future distribution ranges of bird, mammal, and amphibian species, (iii) updating the IUCN Red List of Threatened Species and assessing species' vulnerability to climate change based on their biological traits, (iv) identifying areas resilient to climate change, and (v) bringing the results together for systematic conservation planning to identify priority areas for conservation and assess the suitability of the existing PA network.

Projections of climate change

The PARCC project produced climate projections for the West Africa region, by applying five spatially detailed regional climate models developed for the project (Jones et al. 2012) and three scenarios of future land use change to assess the projected climate impacts on ecosystem services (Hartley et al. 2015a). These climate studies were summarized for each project countries including The Gambia (Hartley et al. 2015b).

In The Gambia, the results of the climate projections confirm the findings of previous studies (presented in the previous section). It is projected with high confidence that mean annual temperatures will increase (by an estimated 3-4.5°C according to regional climate projections) by the end of the 21st century (Janes et al. 2015). The highest temperature increases are expected to occur furthest inland in the eastern region, which is less influenced by the regulating influence of the ocean. There is low confidence in projections of a decrease in precipitations (-40% to nearly -60% according to regional

climate projections). It should also be noted that being a small country, The Gambia is captured only by a small number of grid points within the regional projections, these statistics should therefore be interpreted with a lot of caution.

In terms of climate change impacts on ecosystem services, it is projected that the fraction of bare soil fraction might increasingly replace grass cover in The Gambia, and that vegetation productivity might be slightly reduced (Hartley *et al.* 2015a). Although there is limited confidence in these projections, which are related to western Sahelian precipitations, planning should take into account the possibility that precipitation might decrease in the far future.

Species distribution models

The static and fixed-boundary nature of current PAs compromises their effectiveness in the face of species range shifts caused by changing climatic conditions. The PARCC project used models that link species' distributions to biologically important climatic variables that are likely to define species' distributions in order to project faunal (birds, mammals and amphibians) distributions and representation across PA networks in West Africa. The project found that by the end of the 21st century, 91% of amphibian, 40% of bird, and 50% of mammal species are projected to have reduced climate suitability across the West African PA network, and that individual PAs were likely to both lose and gain species as a result of species distribution shifts (Baker and Willis 2015), with species turnover within PAs expected to reach 45.7% for amphibians, 32.4% for birds and 34.9% for mammals by the end of the century.

In The Gambia, important losses of mammals are expected across many of the country' protected areas, with losses projected to exceed 25 mammal species at some sites (Durham University 2016). Similarly, the number of bird species is projected to be substantially reduced in protected areas by 2040-2069, often by in excess of 30 species at many sites, and only at a few coastal sites is bird species richness not expected to be reduced. Finally, projected changes in future amphibian richness are relatively small.

Climate Change Vulnerability Assessment Based on Biological Traits

A climate change vulnerability assessment of West African species was carried out, which considered the combination of exposure (extent to which a species' physical environment will change due to climate change), sensitivity (lack of potential for a species to persist *in-situ*) and low adaptability (species' inability to avoid the negative impacts of climate change through dispersal and/or micro-evolutionary change). The assessment included all the terrestrial and freshwater vertebrates of West Africa (183 amphibians, 1,172 birds, 517 freshwater fish, 405 mammals and 307 reptiles). Species that were found both sensitive and poorly able to adapt to climate change, and that were among the most severely exposed to climatic changes were described as 'climate change vulnerable' (Carr et al. 2014). This methodology does not provide a definitive indication of vulnerability, but a relative measure that may be compared between species within a group. The results of this study should help prioritize among species and locations to ensure the most efficient and effective use of resources when securing species survival in the face of climate change.

The project recommended that when planning for future conservation and determining geographic priorities, planners could focus more on locations that contain comparatively high numbers of climate change vulnerable and/or threatened species. This strategy could have the greatest positive impact per unit effort, and should address the conservation of the greatest number of species. However, areas with relatively low species richness and low numbers of vulnerable species should not be neglected.

Regarding The Gambia, the assessment showed that the country has one of the highest bird density after the Guinean forests (Carr et al. 2014). It is also a hotspot for threatened bird species, with again some of the highest densities recorded in West Africa.

Areas Resilient to Climate Change

The PARCC project identified areas in West Africa where climate change impacts might be relatively low due to particular physical factors influencing climate at the fine-scale, including precipitation patterns.

In The Gambia, the project found that only 3.6% of the territory can be considered as naturally resilient to climate change, this low value being probably due to the fact that the country has a very low elevation range. Only 12.0 % of this area is already included in PAs (Smith 2013b). The identification of these areas of resilience was based on the fact that physical factors of some areas (e.g., slopes facing away from the Equator and important elevation gradients) can provide considerably lower mean temperatures and lower precipitations. For instance, land on steep slopes allows species to disperse to higher ground in response to climate change. Therefore, these areas could act as small refugia, which could be colonized by species from neighboring areas if temperatures increase.

Systematic Conservation Planning

Systematic conservation planning is the most widely used approach for designing PA networks. Based on a list of important conservation features (such as species, habitats and ecological processes), their distributions was mapped and targets were set for how much of each conservation feature should be protected. A gap analysis was then carried out to measure the extent to which the existing PA system met these targets, and priority areas for conservation were identified.

In The Gambia, 4% of the territory is included in PAs and 2% is included in currently unprotected Important Bird and Biodiversity Areas (IBAs) according to the data included in the World Database on Protected Areas (IUCN and UNEP-WCMC 2015). The conservation features considered included all ecoregions and vegetation types, and the present and future projected distribution of all amphibian, bird and mammal species found in The Gambia. The gap analysis showed that the existing national PA system meets targets for only 1.1% of conservation features. It is indeed failing to meet targets for almost all species considered, especially mammal species for which none of the targets are met, and 18.2% of threatened species are currently unprotected. The current national PA network also fails to sufficiently conserve any ecoregion and a number of vegetation types. Priority areas for protection were identified throughout the country, in some cases around existing PAs. Therefore, given the very important gaps identified, it is recommended that The Gambia expands its national PA system, which would need to cover 23.3% of the territory in order to achieve all conservation targets.

Other results and achievements of the PARCC project

(a) Connectivity analysis of the West African PA network: This study presents an approach to ensure and improve connectivity between PAs for species with different dispersal abilities. This approach highlighted the importance of specific PAs such as the Niimi National Park to maintain the connectivity of the regional network (Arnell *et al.*, 2014);

(b) Transboundary pilot site activities to enhance protected area resilience: The PARCC project selected, in agreement with countries' representatives, five pilot transboundary sites where activities were conducted to enhance PA resilience to climate change. These sites included Niimi National Park in The Gambia, with 'Delta du Saloum' National Park in Senegal (Carr 2015),

(c) Protected area management and financing options for climate change adaptation and monitoring: The PARCC project reviewed a range of options for managing PAs in order to ensure their adaptation to climate change. Several adaptation measures were identified, some of which are currently used in West Africa. It was also noted that there are several financing mechanisms for PAs, among which only a small number is used in West Africa (Smith 2013a).

(d) Updated Management Effectiveness Tracking Tool (METT): Existing tools for PAs management effectiveness assessment focus mainly on sites without considering the effects of climate change. The PARCC project integrated climate change factors in the original PA Management Effectiveness (PAME) approaches developed by the IUCN World Commission on Protected Areas, and incorporated two new indicators related to climate change to the Management Effectiveness Tracking Tool (METT) (Belle *et al.*, 2012).

(e) National and regional capacity building for managing protected areas in the face of climate change: The PARCC project organized several training workshops that helped improve the participants' knowledge and skills in the field of PAs and climate change in West Africa and more specifically in the five project countries (UNEP-WCMC, 2015).

3. Proposed Elements for a Strategy for the Best Approaches to Plan and Manage Protected Areas in the Face of Climate Change in The Gambia

Vision

The vision of this strategy is the same as The Gambia's Vision 2020's long-term objective for environment and the vision of the updated National Biodiversity Strategy and Action Plan (NBSAP), which is 'primarily to conserve and promote the rational use of the nation's natural resources and environment for the benefit of present and future generations in a manner that is consistent with the overall goal of sustainable development'. Part of this vision is to ensure that by 2020, 15% of the country's landscape and/or waterscape is included into a well-managed and efficient protected areas system that ensures biodiversity conservation, economic development, sustainable use and benefit sharing of returns derived from biodiversity resources used therein for the welfare of the people (Government of The Gambia, 2012a).

Mission

The aim of the strategy is to strengthen ongoing reactive and anticipative activities for the conservation of components of biodiversity and associated ecosystem services that require protection and sustainable use. These components are particularly important for the sustainable development of The Gambia. However, some of these components are threatened by various natural and anthropogenic pressures, including climate change.

The aim of this strategy falls within the framework of the National Vision 2020's mission statement, which is 'to transform the Gambia into a financial centre, a tourist paradise, a trading, export-oriented agricultural and manufacturing nation, thriving on free market policies and a vibrant private sector, sustained by a well-educated, trained, skilled, healthy, self-reliant and enterprising population and guaranteeing a well-balanced ecosystem and a decent standard of living for one and all under a system of government based on the consent of the citizenry' (Vision 2020 Foreword).

Strategic Goal 1: Strengthen ongoing conservation plans and programs and their implementation by improving the performance of existing protected areas (PAs) and by finalising the designation or regulation of areas identified as requiring protection.

Objective 1.1: Assess existing PAs and ensure their sustainable and effective management so as to improve the achievement of the conservation objectives for which they were created.

Although small in size, The Gambia harbors a wealth of terrestrial, coastal, marine and wetland habitats and species of local, national, regional and global significance. The coastal and marine environment is one of the areas identified as being of particular importance in the National Biodiversity Strategy and Action Plan (NBSAP) and in the Gambia Environment Action Plan (GEAP). Biodiversity is under a lot of pressure from ecosystem degradation, fragmentation for infrastructural development, and coastal sand mining; overexploitation of natural resources, including in particular fuelwood, overhunting, overgrazing, destructive fishing and overfishing; bush burning and pollution from liquid and solid wastes. All these pressures are being compounded by climate change.

Currently there are 22 PAs in The Gambia, occupying a total area of 76,064 hectares, approximately 6.4% of the Gambia's total surface area (see Section 1.2 above). In addition there are also a number of forest reserves managed by the Department of Forestry together with local communities (Department of Parks & Wildlife Management, 2014), but these are not considered to be part of the country's PA network. According to the Plan of Action for the implementation of the Programme of Work on Protected areas (POWPA) submitted in 2012, PA resources are also under pressure from the three most persistent pressures: logging, infrastructure developments and land conversion. Protected areas in The Gambia continue to face other problems such as land cover degradation, coastal erosion and biodiversity loss. Climate change induced sea expansion with its associated coastal erosion is seriously affecting the Niimi National Park and Tanji Bird Reserve. The rate of erosion is unprecedented and delays in dealing with it may lead to the disappearance of the Jinack Island (Department of Parks & Wildlife Management, 2014).

The protection of biodiversity and related services takes effect only when PAs are effectively managed. However, in The Gambia many PAs are not efficiently managed, essentially due to limited human and financial resources, and inappropriate and conflicting land use policies. This is the case even though The Gambia reported to have almost completed several activities from the POWPA that are relevant to the effective management of PAs, including activities relating to: Goal 1.1 (establishment and strengthening of national and regional systems of protected areas), Goal 1.4 (improvement of site-based

protected area planning and management), Goal 2.1 (assessment and implementation of diverse protected area governance types), Goal 3.5 (strengthening of communication, education and public awareness), and Goal 4.4 (ensuring that scientific knowledge contributes to the establishment and effectiveness of protected areas and protected area systems) and the establishment of marine protected areas.

The country therefore needs to (i) continue implementing these goals as well as Goal 1.5 ('prevent and mitigate the negative impacts of key threats on protected areas' including in particular climate change and related threats) of the POWPA for improving PAs management; (ii) develop management plans for PAs that do not have any yet; (iii) strengthen the activities of reintroduction in PAs of locally extinct species (such as leopard, antelope and cheetah) or species in the process of being extinct. The improved management of existing PAs will give these areas a better chance of resisting the impacts of climate change now and in the future.

Objective 1.2: Accelerate and complete the designation and integration of areas identified as requiring protection in the national PA system

By 2020, the country plans to have 15% of its territory under a well-managed and efficient PA system that will ensure biodiversity conservation, economic development, sustainable use and benefit sharing of returns derived from biodiversity resources for the welfare of the people. According to the biodiversity targets set in the updated NBSAP (still under preparation), the country intends to conserve, as part of its PAs system, at least 5% of terrestrial and inland water, 15 % of coastal and marine areas by 2020 (target 11), prevent 35% of known threatened and rare species from extinction and reintroduce or restock 50% of extinct species by 2020.

The Government of The Gambia therefore has plans to expand its marine and coastal PAs. Unprotected IBAs (such as Dankunku wetlands, Jakhaly rice-fields, Samba Sotor to Kaur wetlands and Prufu - Darsilami area) and the forest parks managed by the Department of Forestry (not considered as PAs) could be candidates for a rapid inclusion as protected areas. Their rapid classification/designation as PAs is justified considering the pressures and threats from many drivers, including climate change. The country initiated a project titled 'Gambia Protected Area Network and Community Livelihood Project' to consider the inclusion of additional areas in the national PA system.

Objective 1.3: Identify biodiversity components and related ecosystem services important for The Gambia and adopt measures for their protection as needed, bearing in mind the Sustainable Development Goals and the new perspectives in the conservation of biological diversity, adaptation to climate change and land degradation issues.

In The Gambia, biodiversity resources, including the country's landscape and waterscape are important for the welfare of the people. As such they have to be used sustainably and be protected or restored where they are being lost. Due to limited resources, protection and restoration activities have to be prioritized, bearing in mind that all components of biodiversity require protection and sustainable use, in line with the ecosystem approach.

For that reason, there is a need to inventory, map and monitor genetic resources, species, habitats, ecosystems and related ecosystem services so as to identify those components that are of direct importance to sustainable development and poverty eradication. If among these, components are significantly threatened by the complex pressures from natural sources (e.g. natural disasters) or human made sources, including climate change, there will be a need to focus conservation measures on these components. Similarly, components that provide resilience to human communities and ecosystems today, or are likely to do so in the future, could also be considered among the priority conservation features. Monitoring the status of these 'priority' components will help ensure that adaptive measures are in place. Identification of biodiversity components requiring conservation is a process that needs to be regularly updated to take into account the status and trends of biodiversity.

Through the implementation of its Environmental Action Plan and the National Biodiversity Strategy and Action Plan, The Gambia intends to achieve by 2020 the following targets:

- (a) At least 5% of terrestrial and inland water, and 10% of coastal and marine areas are conserved through systems of protected areas (NBSAP Target 11);
- (b) 50% of areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity(NBSAP Target 7);
- (c) 60% of areas that are suitable for spawning and nursery are protected, while the use of wrong gears reduced by 40% (NBSAP Target 6);

(d) 35% of known threatened and rare species have been prevented from extinction and 50% extinct species reintroduced or restocked (NBSAP Target 12); and

(e) Ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 50 per cent of degraded ecosystems (NBSAP Target 15).

Objective 1.4: Conduct a gap analysis using an updated list of conservation features, i.e., components of biodiversity that should be protected, and prioritize them bearing in mind the threats posed to them and their ecological/biological and socioeconomic importance in the country.

The PARCC project provided training at multiple institutional levels to carry out systematic conservation planning and identify priority areas for conservation. The experts should use the methodology to repeat the gap analysis using an updated list (from Objective 1.3 above). They will endeavor to consider more than the 3 groups of vertebrates considered in the project, and include invertebrates and plants as well as ecosystem services.

Strategic Goal 2: Anticipate and respond to ongoing and future environmental changes, focusing on changes caused by climate change

Recently climate change impacts have been identified as one of the most important drivers of biodiversity loss. Observations and projections of climate change impacts indicate range shifts for many plant and animal species, with some species undergoing an additional decline in their abundance and/or contractions in their ranges (Niang *et al.*, 2014). Furthermore, the size of many habitats and ecosystems will be shrinking while their functioning will be degrading. Decision-makers will have to anticipate these changes and take measures that take into account the likely future status of species and ecosystems. One of their priorities will be to protect components of biodiversity currently requiring protection, as without this protection, species that are currently threatened, endangered or rare will have little or no chance of adapting to the increasing impacts of climate change and other pressures.

Objective 2.1: Increase knowledge on observed and projected impacts of climate change on biodiversity and associated ecosystem services in The Gambia.

The 5th IPCC Report presented an overview of the observed and projected impacts of climate change (temperature, precipitation and sea level rise) on biodiversity in Africa with concrete references

to West Africa. Additional observational data for The Gambia is reported in the Second National Communication to the UNFCCC (Government of The Gambia, 2012b) and a Technical Report of the PARCC project (Hartley *et al.*, 2015). These data needs to continue to be refined with more observations, particularly at the land or seascape and site levels. In general, climate change has been shown to alter the biological / seasonal calendars (e.g., arrivals of migratory species, the length of the plant growth period and the period of availability of food for animals such as insects and fruits) (Niang *et al.*, 2014).

Changes in rainfall patterns and amounts, mean temperatures, and sea level increase the frequency and intensity of extreme events such as storms, floods, drought and fires. The Gambia's forest cover is expected to fit less into a tropical dry forest categorization and more into dry forest and tropical very dry forest categories (Government of The Gambia, 2012b). Biomass production of warm-season grasses, warm-season forbs and shrubs is expected to decline, with changes in soil organic matter and nutrient cycling. Furthermore, sea level rise could reach 1 meter by 2100 and thus flood the nearby protected areas of Tanbi and Tanji, while shrinking the coastal ecosystem (Camara 2012 and Department of Parks & Wildlife Management, 2014). These changes will be accompanied with changes in species composition and distribution. Climate change will also interact with non-climatic pressures and increase the vulnerability of ecosystems. The PARCC project reported on range shifts of several species found within The Gambia's protected areas (Baker and Willis, 2014) and on the increased vulnerability of many species (Carr *et al.*, 2014).

For policy and decision-makers, it is useful to accompany these data with socioeconomic data. This information will help in the integration of climate change adaptation measures in PA planning, design, establishment and management in accordance with objective 1.4.5 of the work program on protected areas of the Convention on Biological Diversity.

Objective 2.2: Identify and appropriately manage climate refugia and areas that are resilient to climate change and areas that will include the future geographical distribution of species displaced by climate change

In the face of climate change, decision makers will need to investigate and anticipate where species could potentially move to and start protecting some of those areas in advance, such that those areas (including climate refugia) not destroyed or lost before the species move there.

The PARCC project has been able to document (i) the list of mammal, bird, reptile, amphibian, and freshwater fish species considered vulnerable to climate change based on their biological traits, (ii) species expected to lose or gain in climate suitability for each protected area, and the expected species turnover for mammals, birds and amphibians, and (iii) the presence of areas that could be naturally resilient to climate change. This data can be used to develop plans and programmes that anticipate some of the expected impacts of climate change in the country, as a complement to the strengthening of ongoing measures related to the establishment and effective management of PAs.

Possible anticipative measures include conducting a gap analysis to identify whether existing PAs are suitable to protect future distribution of species, and if necessary, the design and establishment of relatively large protected areas that would include areas of present and future distribution of species. These large PAs will thereby foster the ability of species to move across protected landscapes to ensure their persistence in the face of climate change, as well as that of the ecosystems services provided. The establishment of large PAs can be done only after consideration of other land-use and development plans, and in consultation and agreement with local communities and other groups of stakeholders. Specific measures can be taken to protect species that would otherwise become more vulnerable with the increased impact of climate change, for example by facilitating their migration or translocation into climate refugia.

Objective 2.3: Bearing in mind the possible shifts in species ranges, develop, re-evaluate, restore and/or maintain ecological corridors and stepping stones between protected areas, taking into account climate change impacts

Due to the unsustainable use of lands and natural resources, some PAs have become fragmented and their conservation function is being lost. The additional impact of climate change will further reduce the effectiveness of these PAs and the PA system in general, leaving some species without appropriate protection. Thus, in addition to establishing large PAs, one should develop biological corridors and stepping-stones by applying the ecosystem approach to connect fragmented and other small protected areas, including Important Bird Areas (Department of Parks & Wildlife Management, 2014). In doing so, the country would contribute to achieving Aichi Biodiversity Target 11, which states that protected areas should be connected to each other and be well integrated into the wider landscape and seascape. These “corridors create permeability in the landscape allowing the movement of plants and animals, gene flow between populations of species. This is especially critical for

species with low intrinsic dispersion capacity.” The corridors can be classified as PAs in order to ensure their effectiveness in time and should be designed bearing in mind the ecological and biological changes that are expected to take place in the face of climate change. The location of the corridors should be decided on the basis of scientific data but also in consultation with local communities and other stakeholders present in the area who will participate directly or indirectly in the management of these corridors.

Objective 2.4: Identify options for areas that are likely to include the future geographical distribution of species displaced by climate change

As noted in section 2.5. above, the PARCC project conservation planning system identified areas that could be included in the national PA system to make sure that all the conservation features are protected now, also bearing in mind the species range shifts that could occur in the future due to climate change. The analysis was designed to avoid areas of high human population density and identify priority areas that are large enough and/or extend existing PAs to maintain ecologically viable populations (Smith 2015). The first step in taking measures in front of these results is to confirm with local experts that each priority area is really important for the conservation features for which it was selected and to check whether that the designation of the selected areas is in harmony with other social and development activities.

Strategic Goal 3: Strengthen the enabling environment for the successful implementation of the strategy

The success of a strategy depends largely on the factors that promote its implementation. These factors include mainly the integration of the strategy into strategies, objectives, plans or programs which are at the top level in the country's politics, such as the objectives for sustainable development, poverty reduction strategies, the National Biodiversity Strategy and Action Plan (NBSAP), and the National Adaptation Programme of Action (NAPA) on climate change and the climate change National Adaptation Plan (NAP). Other factors include available capacities (human, financial, technological and institutional), awareness and engagement of stakeholders, availability and access to relevant data and information, and existence of monitoring mechanisms.

Strategic goals 1 and 2 above and the associated actions listed in Table 1 below present the objectives that would ensure the best approaches to the planning and management of PAs in the face of climate change in The Gambia at the research, technical, planning and management levels, and at the landscape, PA site and policy levels. Strategic goal 3 focuses on strengthening The Gambia's capacity to ensure the successful implementation of actions under this strategy.

Unavailability of sufficient financial resources, limited human, technological and institutional capacities, limited participation, cooperation, commitment and coordination of all stakeholder groups, and weak enforcement of laws relating to conservation of biodiversity in the country have been highlighted as constraints to the achievement of Sustainable Development Goals in various policy documents, including The Gambia Environment Action Plan (GEAP), the NAPA, the NAP, the NBSAP, the MDG report and the Poverty Reduction Strategy Paper (PRSP) documents. Resource mobilization is considered as one of the key priorities. Participatory action with associated monitoring mechanisms, access to information, awareness about the biodiversity and its drivers, and equitable sharing of benefits and costs of measures taken will generate commitment, particularly of local communities; and capacity development supported by research will enhance stakeholder participation.

It should be noted that the country has many ongoing initiatives building an environment that is favorable to the implementation of this strategy, particularly articulated around the Department of Parks and Wildlife Management (DPWM). The DPWM is the government agency responsible for ensuring the management of the country's PA network, as well as the conservation of its biodiversity both within and outside this network, in close collaboration with other government agencies, NGOs and civil society partners. There is a strong national commitment to protecting the country's natural resources, while addressing climate change, improving participation of local communities (with the establishment of Site Management Committees in all the PAs, formation of Community Forest Committees (CFCs) and community owned PAs), favorable to the designation of new PAs and improved management of PAs in general, and increasing diversified governance that can attract funds from the private sector. A Biodiversity Trust Fund has already been established with proceeds of US\$40,000 as seed money for PA financing sustainability options. Through the PARCC project and the NAPA process, West African countries, including The Gambia, have gained experience, respectively in the conceptualization and planning of the establishment of PAs resilient to climate change, and in the comprehensive planning process for adaptation to climate change.

Objective 3.1: Integrate this strategy on protected area system resilient to climate change in broader national strategies and plans

Integration of this strategy into much wider national strategies, goals, plans and programmes that already benefit from the resources approved by the Government and that have been established as priorities is essential if the strategy is to be successfully implemented. Its potential to contribute to the sustenance of livelihoods, sustainable water management, disaster risk reduction, and natural resource conservation needs to be highlighted, as does its role to fill a gap in national strategies for sustainable development in the NBSAP, the NAPA and the NAP.

Integration is best done at the conceptual stage of projects and during complex development interventions so that the strategy can be taken into account in national budgets, as needed, and given opportunities for funding from multiple sources.

Objective 3.2: Strengthen human, financial, institutional, legislative and technological capacities

The need for capacity building has already been noted in several national strategic and policy documents. A number of initiatives (e.g., the UNDP and GEF supported National Self-Assessment Capacity Study and the Capacity Building Environmental Management Technical Assistance (CBEMTA) project reported on in GEAP II) have been planned, or are under way, to identify capacity needs and fill the gaps. Capacity building needs identified in this strategy will build on ongoing activities to improve effectiveness and efficiency.

Human capacity needs strengthening at all levels of the society, including local communities, the private sector and government institutions, in particular DPWM's capacity to leverage both human and financial resources. In 2004, the country completed its National Capacity Self-Assessment (National Environment Agency, 2004). The Gambia Biodiversity Management and Institutional Strengthening Project (BMISP) was established in 2010, among other objectives, to strengthen DPWM's ability to fulfil its mandate for biodiversity conservation and PA management, by assisting the Government in implementing the key restructuring and capacity building recommendations of the DPWM Institutional Assessment (2007).

Regarding the financial aspects, implementation of this strategy requires mobilization and timely availability of funds, as does the implementation of the plan of action for PA and NAPA initiatives relating to PAs. The Government of The Gambia targets a 35% increase in budget for biodiversity by 2020 (Department of Parks & Wildlife Management, 2014) through mobilization from various sources (also see Smith, 2013), including the Global Environment Facility (with funds for biodiversity, climate change and land degradation, as well as Adaptation Fund (AF), Least Developed Country Fund (LDCF), Special Climate Change Fund (SCCF)). Bilateral processes and other mechanisms such as REDD+ are also worth exploring. The Gambia Biodiversity Management and Institutional Strengthening Project (BMISP) succeeded in putting the program of the Tanji Bird Reserve and the Kiang West National Park on a financially sustainable basis. In line with the 2003 Biodiversity and Wildlife Act, which allows for a proportion of the revenues generated from PAs and biodiversity (through fees, licenses, fines, etc.) to be retained for park management and which authorizes the establishment of a National Biodiversity Trust Fund to manage those revenues, BMISP is implementing the revenue-generating potential of PAs, and has established the National Biodiversity Trust Fund mechanism to manage these revenues on a long term basis.

In accordance with the ecosystem approach, long-term implementation of this strategy requires stability of institutions, legal and policy frameworks, monitoring programs, and extension and awareness programs supported by communication strategies and training programs. Effective management of PAs requires provision, construction and upgrading of physical assets, the empowerment of grass root administrative structures to enact by-laws for the management, use and protection of biological resources and biodiversity in general, as well as the management of databases on biodiversity and biological resources (Department of Parks & Wildlife Management, 2014).

Technologies to implement several of the actions identified in this strategy are not yet available in The Gambia or need to be updated.

Objective 3.3: Strengthen communication, education, research and awareness on the issues of protected areas, the impact of climate change and adaptation to climate change

Communication, education, research and awareness-raising on the issues relating to PAs, the impact of climate change and adaptation to climate change are essential for the success of this strategy. They will support the decision and policy making process, and invite and strengthen participation

(including of the media and parliamentarians), engagement and implementation. Many relevant initiatives (such as the regional Training of Information Programme on the Environment (TIPE) project headquartered in Bamako, the World Bank Capacity 21 project implemented by the National Environment Agency (NEA) and the Environmental Education and Communication (EE&C) project) are under way and could be reinforced by further integrating climate change and PAs issues. In order to make progress on communication, education, research and awareness-raising on the issues relating to PAs, the impact of climate change and adaptation to climate change, The Gambia approaches the challenge through a combination of country-led initiatives and regional cooperation.

Objective 3.4: Strengthen coordination and cooperation, including transboundary cooperation

Many people, organizations and sectors are involved in the planning, establishment and management of PAs and in taking and implementing measures to address climate change at the species, site, waterscape, national, regional and global levels. There is a need to have their work well coordinated to ensure coherence, synergies and efficient use of resources. In The Gambia, in addition to contributing to meetings at the global and regional level, the Government put in place mechanisms to coordinate cooperation on environmental matters. These mechanisms have been described in various broader strategic or policy documents, such as the GEAP in which the NEA plays a central role. Efforts are under way within the NEA to coordinate activities under the different global agreements, in particular the CBD, UNFCCC, UNCCD and other biodiversity-related conventions such as the Ramsar Convention on Wetlands and the CITES (see list of ratified agreements in Annex 2). The NEA's performance greatly depends on available human and financial resources. The Government is also engaged in collaborative work with local communities, non-governmental organisations, the private sector, and with other governments and foreign institutions. Coordination among financial mechanisms and donors is ensured through the NEA and the Ministry of Finance and Economic Affairs essentially through the adoption of a programmatic approach instead of the project approach used in the past.

Cooperation and coordination in the implementation of this strategy will use the same framework and could be articulated around the Department of Parks and Wildlife Management (DPWM) in charge of PAs, the Department of Water Resources in charge of climate change or the Ministry of Environment, Climate Change, Water, Forestry and Wildlife.

A PA is likely to be more efficient in conserving biodiversity, its components and their services if it follows the natural boundaries of ecosystems or land/seascapes instead of administrative boundaries. Species range shifts that are occurring in response to climate change can cross administrative borders and their management would require transboundary agreements. Transboundary conservation areas are thus important for their capacity to allow: species movement (especially fauna), now and in the future in response to climatic conditions and other threats; the maintenance of ecological connectivity between habitats / ecosystems / landscapes, particularly when they are fragmented; and a better management of the areas regarding the control of invasive alien species and other pest species, poaching and illegal trade across boundaries and the reintroduction of locally extinct species. There are many experiences of transboundary cooperation in West Africa that can serve as a guide in ways and means to set up and successfully manage transboundary protected areas. Additional experiences were gained through the PARCC project that implemented activities at 5 transboundary pilot sites, including the transboundary protected area of Niimi National Park in The Gambia and the Delta du Saloum National Park in Senegal This included recommendations for species monitoring in the face of climate change (Carr, 2015) and the updating of the existing transboundary management plan to take into account climate change aspects (Ndiaye *et al.*, 2010). There are also potentials for more other transboundary PAs, such as the Allahein River mouth areas and the Baobolon Wetland Reserve.

Table 1: Key actions, potential specific activities, coordination and anticipated participation of ministries and other contributors

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
<p>Strategic Goal 1: Strengthen ongoing conservation plans and programs and their implementation by improving the performance of existing protected areas (PAs) and by finalising the designation or regulation of areas identified as requiring protection.</p>		
<p><i>Objective 1.1: Assess existing PAs and ensure their sustainable and effective management so as to improve the achievement of the conservation objectives for which they were created.</i></p>		
<p>(a) Periodically and systematically evaluate the effectiveness of the management of existing PAs based on the objectives outlined in the decrees of their creation and in their management plans, if available.</p>	<p>Using the revised Management Effectiveness Tracking Tools (METT) (Belle <i>et al.</i>, 2012), which includes climate change considerations, management effectiveness of the 7 PAs under the Department of Parks and Wildlife Management (DPWM) was assessed in 2007 (3 PAs), 2011 (2 PAs) and 2012 (5 PAs) with an average effectiveness of 46.7%, 79.3% and 52% for each year. There is a need to take measures to improve management to ensure that the PAs and components of biodiversity they are protecting can withstand climate change now and in the future. Bolon Fenyo Community Wildlife Reserve tended to have a better management than the other PAs assessed in 2007 and 2012 (Camara, 2012), indicating that there would be merit to encourage community management and the Site Management Committee of the peripheral communities.</p> <p>Management effectiveness assessment has to include an examination of the possible changes in the presence,</p>	<p>Department of Parks and wildlife Management (DPWM)</p> <p>Department of Water Resources (DWR), Department of Forestry, Ministry of Environment, Climate Change, Water, Parks, Forestry and Wildlife (MOECCWWF), Department of Fisheries, NGOs</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>richness and distribution of species and communities, in the functional attributes of habitats, ecosystems and landscapes, and whether some areas need to be modified or adapted in order to meet the challenges associated with temperature increases, potential variations in rainfall and sea level rise as well as their consequences. This evaluation could be undertaken using, among other techniques, satellite imagery to evaluate for example the changes in land use, primary productivity and phenology.</p>	
<p>(a) Update management plans and develop new ones for PAs lacking them, making sure they integrate climate change aspect and using a participatory approach.</p>	<p>The first PA in The Gambia was established in 1968 (and the first forest reserves in 1952). Today, all PAs, with the exception of Baobolon Wetland Reserve, have management plans. There is a need to develop a management plan for Baobolon Wetland Reserve.</p> <p>Considering that all the management plans may have become obsolete, there is a need to review and update them. The development and updating of management plans should specifically integrate climate change considerations.</p> <p>All pressures on protected areas, including the most recent ones aggravated by climate change need to be addressed, particularly the following threats identified in the 2012 Action Plan for Implementing the Programme of Work on Protected Areas (POWPA) of the Convention on Biological Diversity (CBD): logging within PAs and in the surrounding</p>	<p>DPWM, Local Communities</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>areas to respond to the high demand due to unprecedented population growth; infrastructure developments causing major disruption, particularly in wetlands; land conversion and forest fires posing major threats on the bio-physical resources within and outside the protected areas; climate change induced sea expansion and its associated coastal erosion unprecedented for example in the Niumi National Park and Tanji Bird Reserve.</p> <p>Updating and developing management plans should be ‘participatory’, involving the people affected by the management of the PAs, as early as possible and throughout the life of the respective PAs.</p>	
<p>(a) Revise the status and governance of protected areas¹ that are not managed effectively and consider whether they can be re-classified, including as community-managed PAs.</p>	<p>The PA system of the Gambia currently consists of 14 community-managed conservation areas.</p> <p>For example, Bolon Fenyo Community Wildlife Reserve is managed by the local community of Gunjur, Kombo South District. The METT results seem to indicate that this PA benefited from a more effective management than the others considered in 2007 and 2012.</p> <p>Building on ‘Management Effectiveness Assessment of Protected Areas in The Gambia using METT or WWF’s RAPPAM Methodology’ published in 2011(Government of</p>	<p>Department of Parks and Wildlife Management (DPWM),</p> <p>Department of Water Resources (DWR),</p> <p>Department of Forestry, Ministry of Environment, Climate Change, Water, Parks, Forestry and Wildlife (MoECCWWF), NGOs</p>

¹ In 2014, A. Manjang and F. Drammeh reviewed PA governance in the Gambia (personal communication).

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>The Gambia, 2012a), there is a need to consider whether the status and governance type of PAs that are not managed effectively should be revised. The draft biodiversity management law allows different types of PAs governance.</p> <p>The positive experience with the community-managed protected area in Gunjur and other PAs (see METT results under Objective 1.1 (a) above in this Table) encourages the creation of more Indigenous Community Conserved Areas in line with Goal 2.2 of the POWPA (Government of The Gambia, 2012).</p>	
<p>(b) Strengthen activities aimed at reintroducing extinct or endangered species into PAs, and promote the recovery of threatened species by applying the appropriate management plans in line with Aichi Biodiversity Target 12, the corresponding national target 12, and Article 8 of the Convention on Biological Diversity.</p>	<p>As noted in the 5th National Report on biodiversity (2014), science-based reintroduction of lost species into the wild is one of the priorities for the future of biodiversity in The Gambia. A total of 3,335 species have been recorded in the country to date. However many of these are now rare or locally extinct (some of them for a long time). This includes a number of mammal, such as the African Elephant (<i>Loxodonta africana</i>) and the Giraffe (<i>Giraffa camelopardalis</i>), as well as several plant species (Camara, 2012).</p>	<p>DPWM, Department of Fisheries, National Agricultural Research Institute (NARI), NGOs, Department of Community Development (DCD), Department of Planning</p>
<p>(c) Identify the direct and indirect factors that determine the effectiveness of the management of existing PAs, and implement the appropriate measures, preventive or corrective, to improve or maintain management effectiveness at an</p>	<p>This entails:</p> <ul style="list-style-type: none"> (i) Identifying and assessing both direct and indirect threats/pressures and reducing their impacts on PAs and on measures taken to implement management plans; 	<p>Department of Parks and wildlife Management (DPWM) Department of Water Resources (DWR),</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
adequate level.	<ul style="list-style-type: none"> (ii) Applying adaptive management with monitoring programs to improve and/or maintain adequate levels of resilience in PAs and assess the implementation of management plans; (iii) Undertaking the restoration of degraded PAs, including the reintroduction of extinct or endangered species, and restoring their functioning, their ecological integrity, their associated resistance and their resilience to climate change. It will be useful, in the planning and execution of this work, to integrate ecosystem services associated with biodiversity conservation (for example, carbon sequestration and storage to reduce greenhouse gas), the conservation of knowledge, and other cultural resources and considerations related to climate change; (iv) Building on existing structures, legislation and ongoing initiatives (including the Gambia Environment Action Plan - GEAP), develop and implement programs for the sustainable use of natural resources for local communities around PAs, in order to reduce the pressure on resources within protected areas, in accordance with Article 8 of the CBD. 	Department of Forestry, Ministry of Environment, Climate Change, Water, Parks, Forestry and Wildlife (MoECCWWF), NGOs, NEA
Objective 1.2: Accelerate and complete the designation and integration of areas identified as requiring protection in the national PA system		
(a) Establish the list of areas identified	Many habitats of high ecological significance have been	Department of Parks and

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
<p>as requiring protection and accelerate the process that will lead to their integration in the national PA system.</p>	<p>identified in The Gambia. The outputs of the PARCC project systematic conservation planning are particularly relevant to this activity (see Section 2.5 above).</p> <p>Some important habitats are under protection but others such as Solifor Point, Tujereng Lagoons, River Kakima Delta-Kachuma Forest, Dua Dula to Kartong and Bijilo Forest Park along the coastline require some form of protection.</p> <p>Unprotected Important Bird and Biodiversity Areas (IBAs) (such as Dankunku wetlands, Jakhaly rice-fields, Samba Sotor to Kaur wetlands, Brufut Woods - a renowned bird watching area, and highly ecologically sensitive - and Prufu - Darsilami area), and the forest parks managed by the Department of Forestry (not considered as PAs) could be candidates for a rapid classification and regulation as PAs if their primary aim is biodiversity conservation.</p> <p>The country initiated a project titled ‘Gambia Protected Area Network and Community Livelihood Project’ to consider the inclusion of additional areas in the national PA system.</p> <p>The process of classification of new areas under the PA system will be facilitated if decision-makers are aware of the value added of designating PAs, not only in terms of biodiversity conservation and anticipation of climate change impacts on biodiversity, but also in terms of the socioeconomic gains and thus the contribution to Sustainable</p>	<p>wildlife Management (DPWM)</p> <p>Department of Water Resources (DWR), Department of Forestry, Ministry of Environment, Climate Change, Water, Parks, Forestry and Wildlife (MoECCWWF), NGOs, NEA, University of the Gambia, Local Communities, Department of Community Development</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>Development Goals (SDGs) and poverty reduction.</p> <p>Regarding the expansion of the PAs system, the country has some specific targets for 2020, i.e., at least 5% of terrestrial and inland water, and 15% of coastal and marine areas (Department of Parks & Wildlife Management, 2014) and could adopt detailed actions in its NBSAP. Although marine areas are not part of the PARCC project, it is important to note that among the priorities identified in its 5th National Report to the CBD and revised NBSAP, The Gambia is aware of the fragility of its marine and coastal areas and plans to “designate and effectively manage ecologically and biologically sensitive areas as marine parks” in any future PA expansion.</p>	
<p><i>Objective 1.3: Identify biodiversity components and related ecosystem services important for The Gambia and adopt measures for their protection as needed, bearing in mind the Sustainable Development Goals and the new perspectives in the conservation of biological diversity, adaptation to climate change and land degradation issues.</i></p>		
<p>(a) Identify, inventory, map and monitor species, habitats, ecosystems and related ecosystem services that are important for The Gambia, its sustainable development (i.e. important ecologically, socially and economically) and poverty eradication</p>	<p>Biodiversity components that are unique to the country, at risk (especially if the threat is at the global level) and vulnerable to climate change should be given high priority in conservation planning and programs. This is in order to prevent species extinction, degradation or shrinkage of ecosystems/habitats that are necessary for the survival of species and their communities in the face of climate change, and also to develop conservation actions aiming specifically</p>	<p>DPWM, NEA, NGOs</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>at mitigating the impacts of climate change. According to the PARCC study on species vulnerability, The Gambia is among West African countries supporting great numbers of vulnerable species across much of the sub-humid and semi-arid zone, from Senegal and Guinea Bissau in the west of Benin and central Nigeria in the east.</p>	
<p>(b) Update the goals of each PA’s management plans, taking into account the new list of elements to be conserved and used sustainably</p>	<p>This implies:</p> <ul style="list-style-type: none"> (i) Assessing and documenting the conservation state of the genetic resources, species, habitats, ecosystems and related ecosystem services that are important for The Gambia to find out if they are adequately represented in existing PAs; (ii) Using and disseminating data on species vulnerability; (iii) Mapping: <ul style="list-style-type: none"> a. Areas containing a comparatively high number of threatened species and/or vulnerable to climate change, especially in areas with limited resources; b. Sites that have international recognition, such as Ramsar sites and Important Bird and Biodiversity Areas, but that are not yet protected; c. Other important elements of biodiversity, including their ecological, environmental and socio-economic value. <p>From the combined results of species assessments, it is</p>	<p>DPWM, NEA</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>possible to create maps that show the geographic areas containing a large number of species that are vulnerable to climate change for a given taxon. These maps can be used to determine where conservation measures to reduce the impacts of climate change may be needed more urgently, as well as where such measures could be most effective in terms of impact reduction for the greatest number of species.</p> <p>These actions will help to:</p> <ul style="list-style-type: none"> (i) Compile data needed as a baseline when assessing progress in the implementation of this strategy on protected areas and climate change. It is important that this study also includes what could potentially happen when the components of biodiversity are lost or become degraded and could therefore lead to the loss of ecosystem resilience due to environmental changes; (ii) Update the goals for each PA in the management plans, taking into account the new list of elements to be protected. 	
<p><i>Objective 1.4: Conduct a gap analysis using an updated list of conservation features i.e. components of biodiversity that should be protected, and prioritize them bearing in mind the threats posed to them and their ecological/biological and socioeconomic importance in the country.</i></p>		
<p>(a) Conduct a gap analysis based on an updated list of biodiversity components that need to be protected (see Objective 1.3.a) and identify</p>		<p>Department of Parks and wildlife Management (DPWM)</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
<p>the species and communities of species, as well as the habitats / ecosystems / landscapes and ecosystem services that need to be protected.</p>		<p>Department of Water Resources (DWR), Department of Forestry, Ministry of Environment, Climate Change, Water, Parks, Forestry and Wildlife (MoECCWWF), NGOs, NEA, University of the Gambia, Local Communities, Department of Community Development</p>
<p>(b) Conduct studies and consultations on Important Bird and Biodiversity Areas, including wetlands of international importance as well as ecologically and biologically significant coastal and marine areas; use the results, as appropriate, for the classification of these important areas; and assess their contribution to the representativeness of the conservation features in the national PA system</p>	<p>Studies will be carried out to identify and describe the conservation features that should be protected, and prioritize them bearing in mind the threats posed to them and their ecological/biological and socioeconomic importance in the country, in the view of their future integration to the national PA system.</p>	
<p>(c) Recalibrate Marxan software parameters, and repeat the systematic conservation planning assessment using the updated conservation features.</p>		<p>DPWM, NEA, UTG, DWR</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
Strategic Goal 2: Anticipate and respond to ongoing and future environmental changes, focusing on changes caused by climate change		
<i>Objective 2.1: Increase knowledge on observed and projected impacts of climate change on biodiversity and the associated ecosystem services in The Gambia, taking into account traditional and local knowledge</i>		
(a) Update projections of the future distribution of species and the status of habitats/ecosystems found in protected areas based on information provided by direct observations on the ground	<p>The bioclimatic models implemented in the PARCC project (Baker and Willis. 2014) will be used as a starting point.</p> <p>Gambian scientists are also exploring other tools for assessing the impacts of climate change. Furthermore, there is a need to engage and support institutions dealing with climate, biodiversity, climate change adaptation and mitigation, including meteorological stations and research institutions, and encourage their collaboration.</p> <p>Collaboration with local communities will be necessary for gathering relevant local and traditional knowledge, in accordance with Article 8 (j) of the CBD and national legislation</p>	DPWM, NEA, DWR, Department of Fisheries, Forestry
(b) Establish monitoring mechanisms to regularly assess the trends of biodiversity components in PAs against modeling projections.	As part of projects like Integrated Coastal Area Management (ICAM) I & II, the Gambia Biodiversity Management and Institutional Strengthening (GBMIS), and Environment and Energy, the country put in place flagship species monitoring programmes, as well as data storage and management with a dedicated website or using the national biodiversity clearing-house mechanism for managing and disseminating information (Department of Parks & Wildlife Management,	NEA, DPWM

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	2014).	
<p>(c) Develop species action and management plans based on the knowledge of species threat status and vulnerability to climate change, and projections from species distribution models.</p>	<p>As reported in the 5th National Report on biodiversity, work is under way to develop species action and management plans e.g., for oysters, hippopotamus, sitatunga antelope, lesser flamingo, crowned crane, and bar- tailed godwit. The plans should address the threatened species status, as well as the current and future vulnerability, notably using the list of species considered vulnerable to climate change, as well as the results of species distribution models, both provided by the PARCC project as a starting point</p> <p>The plans could include:</p> <ul style="list-style-type: none"> (i) Facilitating the dispersion of species that have low dispersion capacity in response to climate change, by removing barriers to their dispersal and/or ensuring connectivity between PAs, or by relocating them manually in areas where climate is more appropriate; or (ii) Manipulating the environment manually (e.g., through proactive management of bush fire regimes, or hydrology), so as to create appropriate conditions in the range of species with restricted margins of tolerance for environmental variables such as bushfires, floods, high temperatures or drought. 	<p>NEA, DPWM, DWR, National Disaster Management Authority (NDMA)</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
<i>Objective 2.2: Identify and appropriately manage climate refugia, areas that are resilient to climate change</i>		
(a) Building on PARCC project findings, map potential areas of resilience to climate change	Climate change resilient areas are areas where resilience to climate change is high either because changes due to climate change, in particular in temperature, rainfall and sea level, will have insignificant impact, or because models predict relatively low changes in temperature, rainfall and/or sea level in those areas.	NEA, DPWM, DWR
(b) Include areas resilient to climate change in the national PA system or apply other conservation measures	Areas that are resilient to climate change can serve as climatic refugia. In the process of expanding the PA system, particular attention should be paid to ensuring the full participation and agreement of all groups of stakeholders, in particular local communities (e.g., regarding the acquisition of communal lands for reservation, compensations, benefit sharing of revenue from protected areas and national parks, and the development and implementation of the management plan).	NEA, DPWM, DWR
(c) Drawing on PARCC project findings and its methodology and using participatory approaches, identify options for areas where the national PA system could be expanded to take into account the future distribution of species and adequately represent all the elements of biodiversity requiring	Ensure that, as far as possible, the areas to be protected are large enough to support the types of ecological and evolutionary processes that generate and sustain/maintain biodiversity. Validate the findings on the ground in consultation and	

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
protection	agreement with local communities and development sectors active in the region.	
<i>Objective 2.3: Bearing in mind the possible shifts in species ranges, develop, re-evaluate, restore and / or maintain ecological corridors and stepping stones between protected areas, taking into account climate change impact and possible contraction of some habitats</i>		
(a) Evaluate the performance of PAs and effectiveness of the PA system in relation to the status of protected species in the face of climate change		
(b) Evaluate the effectiveness and appropriateness of existing corridors and decide on the creation of new ones, including when, due to climate change, the distribution of habitats or areas of distribution of certain species is projected to shift or shrink.	<p>In The Gambia, both wildlife corridors linking (i) Abuko Nature Reserve and Tanbi National Park, and (ii) Bolon Fenyo Community Wildlife Reserve with the Allahein River mouth (Dua Dula to Kartong) are not protected (Camara, 2012). They should be under some formal protection as they link ecosystems of ecological significance.</p> <p>A corridor could be considered to overcome the escarpments between Mootah Point (River KM65) and Krul Point (River KM120), overlooking the River Gambia, which constitute an important constraint for species migration towards the largest patch of savannah woodland, considered as quite resilient to climate change in the Lower River region (Government of The Gambia, 2007). Slow-moving threatened species such as <i>Rhizophora spp.</i> and <i>Laguncularia racemose</i> could disappear locally in the absence of a</p>	NEA, DPWM, DWR, NGOs, Local Communities

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	corridor.	
(c) Building on PARCC project findings, identify options for the location of connectivity corridors and validate the findings on the ground in consultation and agreement with local communities and development sectors active in the region.	<p>“Promoting gene flow through the creation of biological corridors to provide connectivity between fragmented biodiversity hotspots including the Important Bird areas and other protected areas” is a priority action for the national PA system identified in the 5th National Report of the Gambia to the Convention on Biological Diversity.</p> <p>This action will use the findings from the PARCC project (Arnell <i>et al.</i> 2014) as a starting point (See section 2.6 above).</p>	DPWM, NEA, NGOs, DCD
(d) Designate and regulate such connectivity corridors as protected areas	This will be done through the development of management plans, and strengthening the enforcement of the appropriate legislation.	MOECCFWF, DPWM, NEA
Objective 2.4: Identify options for areas that are likely to include the future geographical distribution of species displaced by climate change		
(a) Drawing on PARCC project findings and using participatory approaches, identify options for areas where the national AP system could be expanded to take into account the future distribution of species	Ensure that, as far as possible, the areas to be protected are large enough to support the types of ecological and evolutionary processes that generate and sustain biodiversity (see e.g., Smith, 2015).	DPWM, NEA
(b) Validate the findings on the ground in consultation and agreement with local communities and development sectors active in	Following existing guides (e.g., Dudley and Parish, 2006, and CBD PA e-module 1 Lesson 3 ²), the following shall be done through a participatory approach involving all stakeholders:	DPWM, NEA

² <https://www.cbd.int/protected/e-learning/default.shtml>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
the region	ground truthing; identification and assembling of a relevant stakeholder team; prioritization of gaps to be filled taking into account areas where action is most urgent (based on irreplaceability and vulnerability), potentially conflicting plans (e.g., expansion of human settlements, infrastructure or development plans and other land uses such as agriculture) and feasibility (e.g., “easy win” areas, i.e., having already some protection; existing human (support of local communities, type of governance), financial, technical and institutional capacities; size and connectivity.	
Strategic Goal 3: Strengthen the enabling environment for the successful implementation of the strategy		
<i>Objective 3.1: Integrate this strategy on protected areas and climate change in broader national strategies and plans</i>		
(a) Establish an inter-ministerial and inter-sectoral committee, or call on existing committees that will examine this strategy on PAs and climate change and, if appropriate, endorse it and bring it to the attention of the Government through the Minister of Environment, Climate Change, Water and Wildlife.		MoECCFWF, DPWM, NEA
(b) Integrate this strategy into the National Adaptation Programme of Action (NAPA), the National Adaptation Plan (NAP) and the National Biodiversity Strategy and Action Plan (NBSAP) on	Integration is best done at the conceptual stage of projects and at the level of complex development interventions so that it is taken into account in national budgets, as needed, and given opportunities for funding from multiple sources.	MoECCFWF, DPWM, NEA, DWR

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
<p>biodiversity.</p>	<p>Consultations and joint information sessions gathering the authors of the NBSAP and NAPA (including from the Environment Protection Agency, the Ministry of Transport and Aviation, the Ministry of Lands, Country Planning and the Environment) will facilitate this integration.</p> <p>PAs are considered in the two documents, the NAPA and NBSAP, as key elements/tools for the conservation of the country’s natural capital in the context of sustainable development. However, the impact of climate change on PAs and the need to design and manage PAs taking climate change impact into consideration are not discussed. The synergy between the Gambia’s NAPA and NBSAP has been outlined in the NAPA.</p> <p>While the NAPA focuses on short-term projects, the NAP, building on the country’s NAPA, addresses medium and long-term plans. The NAP’s continuous and iterative nature with its three work streams offers opportunities for integrating elements of its strategies in the NAP. Interactions between staff members involved in PAs and members of the NAP process team will facilitate this integration.</p> <p>The Gambia is currently finalising the updates to its NBSAP to include its own goals (already listed in the 5th National Report on biodiversity). In the context of the NAPA, the country has planned among the priority activities the expansion of PAs in forest and woodlands, and the creation of new PAs in the</p>	

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>coastal and marine zone.</p> <p>Also noteworthy is the fact that The Gambia has recently validated the national climate policy that was developed through the GCCA-EU project component 1 being implemented by the Department of Water Resources. Implementation of this policy can be integrated in the implementation of both the NBSAP and the NAPA taking into account the strategic elements described in this document.</p> <p>Annex 1 presents some details on a proposal on ways for integrating the strategy on PAs and climate change into the NBSAP, NAPA and NAP.</p>	
Objective 3.2: Strengthen the human, financial, institutional, legislative and technological capacities		
(a) Human capacities		MoECCFWF, DPWM, NEA, Department of Fisheries, DWR
(i) Develop and implement training programs on climate change and biodiversity conservation focussed on PA planning, design and management adapted to different levels of the society and targeting all categories of stakeholders	<p>It is important to:</p> <ul style="list-style-type: none"> ▪ Build on ongoing and previous human capacity needs assessments (for example, through the activities initiated in the framework of NAPA, the 2012 second national communication on climate change and/or the GEF/ UNDP National Capacity Needs Self-Assessment) ▪ Link these training activities with those organized around climate projections and the training on biodiversity 	

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>issues.</p> <ul style="list-style-type: none"> ▪ Continue the training activities initiated by the PARCC project with the objective of establishing a critical mass of experts capable of collecting, generating, analyzing and synthesizing relevant data to arrive at clear messages for decision-makers at all levels (government, local communities, economic sectors, etc.). These training activities will enable national experts to (i) map species, ecosystems, landscapes and waterscapes, as well as their functions and services; (ii) describe their status and trends across multiple anthropogenic and natural pressures, particularly climate change, while highlighting their vulnerability; (iii) understand projections of their future distribution under climate change; (iv) inventory areas that can serve as refuge for species when climate conditions become unfavourable; (v) Use the Marxan software for systematic conservation planning. <p>National experts should continue to use and build upon the methods used in the PARCC Project using the new data collected and guide research in the collection of additional data.</p> <ul style="list-style-type: none"> ▪ Adequately coordinate all relevant ongoing and planned training programmes, including programmes of the CBD, UNCCD and UNFCCC, so as to ensure coherence and synergies, including through the involvement of 	

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>resource-persons from academia, government, local community (for local knowledge, practices and know-how regarding biodiversity, sustainable use and climate), NGOs and the business sector.</p>	
<p>(ii) Organize and strengthen training activities on the drafting of project proposals for resource mobilization, including human, technological and financial resources for the sustainable management of protected areas that take climate change into account.</p>		
<p>(b) Financial capacities: Mobilize financial resources by exploring traditional and innovative mechanisms</p>	<p>Implementation of this strategy on protected areas and climate change requires a lot of financial resources. Several mechanisms should be explored, such as the Biodiversity Trust Fund established with the proceeds of US\$40,000 as seed money for financing sustainability options for protected areas; the Conservation Trust Fund established through the 2012 National Protected Areas and Conservation Fund Act; the Global Environmental Facility (GEF) for projects related to biodiversity, climate change or land degradation; the Fund for Least Developed Countries; the Special Climate Change Fund and the Adaptation Fund under the Kyoto Protocol. Several objectives and programs envisaged for the sixth period of the fund replenishment (GEF-6) coincide with the actions foreseen in this strategy. These are some relevant</p>	<p>Ministry of Finance, DPWM, NEA, MoECCFWF, Area Councils</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>examples: (i) improve the sustainability of PA networks, (ii) reduce threats to biodiversity of global importance, (iii) promote innovation, technology transfer, and support policies and strategies on climate change, (iv) improve resilience of forests to climate change through the sustainable forest management, and (v) restore forest ecosystems to recover ecosystem services.</p> <p>The private sector involvement in biodiversity management could generate also funds for conservation, and other mechanisms such as REDD+ are also worth exploring.</p>	
(c) Institutional capacities	<p>In accordance with the ecosystem approach, the long-term implementation of management requires stable institutions, legal and political frameworks, monitoring programs, and outreach and awareness programs.</p>	MoECCFWF, DPWM, NEA
(i) Make more operational and effective the existing institutions for research, training and/or management of natural resources, including inter-institutional bodies and coordination mechanisms, by giving them the financial, technological and human means necessary and by ensuring the integration of climate change considerations in biodiversity conservation and protected areas management	<p>Projects described in the NAPA list institutions requiring ecosystem rehabilitation or reconstruction for climate monitoring, training etc. They could be supported in the context of this strategy because their focus on conservation areas can contribute to the reduction of the impacts of climate change, in particular projects 4 (Expansion of Community Participation in the Management of Forests and Protected Areas) and 9 (Restoration/Protection of coastal environments)</p>	

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
(ii) Integrate considerations linked to the adaptation to climate change in the application of the Law on environment, particularly its provisions on protected areas		MoECCFWF, DPWM, NEA
(iii) Strengthen the implementation of laws and decrees relating to the conservation and sustainable management of natural resources, particularly in the face of climate change	Implementation of this activity can be facilitated through training and awareness-raising programs, the provision of necessary equipment / resources, and the use of incentives that will support law enforcement.	MoECCFWF, DPWM, NEA
(d) Technological capacities		DPWM, NEA, DWR
(i) Identify the technologies necessary for the conservation and sustainable use of biodiversity and associated ecosystem services, as well as technologies to monitor biodiversity and record climate data	<p>Several technologies needed to implement many actions of this strategy on protected areas and climate change are not yet available in The Gambia. This activity should focus on these technologies not yet available or widespread in the country.</p> <p>It will be necessary to include their acquisition in projects aiming at mobilizing funds and/or adapt and validate them in accordance with national and international legislation or as part of the Nagoya Protocol.</p>	
(ii) Include in research projects subjects that will enable the collection of useful information for the	The type of information needed to improve the systematic conservation planning as it was used in the PARCC project and improve the interpretation of results includes long-term	DPWM, NEA, DWR, UTG

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
improvement of methods to use in the implementation of this strategy on protected areas and climate change	<p>monitoring of the responses of species to climate change.</p> <p>In addition, it should be noted that the projections obtained through modeling in the PARCC project are appropriate for large areas, but may not capture the details often needed at the local level by decision-makers. Researcher training should enable them to check the results of the models on the ground and/or improve existing methods.</p>	
<p><i>Objective 3.3: Strengthen communication, education, research and awareness on the issues of protected areas, the impact of climate change and adaptation to climate change</i></p>		
(a) Support activities to raise the country’s level of information, education and communication on climate change adaptation, in order to better develop awareness of the potential socioeconomic and ecosystem services provided by PAs, as well as increase awareness of climate risks for better decision-making	<p>A lot of actions have already been planned in the country, e.g., in the NAPA and the Second National Communication on Climate Change regarding the strengthening of information management, communication and awareness raising capabilities of The Gambia Radio and Television Services (GRTS), private and community radios, Multi-Disciplinary Facilitation Teams (MDFTs), Forestry Department, DPWM, NEA, Department of Planning (DOP) and DWR, sectoral data centres. These organs can possibly be linked to the CBD clearing-house mechanism. Implementation of these actions will contribute to achieving Aichi Biodiversity Target 19 and Biodiversity Target 19 set by The Gambia.</p>	<p>DPWM, NEA, DWR, NGOs, Gambia Radio and television services (GRTS)</p> <p>The Ministry of Basic and Secondary Education (MOBSE) and that of Higher Education, Research, Science and Technology (MOHERST)</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
<p>(b) Organize the collected data and information, including from traditional knowledge, into user-friendly databases in accordance with national legislation, and ensure that they are widely accessible in awareness programs, education and decision-making.</p>	<p>The national clearing-house mechanism³ should be developed to become the national mechanism that will organize and harmonize existing information systems of environmental management, and make the information on all aspects of biodiversity widely accessible, including relevant climate change data and information on its impacts. The clearing-house mechanism can also enhance cooperation through the sharing of experiences and information.</p>	<p>DPWM, NEA, DWR, NGOs, Gambia Radio and Television Services (GRTS)</p>
<p>(c) Support research to generate additional data on climate change and its impacts, particularly as it applies to protected areas and biodiversity conservation in general.</p>	<p>Particular efforts will be devoted to areas where the PARCC project identified gaps in data, including on the interactions between PAs, local communities and climate change.</p>	<p>The Ministry of Higher Education, Research, Science and Technology (MOHERST)</p>
<p>Objective 3.4: Strengthen coordination and cooperation including transboundary cooperation</p>		
<p>(a) Ensure proper coordination between government bodies dealing with protected areas and adaptation to climate change.</p>	<p>This could be achieved by establishing an interdepartmental committee. Various coordinating bodies have been set in place, e.g. the National Environmental Management Council (NEMC), the NEA, the Technical Advisory Committee, the Area Environment Committees, the NBSAP Coordination Unit and the National Climate Change Working Group. These bodies are relevant to protected areas and climate change adaptation and need to be strengthened.</p>	<p>DPWM</p>

³ <https://www.cbd.int/countries/?country=gm>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
<p>(b) Strengthen cooperation between the government and local communities, and strengthen partnerships involving NGOs and the private sector for the best approaches to manage PAs in the face of climate change.</p>	<p>The Gambia established a network for the implementation of POWPA known as GamPAN. This partnership is effective in monitoring and implementing PAs. It could be considered for coordinating with all PAs management institutions and partners from the public and the private sectors. Other existing national platforms such as the group for agriculture and natural resources, Coastal and Marine Environment Working Group, and National Climate Change Working Group can also be considered.</p> <p>In addition, as reported in the 5th National Report on biodiversity, The Gambia built some partnerships at the regional and sub-regional levels, including for example in the framework of RAMPAN (the West African Network for Marine Protected Areas), PRCM (<i>Programme régional côtier et marin</i>), NEPAD and the Great Green Wall for Sahel and Sahara, as well as South-South and North-South cooperation.</p> <p>Cooperation agencies and organizations often operate at different spatial scales and with different objectives that could relate to different levels of biological organization (species, ecosystem, landscape). Inter-agency complementarity and synergy should be encouraged in implementing this strategy. Similarly, cooperation should be promoted with neighboring countries for managing transboundary protected areas (see below).</p>	<p>DPWM</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>Cooperation with local communities (co-management), and among ministerial departments, as well as partnerships involving NGOs have each proven to be very beneficial to natural resource management and conservation in The Gambia. This type of cooperation should be fostered in the implementation of this strategy</p>	
<p>(c) Foster cross-border initiatives for an integrated and sustainable management of protected areas that takes climate change into account</p>	<p>Bearing in mind possible shifts in species ranges due to climate change and the need for corridors to link isolated PAs and facilitate the migration of species displaced across borders by climate change, cooperation should be promoted and strengthened with neighboring countries for managing transboundary PAs.</p> <p>There is only one transboundary PA in The Gambia: Niimi National Park, with the Delta du Saloum National Park in Senegal (Niimi-Saloum). However, there are other potential areas for the establishment of transboundary PAs, including the Baobolon Wetland Reserve and the Allahein River mouth areas (Camara, 2012).</p> <p>Transboundary cooperation implies among other requirements (i) the formalization of a framework for concerted intervention between states for cross-border establishment and management of climate-change-adapted transboundary protected areas; and (ii) some harmonization of legislation at the sub-regional level in the field of</p>	<p>MoECCFWF, DPW,NEA</p>

Key Actions	Potential specific activities, policy recommendations and brief explanations	Ministries (coordination or contribution) and contributors
	<p>management of transboundary PAs resources taking into consideration the impact of climate change. The PARCC project selected Niimi-Saloum as a pilot transboundary site for its work on PAs and climate change. The transboundary management plan was revised to integrate climate change aspects, and networking meetings between PA staff from both PAs and the local communities were organized in order to exchange experiences on monitoring programmes, climate change adaptation initiatives, and on local community involvement in transboundary PA management.</p>	

4. Ways and means to implement the strategy

Principles

Implementation of this strategy on protected areas and climate change is guided by the principles and approaches engrained in various policy and legal documents that underpin how The Gambia promotes sustainable development goals to achieve poverty reduction in the country.

1. The natural wealth through the goods and services provided by biodiversity supports the well-being and livelihoods of the populations, and for this reason natural resources need to be protected and used sustainably.
2. The impact of climate change is a reality that all countries, especially the least developed, have to face. It is thus imperative for The Gambia to strengthen its ability to adapt in order to ensure the well-being of its peoples and sustainable development.
3. Effective management of natural resources and protection of the environment, including by establishing a network of protected areas, ecologically representative, well connected and managed in a fair and effective way, constitutes an essential pillar for adaptation to climate change and poverty eradication.
4. The ecosystem approach is the primary framework for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. This approach uses adaptive management in order to anticipate changes in the condition and operation of the components of biodiversity, namely of genetic resources, species and communities formed by these species and the habitats and ecosystems and/or landscapes. This approach requires a management that can adapt to the complex and dynamic nature of ecosystems, as well as knowledge and understanding of their functioning based on the experiences and projections in time and in space.
5. Ecosystem-based approaches to conservation and climate change have the potential to contribute to livelihood sustenance and food security, sustainable water management, disaster risk reduction and biodiversity conservation.

6. Most of the biodiversity management problems are complex and must involve all sectors of the society. They also require the participation of all stakeholders, including local communities and authorities, cooperation within the government, between the various ministerial departments, among public and private organizations, non-governmental and intergovernmental organizations. Thus, it is necessary to use interdisciplinary, intersectoral and multi-scale approaches in the management of protected areas, taking into account climate change, and ensure a fair sharing of benefits and costs at all levels, including from the use of traditional knowledge.

Participatory planning and implementation

Implementation of the objectives of this strategy requires the participation of several ministries, departments within ministries, as well as local communities, economic sectors, and governmental and non-governmental organizations that often operate on different scales and with targets at different levels of biological organization (genetic, species and habitat/ecosystem levels). This participation is needed from the planning phase through to the implementation phase, as well as during the period for monitoring and evaluating the outputs and outcomes. Participation will ensure and maintain interest and support of all the stakeholders.

The Gambia has endeavored to improve full and effective participation at all levels to foster the contributions of all groups of stakeholders (women, indigenous and local communities, civil-society organizations, the private sector and other sectors). Site Management Committees are in place in all the PAs of the country to address diverse governance and to improve PA management. The country has a lot of experience with the involvement of community members and external stakeholders in the work on PAs. Participation of local communities is considered particularly critical when it comes to agree on land to be included in the PA system and on the type of management that could be most suitable for a particular PA. The development of both the NAPA and NBSAP used participatory processes effectively involving a variety of stakeholders, particularly local communities and multidisciplinary teams, and the approach is recommended in all biodiversity conservation and climate change projects. This experience is very appropriate in the development and finalisation of this strategy and its implementation.

Monitoring and follow-up

The Gambia does not have a comprehensive monitoring mechanism in place for biodiversity, ecosystem resilience or climate change impacts. The development of a national set of indicators and standards for national-level monitoring of biodiversity is in progress in the context of the updated NBSAP. Monitoring of progress in the implementation of this strategy will be carried out as part of the monitoring of NBSAP implementation, with a long-term perspective in mind. One of the indicators that could be integrated to the assessment of progress could be the level of use of data, findings and methodologies developed through the PARCC project (see section 2 above on “Overview of PARCC project findings of relevance to The Gambia”). The revised Management Effectiveness Tracking Tool (METT) will help monitor how well climate change aspects have been incorporated into PA design and management (Belle et al., 2012). The PARCC project also recommended the regular monitoring of several bird species including common seabirds and water birds, freshwater fish communities, amphibians, and mammal species, the availability and quality of these species habitats, and climatic factors (Carr 2015). Training in biodiversity surveys and monitoring technologies and the provision of necessary tools and equipment are essential.

It is expected that results from the implementation of this strategy will be reported in national reports submitted to the CBD and the UNFCCC.

Mobilizing financial resources

Lack of financial resources is a major obstacle in achieving the objectives of plans and programs related to biodiversity, including PAs. There is an urgent need to diversify the sources of funding and ensure that funding reaches communities whose conservation activities are essential. A viable and sustainable financing of PAs requires changes in the way that funding is conceptualized and used.

A range of innovative financing mechanisms have been developed and recommended to increase funding for PAs in the framework of international initiatives, such as under the CBD POWPA. Furthermore, through the PARCC project, a review of options for managing and financing PAs in the face of climate change was carried out; it identified a range of adaptation strategies and provided some guidelines on how to select and implement them (Smith 2013). It is important that national experts

consider these mechanisms and identify the most appropriate ones for the country. Among the prerequisites, the description of the importance of PAs in project proposals must convince those who take decisions about funding at both the national and international levels. While ecological aspects of biodiversity conservation should be described, it is more and more critical to identify and put forward the socio-economic benefits of PAs for the well-being of the populations and the country's sustainable development. This could be done particularly through the development of business plans for each PA. It is also important that more national experts develop or strengthen their ability to draft project proposals and are further trained in financial resource mobilization.

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Annex 1

Proposal for the integration of strategic elements for a protected area system resilient to climate change in the 'National Biodiversity Strategy and Action Plan', 'National Adaptation Programme of Action on Climate', and 'Climate Change National Adaptation Plan' development processes

Integration is best done at the conceptual stage of projects and complex development interventions, so that it is taken into account in national budgets and given opportunities for funding from multiple sources. Here we consider how the project results could be integrated into the:

- National Biodiversity Strategy and Action Plan (NBSAP) of the Convention on Biological Diversity (CBD);
- National Adaptation Programme of Action (NAPA) and National Adaptation Plan (NAP) of the United Nations Framework Convention on Climate Change (UNFCCC); and
- Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development.

A. Integration into the National Biodiversity Strategy and Action Plan (NBSAP)

Integration of elements of this strategy for a protected area system adapted to climate change in the NBSAP is possible at two levels: (i) the implementation of the Programme of Work on Protected Areas (POWPA) of the Convention on Biological Diversity (CBD), and (ii) Biodiversity Targets 7, 10, 11, 12 and 15 adopted in The Gambia NBSAP (2015-2020) (Government of the Gambia, 2016).

(a) The government of The Gambia submitted its 'Action Plan for Implementing the Programme of Work on Protected Areas of the Convention on Biological Diversity' to the Secretariat of the Convention in 2012. It is recognized in the POWPA that PAs provide opportunities for adaptation to cope with climate change and may contribute to carbon sequestration and thus to the mitigation of climate change. Integration of elements of this strategy is possible during the implementation of this Action Plan and the POWPA. The PARCC project provided, among other outputs, a list of species considered vulnerable to climate change, as well as the level of species turnover expected within PAs, and guidelines for protected area managers in the face of climate change. All these outputs are useful in the implementation of POWPA Goals 1.4 to 'significantly improve the planning and management of protected areas', particularly activity 1.4.5 on integrating adaptation to climate change in the planning,

designing and management of PA systems, and Goal 1.5 to ‘prevent and mitigate the negative impacts of key threats to protected areas’, climate change being one of the drivers of biodiversity loss.

(b) The Gambia submitted its NBSAP (2015-2020) to the Secretariat of the CBD in January 2016. Implementation of the NBSAP Biodiversity Targets 7, 10, 11, 12 and 15 provides opportunities for integrating consideration of climate change into protected areas planning, establishment and management. Effective and equitable management of PAs will integrate the key actions and recommendations under Strategic Goal 1 of this strategy. Possible expansion of the PA system envisaged under the NBSAP Target 11 will take into account actions and recommendations listed under Strategic Goal 2 of this strategy. Elements of both Strategic Goals 1 and 2 (e.g., action (c) under Objective 1.1 and actions under objective 1.3) are useful for the achievement of the NBSAP Target 12. Elements of these same strategic goals (such as action 1.1 (e), and actions under objectives 1.3 and 2.2) are useful for the achievement of the NBSAP Target 15.

It will be necessary to work in a participatory manner to exploit the findings from the PARCC project and define concrete actions to take for the integration into the NBSAP. These actions will focus essentially on the creation of new PAs and/or the expansion of existing ones for a well-connected national PA network, ecologically representative of all important elements of the country’s biodiversity, and resilient in the face of current and future climate disruptions. It will thus be necessary that participants in the PARCC project understand well and own the outputs from the project and communicate them to the persons involved in the implementation of the NBSAP and the POWPA action plan. It will be particularly useful to:

(a) Integrate the results of the PARCC project, notably on (i) gaps identified in the representation of the existing national PA system (relative to land cover types, elevation zones, ecoregions and current and future expected distributions of mammal, bird and amphibian species), (ii) the vulnerability of mammal, bird, amphibian, reptile and freshwater fish species to climate change, and the presence of areas resilient to climate change in the country, and (iii) the expected species turnover within protected areas, and species expected to gain or lose in climate suitability; and develop and select options for the expansion of existing PAs and/or the creation of new PAs;

(b) Develop action plans to protect vulnerable species, and establish or restore ecological corridors to ensure the migration of species that will be forced to shift their range in search of more suitable climatic conditions;

(c) Consider the finding of the PARCC project that the current PA system of The Gambia needs to be increased in order to ensure an adequate representation of all the components of biodiversity requiring protection. The Marxan software used in the PARCC project has identified areas suitable for the establishment or extension of PAs, which should be considered. Unprotected IBAs and partially protected IBAs could also be candidates for a rapid classification and regulation as protected areas. In doing so, the country will include many areas in its PA system as one of the first steps for addressing changes that would take place due to climate change.

B. Integration into the National Adaptation Programme of Action (NAPA)

The 'Gambia National Adaptation Programme of Action (NAPA) on Climate Change' was submitted to UNFCCC in 2007. Project 4 ('Expansion of Community Participation in the Management of Forests and Protected Areas'), listed in this document among the urgent and immediate adaptation needs, will greatly benefit from integrating the recommendations and actions (e.g., action 1.1 (c), 1.3 (d) and 3.4 (b)) from this strategy regarding consultation and cooperation with local communities. Similarly, strengthened participation planned in this NAPA project has been considered in this strategy. The Second National Communication on Climate Change submitted by The Gambia to UNFCCC in 2012 contains additional adaptation measures of relevance to this strategy, including for example: (i) the 'establishment and rehabilitation of protected wetlands' as adaptation measures to protect the coastal zone and associated wetland ecosystem through the improvement of integrated coastal zone management practices, and (ii) the 'establishment and expansion of community natural forests, plantations, national parks and forest parks' to attenuate adverse climate change impacts. These measures will benefit essentially from the actions planned under the Strategic Goals 1 and 2 in Table 1 above.

The strategic elements proposed in this document, which make use of the findings from the PARCC project, provide guidance on (i) anticipating the impact of climate change by improving existing PAs management and ensuring effective management by promoting community-based management of some PAs, and (ii) selecting areas for the establishment of new PAs so that shifts in species ranges and

the increasing threat caused by climate change can be taken into consideration. In addition, PAs should be managed in ways that will enhance the chances of ecosystems to maintain their natural resilience and functioning (i.e., provision of ecosystem services) and thus contribute to climate change mitigation by retaining carbon.

C. Integration into the National Adaptation Plan (NAP)

The National Adaptation Plan (NAP) process was established under the Cancun Adaptation Framework in 2010 (COP 16/ CMP 6) to enable Parties to formulate and implement national adaptation plans (NAPs) as a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes to address those needsⁱ. The NAP process is meant to complement the existing short-term projects under the National Adaptation Programmes of Action (NAPAs) and play a critical role in reducing vulnerability and, building adaptive capacity by mainstreaming climate change adaptation (CCA) into all sector-specific and national development planning.

The guidelines for NAP processes include:

(a) Laying the groundwork and addressing gaps (Element A) by: (i) initiating and launching the NAP process; (ii) stocktaking i.e. identifying available information on climate change impacts, vulnerability and adaptation and assessing gaps and needs of the enabling environment for the NAP process; (iii) addressing capacity gaps and weaknesses in undertaking the NAP process; and (iv) comprehensively and iteratively assessing development needs and climate vulnerabilities;

(b) Preparing the following (Element B): (i) analysing current climate and future climate change scenarios; (ii) assessing climate vulnerabilities and identifying adaptation options at the sector, subnational, national and other appropriate levels; (iii) reviewing and appraising adaptation options; (iv) compiling and communicating national adaptation plans; and (v) integrating climate change adaptation into national and subnational development and sectoral planning;

(c) Implementation strategies (Element C); and

(d) Reporting, monitoring and reviewing implementation of the plan (Element D).

The Gambia's NAP process is being supported by the USAID Climate Change Resilient Development program and ECOWAS and will take into account the adaptation component in The Gambia's Intended Nationally Determined Contribution (submitted to UNFCCC Secretariat in 2015). The inception workshop for the NAP process in the Gambia was held in June 2015. It adopted a 2-year roadmap with the following work streams:

(a) Work stream 1 'Developing adaptation investment plans' consisting of two sets of activities: (i) the Government collects, compiles and processes data and information on climate risk and vulnerability assessment; and (ii) determines an appropriate set of CCA options; prioritizes them through an appraisal process, and develops an investment pipeline that addresses short and long-term needs;

(b) Under Work stream 2 'Policy research', the Government invites research institutions to 'develop climate change projections and socio-economic projections for the country to 2050 and beyond' develops a central climate risk data management centre and monitoring systems with indicator sets that can measure reductions in vulnerability and/or resilience in livelihood systems; and

(c) Work stream 3 'Policy development' is essentially concerned with financing for adaptation, the review of policies for resilience and/or reduction of vulnerability to climate change.

The NAP process is country-driven, gender-sensitive and participatory. Its continuous and iterative nature provides unique opportunities to integrate the findings from the PARCC project at various steps of the planning process, under each of the work stream.

D. Integration into the Integration into the Sustainable Development Goals (SDGs)

Since NBSAPs, NAPs and NAPAs are strategies and actions that contribute to the sustainable development of The Gambia, the integration of the strategic elements on PAs and climate change will be even more effective if its elements and associated policy recommendations are integrated in measures taken to achieve the Sustainable Development Goals adopted in 2015, particularly targets 13 ('Take urgent action to combat climate change and its impacts'), 14 ('Conserve and sustainably use the oceans, seas and marine resources for sustainable development') and 15 ('Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss').

ⁱ http://unfccc.int/adaptation/workstreams/national_adaptation_plans/items/6057.php

Annex 2.

Indicative list of laws, strategies and programmes of relevance to the strategy for protected areas resilient to climate change in The Gambia

Year	Laws, strategies and programmes	Relevance to the strategy for protected areas resilient to climate change
2015	Gambia National Adaptation Plan Process	The main objectives of the NAP process are to: <ul style="list-style-type: none"> ▪ Take a medium- and long-term approach to reducing vulnerability to the adverse effects of climate change; and ▪ Facilitate the integration of CCA, 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.
2014	Environmental Impact Assessment Regulations	The Environment Impact Assessment is a procedure used to examine the environmental consequence or impacts, both positive and adverse aspect of proposed development project and to ensure that these effects are taken into account in the project.
2013	National Disaster Risk Reduction and Management Policy	To promote priority measures to address already existing vulnerability to hazards, and measures to ensure future development processes and programs strengthen resilience. This includes promoting development planning that considers and addresses disaster risks alongside environmental and climate change concerns.
2012	Nationally Appropriate Mitigation Actions (NAMA) of The Gambia	The Nationally Appropriate Mitigation Actions (NAMA) focus on natural resources and environment sector with reference to wildlife conservation. One of the identified actions is the restoration and rehabilitation of degraded forest lands, protection and conservation of wetlands, and development of greenbelts around human settlements, national forests, wildlife parks and protected areas through afforestation and reforestation activities. This NAMA is intended to expand community-based forest management concept to all districts and bring most of the existing wildlife and biodiversity reserves and national parks under community management. New reserves and parks will also be created and placed under community-based management.
2011	Programme for Accelerated Growth and	This programme has a theme on Environment, Disaster Risk Reduction, and Climate Change. It aims to improve livelihoods and

	Employment (PAGE)	food security, and reduce poverty of population that depend on The Gambia's natural resources (including rangeland, forests, fisheries, and wildlife) through sustainable management and land use of these resources.
2010	Gambia National Agricultural Investment Plan (GNAIP) 2011-2015	The GNAIP notes the importance of conservation and sustainable use of the wildlife resource base for national socio-economic development.
2007	Fisheries Act (Department of Fisheries)	The Fisheries Act governs the most significant aspects of fisheries and aquaculture activities. It provides for the conservation, management sustainable utilization and development of fisheries and aquaculture in the fisheries waters and in the territory of the Gambia, and for matters connected therewith.
2007	Gambia National Adaptation Plan of Action (NAPA) on Climate Change	In the National Adaptation Plan of Action (NAPA), expansion of protected areas, particularly by including more forest ecosystems, is one of the identified adaptation options. The Gambia submitted its Initial National Communication on climate change to the UNFCCC in 2003 and its second National Communications in 2012. Prioritized CCA measures in the second National Communication included: forestry: establishment and expansion of community natural forests, plantations, national parks and forest parks; expansion and intensification of agroforestry and reforestation activities; and mainstreaming of climate change into forest policies and plans.
2003	The Biodiversity / Wildlife Act (Department of Parks and Wildlife Management)	This Act provides for the conservation of biodiversity and wildlife; to promote, regulate and protect the use of biological resources; and establish, maintain and administer protected natural areas and cultivated sites; and for the participation by the population in conservation and sustainable use and for matters connected therewith. The Biodiversity and Wildlife Act 2003 is currently being revised to further enhance the implementation of the NBSAP, other conventions and protocols.
2001	The Gambia Wildlife and Biodiversity Policy (Department of Parks and Wildlife Management)	The overall goal of the Biodiversity/Wildlife Policy is to create a society that sees itself as an integral part of nature; that recognizes different life forms, sustainably uses natural resources and maintains for posterity,
1998	The Forest Act (Department of Forestry)	This Act provides for the maintenance and development of the forest resources of the Gambia with a view to enhancing the contribution of forestry to the socio-economic development of the Gambia and for matters connected therewith.
1998	Forest Regulations (Department of Forestry)	These Regulations contain provisions on prohibited acts in protected lands; power of the secretary of State to declare trees to

		<p>be protected; the control of fires (prohibitions and allowed fires); on wind erosion areas, and on the issue of licenses to exploit forestry produce and permits to allow activities in protected lands.</p> <p>The Forest Act, 1998 and Forest Regulations involve the communities in forest management.</p>
1995	<p>Fisheries regulations (Department of Fisheries and Water Resources)</p>	<p>In The Gambia, the Fisheries Regulations control aquaculture activity in more detail and address conservation measures, fish export and specific licensing requirements. The substantive provisions of the 1995 Regulations have been incorporated into the Fisheries Act. Although the 2007 regulations for fisheries products were approved in 2010, the finalized text is not available.</p>
1994	<p>The National Environment Management Act (NEMA), first passed in 1987 and amended in 1994</p>	<p>The National Environment Management Act of 1994 (NEMA) outlines the general procedures to be followed in the area of Environmental Impact Assessment (EIA) in The Gambia.</p>
1977	<p>Banjul Declaration and the Wildlife Conservation Act</p>	<p>This Act lays foundations for the conservation and sustainable use of biological resources in The Gambia.</p>

Annex 3.

Multilateral Environment Agreements ratified by The Gambia.

- Convention on Biological Diversity (CBD)
- United Nations Convention to Combat Desertification (UNCCD)
- United Nations Framework Convention on Climate Change (UNFCCC)
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (Basel)
- Stockholm Convention on Persistent Organic Pollutants (POPs)
- Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol)
- Convention for the Protection of the Ozone Layer (Vienna Convention)
- Protocol on Biosafety (Cartagena Protocol)
- Convention for cooperation in the protection and development of the marine and coastal environment in West and Central Africa (WACAF)
- Bamako Convention on the ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa
- Convention establishing a permanent Inter-State Drought Control Committee for the Sahel

Annex 4.

Terms of reference for the consultancy on the 'Development of strategies and policy recommendations to enhance the resilience of West African protected areas to climate change impacts'.

The Consultant shall:

Produce adaptation strategies for the best approaches to manage PAs for climate change, building on the results of the projects scientific outputs, and develop policy recommendations for PAs in the face of climate change, including draft policy documents, at the regional level and national level for each of the five PARCC project countries.

In particular the Consultant shall carry out the following activities:

- Map/Review the legal and policy framework of each country, focusing on legal aspects related to environmental management, especially in relation to protected areas and climate change; this will also include identifying:
 - Regional and international obligations relating to the regional policy recommendations
 - National plans and policies relating to the national policy recommendations for the five project countries
- Consider how the policy recommendations being developed could be integrated into NBSAP and NAPA development and implementation.
- Identify the relevant government bodies and representatives in all relevant sectors for each project country, with the help of project partners, including the executing agency and the NLOs from each country.
- Travel to the region and, in particular, each project country (provided that the security situation allows it) to work with appropriate government representatives on the development of the policy recommendations.
- Present the draft adaptation strategies and policy recommendations at the final regional meeting of the project.
- Formulate adaptation strategies for PAs in the face of climate change at the regional level and for the five project countries on the basis of the project scientific outputs, including the systematic conservation planning systems.

- Develop regional policy recommendations and national policy recommendations, with draft policy documents including innovative management systems for PAs and biological corridors, in collaboration with country representatives.

The strategies and policy recommendations will be detailed in concise reports (20 to 30 pages each), one at the regional level, and one for each of the 5 project countries. The consultant will work in close collaboration with the Project Management Unit, UNEP-WCMC, and the Project Regional Unit, IUCN PACO, as well as technical partners.

The Consultant shall deliver the following outputs:

- A. A report outlining strategies for PAs to adapt to climate change and policy recommendations for PAs in the face of climate change at the regional level (20 to 30 pages) (after consultation with country representatives).
- B. A report outlining strategies for PAs to adapt to climate change and policy recommendations for PAs in the face of climate change at the national level for each of the project countries (5 reports of 20 to 30 pages each) (after consultation with country representatives).
- C. A brief report on meetings held with government representatives and other relevant stakeholders in the project countries and the West Africa region (including additional discussions held remotely).

Annex 5.

Ways through which the strategic elements for PAs to adapt to climate change and policy recommendations for PAs in the face of climate change were developed for The Gambia.

Activity in the terms of reference	Ways and means
Preparatory phase	<ol style="list-style-type: none"> 1. Consultations: UNEP-WCMC, IUCN PACO, Secretariat of the Convention on Biological Diversity 2. Development of lists of people that could be contacted in the Gambia and in the PARCC project partner organizations. 3. Review of documents published by the PARCC project on the Gambia and other relevant national documents, including in particular the NBSAP, NAPA, the first and second national communications on climate change, the 2014 Fifth National Report to the CBD, the 2012 Action Plan for Implementing the Programme of Work on Protected Areas of the Convention on Biological Diversity, the Gambia Environmental Action Plan, the report prepared for Rio + 20, and various legal documents.
Map/Review the legal and policy framework of each country, focusing on legal aspects related to environmental management, especially in relation to protected areas and climate change	See Annexes 2 and 3 above
Consider how the policy recommendations being developed could be integrated into NBSAP and NAPA development and implementation	See Annex 1 above
Identify the relevant government bodies and representatives in all relevant	See column 3 in Table 1. The list was prepared during the consultation held on 9 September in Banjul.

<p>sectors for each project country, with the help of project partners, including the executing agency and the NLOs from each country</p>	
<p>Travel to the region and, in particular, each project country (provided that the security situation allows it) to work with appropriate government representatives on the development of the policy recommendations</p>	<p>Face-to-face interactions with country representatives took place during the consultation and the final PARCC regional meeting held in Banjul in September 2015 and January 2016 respectively</p> <p>The following points should be noted from the consultations held in the 4 pilot countries visited:</p> <ol style="list-style-type: none"> 1. Participants represented mainly people already involved in the project and very few or no (i) UNFCCC representatives (ii) representatives of the local communities and local authorities and (iii) other stakeholders who can play important roles in the formulation and implementation of national strategies and policy recommendations to fulfill the participatory approach, one of the principles for the implementation of environmental (including biodiversity and climate change) strategies. 2. Participants expressed the need to be more informed about the outputs of the PARCC project. It was therefore necessary to spend time explaining the project outputs that participants needed to own so that they can be used and integrated in ongoing and planned work; 3. Participants acknowledged they needed more training on the Systematic Conservation Planning. Their participation in the workshops did not seem to give them the required capacity for the provision of well-informed advice on the calibration of the Marxan software. Because they did not find opportunities to use what they had learned in the workshops, they forgot most of the knowledge and tools taught in the workshops; 4. Funding was noted as the most urgent requirement for them to first carry out their current commitments before they engage in new endeavours. Although they recognized the value of the strategic elements and policy recommendations discussed and presented in the consultant’s documents, the need for national and regional

	<p>strategies on PAs and climate change were considered of secondary importance as compared to the need for financial resources for ongoing and planned work on PAs;</p> <p>5. There were often heated discussions to try to agree on which department would lead on the activities described in Table 1, in particular the integration of the strategic elements and policy recommendations in NBSAPs and NAPAs, bearing in mind that countries were either finalizing their updated NBSAPs and thus could not add much to the documents or had completed work on NBSAPs.</p>
<p>Present the draft adaptation strategies and policy recommendations at the final regional meeting of the project</p>	<p>Presentations were made at the final regional meeting of the PARCC project held in Banjul, The Gambia from 25 to 29, 2016</p>
<p>Formulate adaptation strategies for PAs in the face of climate change at the regional level and for the five project countries on the basis of the project scientific outputs, including the systematic conservation planning systems.</p>	<p>See sections 3 and 4 including Table 1 and annex 1</p>
<p>Develop regional policy recommendations and national policy recommendations, with draft policy documents including innovative management systems for PAs and biological corridors, in collaboration with country representatives</p>	<p>See rationales in section 3, section 4 and column 2 in Table 1</p>

Annex 6

List of individuals consulted in Banjul on 9 September 2015.

Name	Role/Institution
Abdoulie Sawo	Department of Parks and Wildlife Management (DPWM)
Abubacarr Kujabi	National Environment Agency (NEA)
Aji Binta Jagne	UNFCCC Article 6 Focal Point
Ajie Binta Kinteh*	NEA
Alpha Omar Jallow**	UNFCCC focal point, Department of Water and Resources
Amie Touray*	DPWM
Anna Mbenga Cham**	Fisheries Department
Baboucarr Mbye*	Stay Green Foundation
Babucarr Dumbuya*	DPWM
Binta Sambou*	DPWM
Foday NK. Fatty	NEA
Ibrahim Colley*	MOECC WWF
Kawsu Jammeh	DPWM
Lamin Jawneh	NEA
Lamin Jobaate**	WABSA
Lamin Komma**	NEA
Lamin M. Touray	Director of water resources
Lamin Sanyang	Niumi National Park
Mawdo Jallow	DPWM
Momodou Suwareh*	NEA
Omar Ceesay**	NEA
Omar Ngum*	Department of Community Development
Ousainou Cham*	Forestry Department
Ousainou Touray	CBD focal point, DPWM
Sambou Nget	Department of Forestry, UNCCD
Siaka Touray*	NEA

List of individuals who attended the final regional meeting of the PARCC project and contacted after the meeting.

Name	Role/Institution
Abdoulie Sawo	Department of Parks and Wildlife Management
Abubacarr Kujabi	NEA
Aji Binta Jagne	UNFCC Article 6 Focal Point

Alpha Omar Jallow	UNFCC focal point, Department of Water and Resources
Anna Mbenga Cham	Fisheries Department
Foday NK. Fatty	NEA
Kawsu Jammeh	Department of Parks and Wildlife Management
Lamin Jawneh	NEA
Lamin Jobaate	WABSA
Lamin Komma	NEA
Lamin M. Touray	Director of water resources
Lamin Sanyang	Niumi National Park
Mawdo Jallow	Department of Parks and Wildlife Management
Ndey Bakurin	Executive Director, NEA
Omar Ceesay	NEA
Ousainou Touray	CBD focal point, department of Parks and Wildlife Management
Sambou Nget	Department of Forestry, UNCCD

Additional comments received.

Name	Role/Institution
DRAMMEH Famara	Coastal and Marine Environment, and Climate Change (former NLO)