GLOBAL APPROACHES TO ADAPTATION PLANNING

Centre for Science and Environment

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1 Introduction

According to the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), the impacts of climate change are increasing globally.[1] The report of the Working Group II (WGII) highlights disruption in the global hydrological cycle due to changing precipitation patterns and melting of snow and ice causing proximate effects such as extreme weather conditions, droughts and flooding.[2] A significant shift in ecosystems, leading to shifts in range, migration patterns, seasonal activities and abundance of territorial and marine species, affecting the livelihood of resource-dependent communities, was reported.[3] Added threats to food security of poor populations, human health, lives of communities in low-lying coastal zones and infrastructure damage were projected in the report. More than 528,000 people died as a direct result of nearly 11,000 extreme weather events in 1996–2015 and losses amounted to around US $3.08 trillion.[4]

In view of the impacts of climate change, adaptation—or coping with climate impacts—becomes imperative. The United Nations Framework Convention on Climate Change (UNFCCC) defines adaptation as adjustments in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects. Such adjustments would imply changes in processes, practices and institutions to moderate the potential damage arising due to climate impacts.[5] Of the ten most affected countries (in 1996–2015), nine were developing countries.[6]

While developing countries bear the brunt of climate impacts due to their greater vulnerability, developed countries are also greatly affected. Since 1980, the cost of extreme events for the US has exceeded US $1.1 trillion[7] while Europe suffers damages of up to US $12 billion every year.[8] Therefore, while developing countries have focused more on adaptation, developed countries are also coping with climate impacts.

This report reviews the approaches to adaptation followed by different countries—developed and developing—in an attempt to understand the best way to plan adaptation.

ADAPTATION UNDER UNFCCC

While the Paris Climate Agreement mandates that adaptation gain parity with mitigation, it has taken almost two decades for adaptation to develop as a regime within UNFCCC.

Three major landmarks can be cited with reference to the development of adaptation:

1. Least Developed Countries (LDC) Parties established in Marrakech in 2001 a work programme to develop climate change mechanisms and build capacities, mainly through National Adaptation Programmes of Action (NAPAs) aimed specifically at LDCs. An LDC Expert Group (LEG) was also established to advise on NAPAs.[9]

2. The Nairobi Work Programme (NWP) established in 2006 a mechanism to catalyse the development and dissemination of information and knowledge that would inform and support adaptation policies and practices. The Subsidiary Body for Scientific and Technological Assistance (SBSTA), a negotiating body under UNFCCC, is primarily responsible for coordinating its implementation. The work programme provides unique

opportunities for linking relevant institutions, processes, resources and expertise outside the UNCCC to respond to adaptation knowledge needs identified by Parties.[10] The Adaptation Portal was created within the NWP to provide information on adaptation and needs within NWP's thematic areas, i.e. ecosystems, water resources, health, gender etc.[11] In a recent development, SBSTA requested submissions to understand ways to enhance linkages with partner organizations to ensure that NWP can best serve the mandate and integrate NWP with other programmes and constituted bodies under UNFCCC.[12]

3. The establishment of the Cancun Adaptation Framework in 2010, which advocated a country-driven, gender-sensitive, participatory and fully transparent approach intending to enhance action and support Parties to plan and prioritize adaptation actions. Two focus areas were included—providing support in the formulation of National Adaptation Plans (NAPs) and considering approaches to address loss and damage due to climate change in developing countries and LDCs.[13]

While the Paris Agreement recognized adaptation to be on an equal footing to mitigation, it also talked of a global goal on adaptation for 'enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring adaptation response'.[14]

Adaptation comprises five elements, namely observation, assessment of climate impacts and vulnerability, planning, implementation and monitoring.[15] Under UNFCCC, there are various processes to support Parties in their planning efforts on adaptation. The NAPAs enable LDCs to identify and prioritize urgent and immediate needs with regard to adaptation. Under the Nairobi Work Programme and Cancun Adaptation Framework too, Parties and partner organizations have undertaken a large number of activities.

ADAPTATION PLANNING IN COUNTRIES

This study focuses on the planning aspect of adaptation and looks into adaptation planning approaches, including NAPAs, NAPs and other approaches pursued by countries. Accordingly, three clusters of countries are identified—developed, developing and LDCs. Within the three clusters, a total of 18 countries have been randomly selected and studied.

- Developed countries: Member States of European Union (EU), United States of America (US) and Australia
- Developing countries: Brazil, Kenya, India, Indonesia, Ghana. Morocco, Nigeria, Philippines and South Africa.
- LDCs : Bangladesh, Ethiopia, Maldives, Malawi and Nepal

The aim of this study is to examine and compare how the three groups of countries are approaching adaptation planning and identifying best practices. For this purpose, the climate action plans submitted under the Paris Agreement—the Nationally Determined Contributions (NDCs)—National Adaptation Programme of Actions (NAPAs), National Adaptation Plans (NAPs) and domestic adaptation measures of countries are studied and analysed.

2 Developed countries

Progress on adaptation to climate change in developed countries tracked by the Organization for Economic Co-operation and Development (OECD) in 2006[16] and 2013[17] report that until 2006, developed countries' National Communications (NatComs) neglected adaptation as compared to mitigation. In 2013, the coverage of adaptation in NatComs expanded. Out of the 34 OECD countries, 18 had formulated national strategies for adaptation and 10 had developed detailed adaptation plans.

This chapter looks at the EU's, Australia's and the US's efforts towards climate change adaptation at both the national (supranational for the EU) and local levels. Out of the three countries, only Australia's NDC mentions adaptation and the government's effort to support adaptation to climate change in the form of the National Climate Resilience and Adaptation Strategy, reconfirming the mitigation-centric approach of developed countries to address climate change.[18]

The EU and Australia both have national-level climate-adaptation strategies and frameworks that serve as guides for EU member states and Australian states to develop their own adaptation strategies, i.e. the EU Strategy on Adaptation, adopted in 2013,[19] and Australia's National Climate Resilience and Adaptation Strategy, adopted in 2015.[20]

THE EUROPEAN UNION: SUPRANATIONAL-LEVEL PLANNING ON ADAPTATION

Prior to the development of adaption strategies and plans on the supranational EU level, some member states had already developed their National Adaptation Strategies (NAS), e.g. Finland (NAS adopted in 2005), Germany and the UK (NAS adopted in 2008).[21]

In 2007, the European Commission (EC) published the Green Paper on Adapting to Climate Change[22] to launch consultation and public debate on adaptation. The outcome of the consultation was published as a White Paper titled 'Adapting to Climate Change in Europe' in 2009[23] that paved way for EU-level action on adaptation. A web-based Climate Adaptation Platform (Climate-ADAPT) launched in 2012 emerged as a key outcome of the White Paper,[24] pushing the development of a solid knowledge base to the foreground of EU activities. The need for a supranational adaptation strategy was established to ensure adaptation through common EU policies in vulnerable EU regions and sectors such as agriculture, water biodiversity, fisheries and energy.[25]

The EU Adaptation Strategy was adopted by the EC in 2013[26] for developing a more climate-resilient Europe. The strategy was built around three objectives—to achieve coordination among member states for planning and implementing adaptation, improving and expanding adaptation knowledge to enhance decision-making, and incorporating adaptation in vulnerable sectors (building, energy and transport) and EU policies. As evaluation of the comprehensive EU adaptation strategy is in progress and expected to be released by the end of 2018,[27] we have corroborated our research with findings from independent researches.

Only strategies won't suffice

The EU Adaptation Strategy made it mandatory for all member states to adopt a comprehensive National Adaptation Strategy (NAS). Until 2017, 25 member states—most of which are developed countries that have the infrastructural capacity to adapt—submitted their NASs.[28] Apart from Cyprus, countries like Croatia[29] and Bulgaria,[30] which are most in need of adaptation have no NAS and require institutional and financial support and resources to frame their NASs.[31] More work is to be done to develop coherence and coordination among Member States while framing NAS to ensure that the first objective of the EU Adaptation Strategy is achieved.

The adaptation strategies identify reliable and feasible initiatives and examine issues such as inclusion of adaptation in developing policies and sorting reliable data to frame plans, but it is the action plans that ensure the implementation of these strategies. So far, 15 member states have adopted National Action Plans on Adaptation,[32] hereby slowing the pace of implementation.

Most of the research to evaluate the efforts of member states on adaptation reports that the implementation of NAS and the National Action Plan on Adaptation varies country-wise[33] and is limited overall.[34, 35] In addition, the lack of NAS in vulnerable countries and limited National Action Plans on Adaptation developed by member states have set a slow pace on the EU's role in adaptation.[36]

Adaptation in vulnerable areas

The EU Adaptation Strategy seeks to promote adaptation in key vulnerable areas through climate proofing of EU-level policies such as Common Agricultural Policy (CAP), Common Fishery Policy (CFP) and Cohesion Policy (CP) (see *Box: Climate proofing*).

Climate-proofing policies: Significant but not enough

As per the reforms brought about due to climate proofing in CAP, farmers are to meet statutory management requirements and maintain their land in good environmental and agricultural condition.[37] This has, to an extent, promoted environmentally sensitive practices, reducing vulnerability to climate change. In the case of CFP, the impact of climate change on distribution and productivity of fish stock is addressed by introducing catch limits for 2015–20 to maintain fish stocks in the long term.[38] The Cohesion Policy developed to promote social, economic and territorial cohesion within the EU has been the financial force behind hundreds of thousands of development projects. The inclusion of climate change adaptation, and risk prevention and management in their thematic objectives of policy aims to assist Member States meet their adaptation targets.[39]

CLIMATE PROOFING

Climate proofing means protecting development projects by identifying risks to climate change and ensuring they are reduced to acceptable levels through long-lasting, environmentally sound, economically viable and socially acceptable modifications brought about in the design or implementation of plans. Climate proofing seeks to improve the overall sustainability of projects.

Source: https://www.adb.org/sites/default/files/publication/28796/climate-proofing.pdf

Though climate proofing of major policies has succeeded in identifying risks in respective sectors, the modifications brought about are still not effective. For example, after the inclusion of climate adaptation, the CP has formulated contradicting objectives. While on the one hand the policy campaigns for environmental safeguard and climate proofing, on the other it promotes development of air and road infrastructure from Cohesion funds. In addition to climate proofing of sector-specific policies, it is imperative that other polices are also reformed in a way to complement climate-proofed policies. For example, no amount of climate proofing of national policies will lead to long-term climate goals as long as heavy subsidy on road and air travel exists in Europe.

EU cities' role in adaptation

As early as 2010–11, before the EU Strategy for Adaptation was prepared, cities such as London,[40] Copenhagen[41] and Helsinki[42] were involved in adaptation. Proceeding in a similar direction, the Strategy highlights the role of cities as a major driver in adaptation to climate change. In this regard, the Mayor Adapt, an initiative set up in 2014, which has merged into the Covenant of Mayors (CoM) for Climate and Energy, has played a prominent role.

CoM has 600 cities covering 50 million habitat from 25 Member States who have committed to develop local adaptation plans.[43] CoM's approach is based more on case studies, where cities work together in adaptation-related cities-twinning programmes that facilitate city-city cooperation to exchange best adaptation practices.

Since its initiation, there has been a wide proliferation of CoM in the EU cities[44] but only large and economically prosperous cities are engaged in intensive adaptation planning and implementation.[45] Out of 41 case studies conducted in EU cities as registered in Climate-ADAPT website, only two are associated with vulnerable regions—Coastal Planning in Šibenik-Knin County in Croatia and Flood Protection measures in Smolyan, Bulgaria.[46] The ambit of CoM needs to increase to include more vulnerable cities. Further, the non-legal binding nature of CoM may easily develop consensus among cities but simultaneously breed faction among authorities and administrative departments to make decisions and take action.

Financial tools to address adaptation

The EU's Adaptation Strategy aims to address key knowledge gaps on the costs and benefits of adaptation, and includes local-level analyses and risk assessments through relevant financial tools such as Horizon 2020 and LIFE.

The European Commission is working towards feeding climate adaptation into Horizon 2020, a research funding programme expected to invest 35 per cent of its fund for climate action and resource efficiency research.[47] LIFE—which has supported environmental, nature conservation and climate action projects since 1992—has pledged to contribute EUR 3.4 billion in 2014–20.[48] The mid-term evaluation[49] of LIFE reports 99 per cent utilization rate of funds in 2014–16.

Though the utilization of funds seems impressive, there is a discrepancy in allotment of funds, with developed Member States taking the lead. The funding was directed to 15 integrated projects located in Belgium, Finland, Italy, Germany, UK, Italy, Poland, Denmark and Spain.[50] In the case of less developed member states, the funds covered a turtle management programme in Croatia and a rural development plan in Bulgaria.

Despite claims of EU's considerable financial support in adaptation of cities and regions, the funding is project-based and runs out after the completion of the project.[51] This has proved to be a compounding obstacle in implementing strategies and steps have to be initiated to ensure that adaptation goes beyond the project's scope.

THE UNITED STATES: NATIONAL-LEVEL PLANNING ON ADAPTATION

In the case of the US, the formation of the Inter-agency Climate Change Adaptation Task Force in 2009 was the country's first initiative towards developing a national platform for adaptation planning. This was followed by the signing of Executive Order 13514: Federal Leadership in Environmental, Energy, and Economic Performance by then-President Obama in 2009[52] that directed the development of national principles for adaptation and government-wide adaptation policies. Under Executive Order 13514, each federal agency was required to develop a climate-change adaptation and action plan. As of December 2014, 40 federal departments and agencies have submitted their climate change adaptation plans outlining strategies to protect their operations, missions and programmes from the effects of climate change.[53]

Adaptation across federal agencies

The climate-adaptation plans submitted by federal agencies are agency-specific with broad-scale strategic plans and approaches for adaptation.[54] For example, the adaptation plan of the US Department for Agriculture (USDA) has separate adaptation plans for 11 USDA agencies such as the Animal and Plant Health Inspection Service, Agricultural Research Service, Natural Resource Conservation, Forest Service, and Rural Development.[55] Although federal agencies are instrumental in facilitating climate adaptation, lack of coordination among the agencies[56] necessitates a need for a national forum to communicate and coordinate adaptation-related work among the range of relevant federal agencies.

Climate change challenges that deal with the jurisdiction of several federal agencies have been addressed through sector-specific national adaptation strategies such as the National Action Plan: Priorities for Managing Freshwater Resources in a Changing Climate, the National Fish, Wildlife and Plants Climate Adaptation Strategy; and the National Ocean Policy Implementation Plan.[57]

Focus on research

The US government has increased funding for research on climate change and its impacts. Since its creation in 1989, the United States Global Change Research Program (USGCRP) comprising 13 federal agencies, has conducted and supported extensive work in assessing and predicting climate change, which provides a solid understanding of the climate scenarios that the US can anticipate in the coming years.[58] In addition, the National Global Change Research Plan was set up in 2012 under the programme to provide critical science information, and support decision needs and capacities for climate adaptation.[59] However, this has not served as an effective decision support tool due to the inadequate incorporation of social science methodologies and expertise as reported in the triennial review of the plan published in January 2017.[60] As scientific understanding of climate change continues to grow in the US, a need to integrate social science to assess anthropogenic factors, and vulnerability and capacity for response towards climate change adaptation is to be addressed.

Researches[61, 62, 63] on the states of adaptation in US have unanimously reported that in spite

of adequate scientific databases, analytical tools and decision-support aids available, on-the-ground adaptation measures and projects, especially in natural resource management,[64] are limited and if implemented are not evenly spread across agencies. In addition, constraints in financial resources for agencies to carry out adaptation have been voiced.

Role of US states in adaptation

At the state level, progress on adaptation planning has been low, with only 15 state-led adaptation plans developed so far.[65] California has 48 out of 345 adaptation goals completed and 251 goals in progress; Massachusetts has 24 out of 373 adaptation goals completed and 191 in progress; New York has 17 out of 121 adaptation goals completed and 63 in progress—these states have been the forerunners in implementing adaptation.[66] With climate actions at the federal level coming to a halt under the current administration, it is up to the state governments to take up climate adaptation to ensure a climate-resilient future in the US.

The US has sustained 218 weather and climate disasters in 1980–2017, with estimated overall damage costs exceeding $1.2 trillion.[67] These figures establish that adaptation to climate extremes serves to prepare society for climate change. But climate adaptation can be expected to be more in shambles after the US's withdrawal from the Paris Agreement deliberated by a climate-sceptic President Trump. Though counter movements such as We Are Still in Coalition[68] and the United State Climate Alliance (USCA)[69] have been formed to uphold the objectives of the Paris Agreement, it is highly doubtful that serious efforts will be directed towards enhancing the country's adaptive capacity as it enters into an internal battle with the current administration. Moreover, the mitigation-centric climate action plans of the US further shifts the need to adapt to the back-seat. With the US lacking strong political leadership to enhance international cooperation in addressing climate change adaptation, its global leadership is questionable.

Role of US cities in adaptation

The role of US cities in climate adaptation has been significant only in recent years, with just 50 city-centred adaptation plans registered until 2015.[70] US cities have taken up different strategies towards adaptation planning as discussed in the following:

Ambitious city adaptation plan

New York has been a forerunner in laying down city adaptation plans in the US. With its $19.5 billion adaptation plan involving 250 initiatives to reduce the city's vulnerability to coastal flooding and storm surge, it has been noted as the most ambitious and expensive city adaptation plan. But doubts have been placed as the adaptation plan has been developed on models that predict climate trends until 2050.[71]

Integrating adaptation and natural hazard mitigation

Cities like Lewe in Delware, Santa Cruz in California and Baltimore in Maryland have incorporated climate-adaptation issues into a natural hazard mitigation plan addressing climate adaptation.[72] Though instructive lessons can be acquired, overlapping climate change adaptation with natural hazards mitigation is not advisable. Natural hazard mitigation plans use projections of future hazards based solely on past hazard experiences and do not address how climate change will alter existing hazards.

Standalone adaptation plan

Focusing solely on climate-change impacts, counties such as Keene, New Hampshire and Boston, Massachusetts have developed standalone adaptation plans.[73] Such plans are

more likely to expand adaptation to broader sectors such as public health, natural resource management and ecosystems. But cities with such plans are facing the dilemma of lack of national-level incentives and support.

Composite Climate Action Plans

Cities such as Portland and Oregon have developed composite Climate Action Plans that address climate change briefly. Earlier Climate Action Plans rarely addressed adaptation,[74] but in recent times negotiations on the international platform for adaptation has facilitated domestic adaptation planning. For example, in Charleston, a city that survived more than 20 inches of rain over three days when Hurricane Joaquin hit in 2015, focus was on sea level rise. The Sea Level Rise Strategy launched in December 2015, however, is still awaiting federal funding.[75]

As deduced by the study 'Where to begin municipal climate adaptation planning' by Ward Lyles and co-workers,[76] a city should ideally approach adaptation with multiple plans with each plan focusing on specific climate issues engaging related departments for execution. But as reported in the study, constraints of resource availability offset timing for updating existing plans, and with fluctuating local political priorities, most US cities lack the intention to address climate change. Also, no adequate information about implementing strategies and policies are mentioned in the plan, leading to plans being futile.

AUSTRALIA: NATIONAL FRAMEWORK AND PLANNING ON ADAPTATION

The establishment of the National Climate Change Adaptation Research Facility (NCCARF) in 2007[77] commenced Australia's pursuit towards climate change adaptation. Since then, NCCARF has worked to deliver practical, hands-on tools and information to help governments, businesses and communities manage climate risks, particularly in the coastal zone. The launch of Coast-Adapt, an online tool under NCCARF in 2014,[78] has proved to be a resource for regions to identify their adaptation challenges, undertake risk assessments, and identify and assess solutions.

The National Climate Change Adaptation Framework[79] developed in 2007 became the base for the overarching National Climate Resilience and Adaptation Strategy framed in 2015. The strategy includes adaptation initiatives to be undertaken in prioritized key areas such as coastal cities and the built environment, and key sectors such as agriculture, forestry and fisheries, water resources, natural ecosystems, health and wellbeing, and disaster-risk management,.[80]

Regional adaptation

To boost the resilience of Australia's coastal ecosystems, a separate adaption plan to address the impact of climate change on the Great Barrier Reef[81]—the world's largest and most complex reef system developed—is being implemented by the Australian government. Initially framed as the Great Barrier Reef Climate Change Action Plan 2007-2012, it led to greater knowledge and understanding of the critical need for adaptation in the Great Barrier Reef, which translated into the Great Barrier Reef Climate Change Adaptation Strategy and Action Plan 2012-2017.[82] The current adaptation strategy adopts ecosystem-based approaches to increase the health and resilience of the Great Barrier Reef. In addition, the strategy pushes to build capacity to manage and foster the sense of stewardship among users of the Great Barrier Reef catchment.[83] In continuation of the adaptation plan, Reef

2050 Plan was formulated that provides an overarching strategy, actions and investment for the management of the Great Barrier Reef up to 2050 to achieve long-term resilience.[84]

Sectoral adaptation

The adaptation initiatives for the agriculture sector have concentrated on research and development with a focus on productivity in a water-limited environment; improving seasonal forecasting at the regional and district levels and forecast of extreme events; and availability of spatially explicit information on historical weather data, land use, vegetation, soils and topography to underpin adaptation decision-making.[85] The majority of such initiatives are undertaken by the Rural Research and Development for Profit Programme[86] of the Department of Agriculture. Under the Intergovernmental Agreement, the National Drought Programme has been implemented since 2014[87] to prepare farmers for droughts and manage their business risk pro-actively.

The Water Sector has been comparatively neglected with no specific adaptation plan at the national level. Adaptive measures are promoted through two national programmes—National Water Initiative (NWI)[88] and Water Efficiency Labelling Scheme (WELS).[89] Since the plans focus on identifying climate change risks affecting available water resources and efficient use of water, there is a need for stronger planning provisions for adaptive management of surface- and groundwater systems. Similar views were held by an inquiry into the reform of Australia's water resources sector held in May 2017,[90] which notified a lack of understanding of the effect of climate change on water access entitlements (that advocated equal share in water), especially at the local level. This hindered the scope to improve existing water plans to deal with long-term climate change.

Role of states in adaptation

Australian states have recently ventured into framing separate climate adaptation plans, with only three out of six states having separate adaptation strategies, including the South Australian Climate Change Adaptation Framework of 2012,[91] Queensland Climate Adaptation Strategy 2017–2030,[92] and Victoria's Climate Change Adaptation Plan 2017–2020.[93] At the state level, the adaptation strategy is sector-based, with a regional planning approach. For example, Queensland's adaptation strategy aims to develop two pilot adaptation plans for the agriculture and infrastructure sector and simultaneously promote regional planning through the partnership of local and state governments under the Queensland Climate Resilient Councils (Q-CRC) programme.

Tasmania, Western Australia and New South Wales have not yet adopted any separate strategy for adaptation. The adaptation component of Tasmania's Climate Change Action Plan for 2017–2020[94] is centrally focused on the Tasmanian Coastal Adaptation Pathways Project that aims to help the vulnerable coastal communities to adapt. In 2012, the West Australian Climate Change Strategy was framed where adaptation was approached via integrating adaptation initiatives into existing development strategies of sectors.[95] The 2016 Climate Change Policy framework of New South Wales (NSW) intends to develop a climate adaptation action plan. So far, the government of NSW has focused on local adaptation through the Enabling Regional Adaptation Approach in the south-east, a vulnerable region with snowy mountains and tablelands in the south. This Approach has helped incorporate climate change in long-term planning for adaptation.[96]

Role of Australian cities in adaptation

Since the major Australian cities are coastal, all three adaptation strategies resonate with measures towards rising sea levels, heatwaves, drought and flood. The Australian cities have gained momentum in the formulation of adaptation plans, but they have a long way to go in implementation as they tackle distribution of responsibilities across different levels of government and citizens.[97]

Cities' coordination with states

While drafting the adaptation plans, the Australian cities have made efforts to coordinate with state governments. For example, the adaptation strategy of Sydney, adopted in 2017, mentions the Adaptation Development Heat Wave Response Plan to align with the New South Wales State Heatwave Sub Plan of 2011.[98] The review of Adelaide's first Climate Change Adaptation Action Plan of 2011-2013[99] revealed that many adaptation initiatives of the plan overlapped with the programmes of the Council government that led to the revision of the plan and development of a new Adaptation Action Plan for 2013–15. Since then the city has framed short-term plans to ensure monitoring of the progress of the State Government Climate Change Adaptation Framework and the Council's current status in relation to adaptation planning.

Collaborative programmes for adaptation

Australian cities are working towards building a collaborative programme of strategies adopted in 2013 for specific areas such as the Western Adelaide Region Climate Change Adaptation Plan (WARCCAP), which coordinated among the cities of Adelaide, Enfield, Charles Stuart and West Torrens. WARCCAP's initiative is aligned with the National Climate Change Adaptation Framework, Natural Disaster Resilience Strategy and the Local Government Association South Australia Climate Change Strategy.[100]

In spite of positive attempts made by Australian cities towards adaptation, they are burdened with financial and technical constraints.[101] There is no mandate from the higher-level of governance for planning adaptation and responsibilities among administrative officers are unclear.[102]

ANALYSIS OF DEVELOPED COUNTRIES

While researching on the approaches adopted by developed countries towards adaptation, ecosystem-based adaptation (EbA) seems to have emerged as the key instrument adopted by the majority of countries.

Ecosystem-based adaptation

EbA utilizes nature's capacity to absorb and control impacts of climate change and has led to co-benefits such as aesthetics, biodiversity, improved mental welfare and property/neighbourhood improvements.[103]

Compared to the US and Australia, there is a larger trend in Europe for adopting EbA, with specific mention of the need to provide resources to 'ensure the full mobilization of ecosystem based approaches to adaptation'[104] in the EU Adaptation Strategy. Country-wise EbAs have been implemented in countries such as Germany,[105] Sweden,[106] the UK, Netherlands and Denmark. The earliest ecosystem-based project, i.e. the Biotope Area Factor (BAF) Programme of Berlin, Germany, was initiated in 1994 with the objective of environmental conservation and has evolved into an important mechanism to reduce local vulnerability.[107] Similarly, the Humber Flood Risk Project of the UK, launched in 2008,

utilized EbA-managed realignment to protect against sea-level rise and creation of wash land, wetland and salt marsh habitats to buffer the force of incoming waves and tides.[108] In addition, successful transnational EbA projects such as WAVE (Water Adaptation is Valuable to Everyone) in 2008–15[109] implemented in the UK, Netherlands, France Belgium and Germany.

In USA, the State Action Plans on adaptation included EbA[110] but it has not been the bedrock of any state's effort. California is by far the most advanced in integrating EbA into their adaption plans, with the notable example of the Bay Area Ecosystems Climate Change Consortium (BAECCC) that supported numerous projects on ecosystems affected by rising tides.[111] In Australia, the Great Barrier Reef Adaptation Strategy and Action Plan has opted for the EbA approach to ensure the resilience of ecosystem by improving the health of the reef and reduce vulnerability of industries and communities dependent on the Reef.[112]

Though the EbA has acquired a niche in national-level and state-level adaptation planning of developed countries, its integration in local planning is still in its infancy[113] and more effort is required to shift EbA from an approach (theory) to action (practice).

Limitations identified

Irrespective of developed countries' technological, infrastructural and financial advantages, their adaptation efforts are laagered and do not match up to the momentum of mitigation efforts.

More focus on infrastructure and less on communities

It is a common assumption that vulnerable communities in developed countries are better off than those in developing countries owing to their wealth, democratic institutions and post-industrial development status. But with the existence of regional and social differences in developed countries, some communities have not adapted effectively. For example, ethnic minorities and less educated populations were found in studies conducted in Europe[114] and the US[115] to be more vulnerable to heat-associated mortality. Studies have also shown that most of the adaptation plans of developed countries have addressed only Arctic and coastal areas.[116, 117, 118] Further, in the reviewed adaptation plans and strategies, there has been limited focus on vulnerable communities.

The US government has made efforts to expand their coordination with the American Tribal Association for planning and implementing adaptation. The inclusion of two tribal leaders, along with eight governors, and 16 county and local officials in the Task Force on Climate Preparedness and Resilience created in 2013[119] sets a notable example. Such gestures should go beyond fulfilling political obligations by allowing tribal representatives to articulate the traditional version of reality, i.e. climate change impacts on them and their traditions. This is imperative as their traditional knowledge—which only can cater to tribal survival and strategies of adaptation—should be utilized in proper manner. Similarly, the Australian government under NCCARF formed the Vulnerable Communities Network (VCN)[120] to carry out research towards understanding the health and socio-economic factors of vulnerable communities.

This calls for developed countries to address vulnerable population such as ethnic minorities, females, the elderly, children and those belonging to the lower socio-economic spectrum in in their adaptation plans and actions. In addition, a strong voice from vulnerable communities for designing and implementing adaptation plans for them is essential.

Meagre action on the ground

Research has commented that most of the adaptation plans from developed countries appears merely institutional, comprising policies, regulations and guidelines[121, 122, 123] as well as governmental mechanisms.[124] Even after elaborate plans and policies were formulated by developed countries, implementation has been limited.[125, 126] Limited on-ground actions relate most to securing infrastructure, utilities and transport, while sectors like agriculture, water and natural resource have been left with a set of guidelines and regulations.[127]

Our assessment too has established similar notions—that adaptation actions are lacking both on-ground implementation and increased focus on infrastructure. The EU adaptation strategy seeks to address adaptation by adjusting the angles of its policies such as CAP, CFP and CP whereas the action for adaptation in the infrastructure sector has been initiated with the setting up of the Adaptation to Climate Change Coordination Group (ACC-CG) in 2014.[128] ACC-CG currently focuses on revising existing standards or developing new standards in the areas of energy, transport and building for the inclusion of adaptation. This observation is reiterated by more than double the case studies conducted for the infrastructure sector than of agriculture (as acquired from the database of Climate-ADAPT).[129]

Though it is noted that a significant amount of time is required to progress from identifying issues to implementing interventions, further delay will only diffuse the targets set by adaptation plans given the momentum of climate change. The existential gap between planning for adaptation and translating it into on-the-ground action needs to be addressed at the earliest.

Financial barriers

Developed countries are not expected to face financial barriers in implementing climate adaptation as their pledges towards funding global adaptation efforts are promising. The European Commission and USA both doubled their climate finance grants, as announced in the Paris Conference of 2015, which amounted to EUR 2 billion and US $800 million per year until 2020.[130] Australia has provided US $328.2 million adaptation assistance through the International Climate Change Adaptation Initiative.[131]

Yet financial barriers have been reported as a cause for limited implementation within developed countries,[132, 133] contributing to the meagre amount spent on adaptation. In 2014–15, cities in developed countries spent 0.22 per cent of their GDP as compared to 0.15 per cent GDP spent by cities in developing countries.[134] The per capita spending on adaptation by developed countries shows roughly $300-500 as compared to less than $60 in developing countries.[135]

This leads to two important observations:

- Developed countries are putting in approximately the same technical and financial resources as developing countries towards adaptation.
- The higher per capita investments (almost five times) of developed nations substantiated our earlier observation that adaptation in developed countries focuses more on protecting physical structures than populations at risk.[136]

The lack of legislations that mandate adaptation in countries is another factor that hinders the smooth flow of financial resources. It is imperative for countries to draft legislations like the US Disaster Mitigation Act of 2000 that allocates federal funds to all local governments that develop hazard-mitigation plans.[137] Financial barriers in developed countries are unforeseen and can be resolved smoothly if governments build serious attitudes and stringent actions.

3 Developing countries and LDCs

ADAPTATION IN THE DEVELOPING WORLD

While NAPA (National Adaptation Program of Action) and NAP (National Adaptation Plan) are both adaptation efforts in developing countries and LDCs, there are differences in their objectives and implementation.

How is NAPA different from NAP?

The National Adaptation Programmes of Action (NAPAs) are action-oriented programmes set up for LDCs in 2001 by UNFCCC to address their most urgent and immediate adaptation needs. Their approach was to list out priority projects built on short-term adaptation interventions and long-term development strategies.[138] So far, however, only 24 per cent of NAPAs have demonstrated integration with national development processes,[139] creating a need for countries to move towards long-term adaptation strategies.

The creation of National Adaptation Plan (NAP) in 2011 at COP in Durban[140] aimed to guide countries to prepare and execute comprehensive medium- and long-term adaptation plans (see *Box: Development of NAPA and NAP*). Unlike NAPA, NAP is meant to be a continuous, progressive and iterative effort towards fulfilling two objectives—increasing countries' resilience towards climate change and facilitating integration of climate change adaptation into countries' development processes.[141] The holistic approach of NAP seeks to fulfil the objectives through four NAP processes:

- Laying down ground rules and addressing gaps
- Preparing to fill information gaps—focusing on national vulnerability assessment and developing future climate scenarios
- Building implementation strategies
- Monitoring and evaluating NAPs' progress

Emphasis of the NAP guidelines is more on the four processes than on the objectives with a view to ensure transparency, gender-sensitivity, and a country-driven and participatory approach. With only eight NAP submissions to UNFCCC so far, most of the countries are in the process of developing and submitting their NAP.

Adaptation component in Nationally Determined Contributions (NDCs)

As of May 2017, 145 of 163 NDCs submitted have adaptation components that undoubtedly are submissions from developing countries and LDCs.[142] Developing countries and LDCs are more vulnerable to climate change and the need for adaptation is communicated in their NDCs.

NAP in NDCs

As NDCs were submitted before the NAPs, developing countries like Brazil[143] and Kenya[144] mention the preparation of NAPs in their NDCs. Brazil's adaptation strategy was centred on social dimension with efforts to protect vulnerable population especially along its coastlines. The NAP of Kenya is to include a comprehensive programme for adaptation action across sectors in support of livelihoods and the economic wellbeing of the Kenyan people.

DEVELOPMENT OF NAPA AND NAP

NAPA

2001: UNFCCC recognized the need for specific and urgent adaptation in LDCs in COP7, which established NAPA and adopted guidelines for the preparation of NAPA. In the same year, the LDC Expert Group (LEG) was set up to provide guidance and advice on the preparation and implementation strategy for NAPA.

2003: Decisions of COP9 directed the Global Environmental Facility (GEF) to support implementation of NAPAs on their completion

2005: GEF operationalized the Least Developed Country Fund (LDCF) for the implementation of NAPA in COP11

2016: 51 LDCs submitted their NAPAs with the first submission from Bangladesh in November 2005 and last by south Sudan in November 2016

NAP

2010: The Cancun Adaptation Framework established in COP16 initiated the process of National Adaptation Plans (NAPs) to enhance adaptation efforts in LDCs and simultaneously set up the Adaptation Committee (AC) to provide technical support to parties, facilitate sharing of information and best practices, and advise on adaptation-related matters.

2011: The guidelines and modalities for NAP were formulated in COP17. Also, interested developing countries were solicited to draw up their NAPs and were permitted to approach the AC for support.

2012: The guidelines, modalities and four NAP processes were approved in COP18

2015: Article 7.9 of the Paris Agreement mentions that all Parties shall as appropriate engage in the formulation and implementation of NAP

2017: Eight countries (Brazil, Burkina Faso, Chile, Cameroon, Kenya, Sudan Palestine and Sri Lanka) have submitted their NAPs to UNFCCC

Source: http://unfccc.int/national_reports/napa/items/2719.php

http://unfccc.int/adaptation/workstreams/national_adaptation_plans/items/7594.php

The adaption processes, iterative in nature, have been ongoing for over decades. Focusing on long-term adaptation initiatives, the NDCs of Ghana[145] and Indonesia[146] mention mainstreaming adaptation initiatives into the National Development Plan via drafting and implementing the NAP. Entering the final stages of NAP preparation, Morocco[147] intends to implement a sectoral approach towards adaptation, outlining the national-level plans for energy, waste management, water, agriculture and forests. Similarly, while submitting its NDC, South Africa was developing a National Climate Change Adaptation Strategy and Plan to be integrated into all relevant sector plans, and upon which their NAP would be based.[148]

National Climate Change Plans in NDCs

The NDCs of countries such as India, Nigeria and Philippines have shared adaptation activities identified and planned for their national plans, policies and strategies. For example, India's adaptation initiatives in sectors like agriculture, water, forest and sensitive

Himalayan ecosystems have been mentioned through the eight National Missions running under the National Action Plan for Climate Change (NAPCC).[149] Similarly, the aspirations of Nigeria and the Philippines to adapt to climate change have been highlighted through the National Adaptation Strategy and Plan of Action for Climate Change for Nigeria[150] and the National Climate Change Action Plan for the Philippines[151] respectively in their NDCs.

NAPA in NDC

All the LDCs have communicated their ongoing activities under NAPAs in their respective NDCs. Though the project-based NAPA has promoted adaptation in these countries, the need for long-term adaptation initiatives has been expressed. Bangladesh's NDC speaks of the formulation of a road map for the preparation of NAP to integrate adaptation to existing policies.[152] In addition to NAPA, LDCs have mentioned their own adaptation strategies such as the Ethiopian Programme of Adaptation to Climate Change set up in 2011, whose efforts will be built on existing practices to mainstream and upscale NAPA's interventions.[153] Malawi's NDC mentions adaptation actions in sectors like agriculture, water, forestry and energy, which resonates with the objectives of its NAPA.[154] Nepal's NDC mentions a mechanism to address the local adaptation need called Local Adaptation Programme of Action (LAPA).[155] Similarly, the Maldives' NDC mentions the country's continued and required adaptation effort in sectors like food security, coastal protection, health and water.[156]

Analysis of NDCs

Including adaptation in NDCs was optional but most developing countries and LDCs did so to voice their specific need for adaptation (both immediate and long term) as a part of their climate actions. Considering adaptation as a part of NDCs enhances its portrayal at the national and international levels, initiating action.

Our study has led to the following analysis:

- Detailed accounts of adaptation approaches and strategies focusing on vulnerable sectors (in India, Kenya, Ghana) or vulnerable populations (in Brazil, Indonesia) have been mentioned in NDCs along with the preparation of NAP (in Brazil, Kenya, Morocco, South Africa and Bangladesh) or the existence of at least one domestic adaptation plan (in India, Philippines, Ghana, Indonesia). Diversity in the initiatives, priorities and needs of countries reflect that adaptation is country-driven.

- The preparation of NDCs involved country-level and domestic exercises to acquaint countries to assess their activities, work, challenges and costs with regard to adaptation. This has led to identifying and addressing knowledge, financial and institutional gaps and barriers to promote effective actions. For example, countries such as India, Ghana and South Africa have gone ahead to estimate the cost of adaptation in their NDCs. India's adaptation cost estimate of $206 billion for the period 2015–30,[157] Ghana's estimate of $4.21 billion for 2020–30[158] and South Africa's annual estimate of $170 million[159] for post-2020 emphasizes the need for financial assistance to be directed to developing countries for adaptation.

- The NDCs mention the need to integrate adaptation to existing policies and development plans but do not clearly articulate the means to do so. Kenya's priority adaptation activities include integration of climate change into the health sector.[160] Integration of climate change as mentioned in Nigeria's NDC will be attempted into

national, sectoral, state and local government planning.[161] Along with climate change, the Philippines also intends to integrate disaster-risk reduction into the country's plan at all levels.[162] Countries have to touch on priority sectors and how they intend to link adaptation to their national development plans.

- The NDCs are communication documents rather than plans. The commitments laid down in them elucidate only the country's solemnity towards battling global climate change. Such communications can nevertheless develop global cooperation, identify global needs and guide adaptation investments. But the claims and intentions put forward in NDCs will remain irrelevant if they not provided with proper resources and efficient planning mechanisms to fulfil them.

APPROACHES TO ADAPTATION PLANNING IN DEVELOPING COUNTRIES

NAPAs and NAPs are not the only instruments for climate adaptation in developing countries and LDCs. Countries have their domestic strategies or plans catering to either adaptation separately or together with mitigation. The following section deals with the adaptation efforts of developing countries and LDCs.

NAPs

Countries are in different stages of development of NAP, including initiating the process to formulate and implement NAP, laying the groundwork and addressing gaps. Out of the developing countries reviewed, only Brazil (May 2016)[163] and Kenya (February 2017)[164] have submitted their NAP to UNFCCC. The existing regulatory framework (National Plan for Climate Change, 2010 for Brazil; National Climate Change Response Strategy for Kenya) and legal framework (National Policy for Climate Chang, 2009 for Brazil) served as default mandates for formulating and implementing NAP. Also, it is important to gain clarity on the time frame set in adaptation plans for accomplishing medium- and long-term adaptation needs. The time frame of four years (2016–20) has been set for Brazil. In Kenya's NAP, different time scales, i.e. short term (one to two years), medium term (three to five years) and long term (more than six years) for a fixed time frame of 15 years (2015–30) is set for completion of adaptation activities. The details of sectors covered for all the countries are given in *Table I: Adaptation plans at national level and sectors covered*.

National-level adaptation planning

South Africa, Indonesia, Ghana and Nigeria have set up separate adaptation strategies at the national level. The National Adaptation Strategy of South Africa drafted in September 2016 on the basis of the National Climate Change Response Policy of 2011 has a time frame set from 2020 to 2030.[165] The strategy aims to direct adaptation efforts in all levels of government and secure communication and coordination among them. Through the strategy, the government seeks to not only assure the development not affected by climate change but make adaptation a tool for sustainable and social development.

Indonesia's National Action Plan for Climate Change Adaptation launched in November 2013 has a time frame of twenty years that is outlined in four phases of five years each.[166] The strategic objectives of the plan are directed to building economic resilience, establishing livelihood resilience, maintaining the sustainability of environmental services (ecosystem resilience) and strengthening the resilience of vulnerable areas—coastal and small islands.

Likewise, Ghana also has adopted the National Climate Change Adaptation Strategy set at time frame from 2010 to 2020.[167] The ongoing adaptation initiatives involve several

projects (10) that address Ghana's urgent adaptation priorities in vulnerable sectors like agriculture, water, health and energy. The priority projects were selected through a multi-criteria analysis and concentrated in northern Ghana, the most vulnerable region due to high levels of poverty, dry conditions and heavy reliance on agriculture.

The National Adaptation Strategy and Plan of Action on Climate Change for Nigeria was developed by the then-ongoing Building Nigeria's Response to Climate Change (BNRCC) project in November 2011.[168] BNRCC was a joint effort of the Ministry of the Environment and civil society actors and was funded by the Canadian International Development Agency (CIDA) that worked towards sensitizing communities and developing a community-based approach in climate adaptation activities. Replicating the adaptation approach of BNRCC, the comprehensive adaptation strategy includes measures for 13 priority sectors (see *Table 1: Adaptation plans at national level and sectors covered*).

National-level plan on climate change

For countries like India, Philippines and Morocco, broad adaptation issues are grasped under the action plans drafted by states to address climate change along with mitigation plans (see *Table 1: Adaptation plans at the national level and sectors covered*). The National Action Plan for Climate change (NAPCC) launched in India in 2009[169] has a pronounced presence of adaptation component and cross-sectoral links through eight missions—the National Solar Mission, the National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a Green India, National Mission for Sustainable Agriculture, and National Mission on Strategic Knowledge for Climate Change.

The Philippines' National Framework Strategy on Climate Change released in 2010 stressed on a balance between mitigation and adaptation. It paved the way for the development of the National Climate Change Action Plan whose actions are divided into three phases in six years for 2011–18.[170]

The adaptation component of the Moroccan National Action Plan against Global Warming rests on two pillars—Strategy for Water launched in 2009 and the Plan Maroc Vert (Green Morocco Plan) launched in 2009 for agriculture.[171] The Strategy for Water, with implementation period 2010–30, focuses on risk prevention via the National Plan of Protection against Flooding. Additional programmes for conservation of drinking water and industrial uses and programmes for protection of watershed, groundwater, wetlands and lakes are included in the strategy. Plan Maroc Vert, a major development plan in the agricultural sector, aims to improve efficiency of water use in the agricultural sector.

While several adaptation issues are being addressed in the current national actions plans on climate change, centralization of adaptation plans will enhance its scope and effectiveness and accelerate implementation.

Table 1: Adaptation plans at the national level and sectors covered

Country	Plan (in year)	Sector
Brazil	National Adaptation Plan (2016)	Agriculture, Biodiversity and Ecosystems, Cities, Disaster Risk Management, Industry and Mining, Infrastructure (Electric Power, Transport and Urban Mobility), Vulnerable Communities, Water Resources, Health, Food and Nutritional Security, and Coastal Zones
Kenya	National Adaptation Plan (2017)	Energy, Infrastructure, Health, Water and Sanitation, Biodiversity, Wildlife, Agriculture, Oil and Mineral Resources and Tourism
South Africa	National Adaptation Strategy of South Africa (2016)	Agriculture, Water, Health, Biodiversity, Human Settlement, Disaster Management, Forestry, Mining, Energy, Transport and Infrastructure
Indonesia	National Action Plan for Climate Change Adaptation (2013)	Agriculture, Energy, Health, Infrastructure, Urban Centres and Coastal Areas
Ghana	National Climate Change Adaptation Strategy (2010)	Water, Agriculture, Fisheries, Health and Energy
Nigeria	National Adaptation Strategy and Plan of Action on Climate Change (2011)	Agriculture, Water Resources, Forestry, Health And Sanitation, Human Settlement And Housing, Energy, Transportation and Communication, Disaster and Migration, Livelihoods, Vulnerable Groups, Education
India	National Action Plan on Climate Change (2009)	Water, Agriculture, Forestry, Energy, Urban centres and vulnerable regions like Himalaya and Coastal zone (recently added)
Philippines	National Climate Change Action Plan (2010)	Food Security, Water Sufficiency Ecosystem and Environmental Stability Human Security Climate-Smart Industries and Services Sustainable Energy Knowledge and Capacity Development
Morocco	National Action Plan Against Global Warming (2014)	Meteorology, Water, Agriculture, Forestry and the Fight Against Desertification, Fisheries and Coasts, Land Use, Health and Tourism

Source: Compiled from different country level action plans

MAINSTREAMING ADAPTATION

Mainstreaming climate change adaptation is the iterative process of integrating climate change adaptation into policy-making, budgeting, implementation and monitoring processes at the national, sectoral and sub-national levels.[172] To initiate mainstreaming, it is essential to establish a linkage between climate change and national development priorities to identify the entry point for integration of adaptation into developmental plans, existing policies, sectoral plans, budgeting and finances.[173] There is a need to establish a standard practice for mainstreaming as formulation of strategies and action plans are not sufficient. This section deals with the mainstreaming efforts of countries.

The need to mainstream climate adaptation has been communicated in all the national plans but the mention of methods is meagre. This goes to explain that though the countries have grasped the urgency of mainstreaming climate change, the concept is still unclear.

Mainstreaming through legislation and policies

So far, countries have opted for strategic integration by developing Climate Change Policies and Climate Change Acts. For example, the National Climate Change Policy of Ghana,[174] the Climate Change Act of Philippines[175] and Kenya[176] dictate the state and national governments to integrate climate change in their action plans with no mention of ways to mainstream climate change.

For some countries, other government policies have strong bearing to climate change mainstreaming. In Nigeria's case, policies like the National Agricultural Resilience Framework (NARF) aim to strengthen the overall institutional framework for improved resilience and adaptation to climate change. Likewise, the Agricultural Promotion Policy (APP) that focuses on promoting climate-smart agricultural governance, legislation and mechanism by strengthening institutional linkages (APP) has significant accountability towards mainstreaming climate change.[177]

Mainstreaming pilot projects

When adaptation initiatives are carried out on a pilot scale, mainstreaming of climate adaptation is often done by either upscaling pilot projects or integrating them into existing development plans and policies. Some countries wish to test approaches to climate resilience before mainstreaming adaptation as in the Green Morocco Plan launched in 2011. Morocco attempted sectoral mainstreaming through this project, which focused on integrating climate change into the agricultural sector. The World Bank review on the project reports a better mainstreaming would take place if pilot projects were integrated with the institutional structure and processes of the agencies responsible for carrying out the project.[178]

Guide to mainstreaming

South Africa is the only reviewed country that devised a guide to mainstreaming climate change. The 'Let's Respond Toolkit' launched in 2011,[179] with supporting information and exercises, guides mainstreaming climate change into local development plans. It comprises the necessary steps towards climate-responsive planning and provides a set of practical tools to support the process that has been beneficial for municipal leaders and administrators.

ASPIRATION BEHIND NATIONAL ADAPTATION PLAN

Despite countries having national-level adaptation plans or strategies, the UNFCCC has mandated the submission of NAP which calls for additional work for countries framing it.

This section discusses what necessitate the drafting of NAPs as countries undergo complex and detailed NAP guidelines.[180] The formulation of NAP is based on a country's past experience on adaptation and its implementation intends to integrate climate adaptation into national decisions to ensure the long-term impact of adaptation initiatives. NAP was not meant to serve as a plan that lists adaptation activities separate from development activities but was intended as

- A platform to link adaptation activities to existing national plans and policies and identify entry points for adaptation towards future national development plans
- A comprehensive, systematic and standardized literature source of documented adaptation initiatives at national, sub-national and local levels so the adaptation efforts of countries can be easily gauged by the UNFCCC and exchange of best practices facilitated among countries with similar socio-economic scenarios
- A venue for linking adaptation actors on different scales and levels of governance

Implementing approaches to NAP

Of the two NAPs reviewed (Brazil and Kenya), both have followed different implementation approaches.

Upscaling sectoral adaptation in Brazil

The guidelines for implementing Brazil's NAP include strengthening and reviewing the existing sectoral adaptation plans of the country. For example, the strategy for agriculture was based on providing inputs for review of the adaptation programme of Low-Carbon Agriculture Plan launched in 2011 and confirms suitable adaptation actions to be carried out by 2020.[181.] Similarly, in the infrastructure sector, the review of Sectoral Plan for Transport and Urban Mobility for Mitigation and Adaptation to Climate Change was outlined in the NAP.

Restructured institutional priorities

Kenya seeks to use the current institutional arrangements like National Climate Change Action Plan that was launched in 2013 and the Climate Change Act of 2016[182] for implementation of proposed sectoral adaptation actions as outlined in their NAP. In addition, coordination institutional arrangements have been proposed like the National Climate Change Council to oversee implementation of NAP and the Climate Change Directorate for setting targets and coordinate adaptation actions.

This goes to show that as NAP is country-driven, the implementation approaches may be different for different countries as long as the adaptation actions are not differentiated from development actions.

LINKING ADAPTATION TO GLOBAL PROCESSES

The following section discusses how the objectives of global processes like the Global Goal on Adaptation (GGA), Sendai Framework for Disaster Reduction (DRR) and Sustainable Development Goals (SDG) framed under the UNFCCC are in sync with the objectives of adaptation. Since all the countries are signatory to UNFCCC, they are required to implement these processes in their national systems and processes. So establishing a link between adaptation and global processes can provide better understanding of climate-induced disasters and help in translating adaptation to disaster-risk reduction and sustainable development.

Global goal on adaptation (GGA)

The need to develop a Global Goal on Adaptation (GGA) that aimed at '*enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the global temperature goal*' was recognized at COP at Paris[183] in 2015. Countries have come out in support of GGA while discussions continue on how to operationalize GGA. The aspiration behind establishing GGA is to set ambitious adaptation target and facilitate monitoring of adaptation in countries.

The UN Adaptation Gap Report of 2017 states that to carry out global assessment of adaptation progress, there is a need to collect information regarding country-wise adaptation in a systematic, comprehensive and consistent manner at regular intervals.[184] For this, the learnings from NAPAs an NAPs can feed into the discussion of GGA. With the ongoing discussion, continuous effort is required for more research, technical exercise and assessment of adaptation cost to develop metrics for assessing the GGA. Until then, the

adoption and implementation of NAP can give insight on the progress of adaptation made by countries that can contribute to creating momentum for formulating GGA.

Disaster Risk Reduction (DRR)

Disaster Risk Reduction is the concept and practise of reducing disaster risks through minimizing exposure to hazards and reducing the vulnerability of people and assets while preparing the land and environment for adverse events.[185] Climate change adaptation addresses the reduction and management of climate risk. For many countries, climate risk can be aligned with disaster risk, and adaptation initiatives to reduce vulnerability in regions and communities can contribute to strengthening DRR. This way the objectives of DRR and adaptation overlap and converging policies and plans can meet both DRR and adaptation objectives to facilitate conditions to prevent repetition of action, redundancy and gaps in service.

The Sendai Framework on Disaster Risk Reduction adopted by the UN in March 2015 aims to achieve substantial reduction of disaster risk and losses in lives, livelihoods and health in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries over period 2015–30.[186] The 'build back better' principle of the Sendai Framework that suggests that DRR should go beyond addressing short-term risk to prevent creation of disaster risk stands similar to the principle of adaptation.

Sustainable Development Goals

The Sustainable Development Goals (SDGs), set by the United Nations, came into effect in January 2016. The broad and comprehensive agenda has 17 SDGs with 169 associated targets that are integrated and indivisible and required to be fulfilled by 2030 by the global community.[187] The SDGs call for socially inclusive and environmentally sustainable economic growth. It vows to continue the fight against extreme poverty and add the challenges of ensuring more equitable economic growth and environmental sustainability, especially the key goal of curbing the dangers of human-induced climate change. In fact, 13-14 goals have some elements of climate change linked with them and therefore climate change is clearly woven into the Sustainable Development Goals. It can be said that the adoption of the Sustainable Development Goals has opened the opportunity to meet the challenge of climate change. It is in this relation that SDGs and adaptation, which are a significant component of climate change, are linked. Successful adaptation would lead to sustainable development, which is one of the prime objectives of the SDGs themselves.

NATIONAL ADAPTATION PROGRAMME OF ACTION IN LDCs

While the forthcoming NAPs intend to prioritize sectors to address mid-term and long-term adaptation needs of countries, the earlier adopted NAPA prioritized the most vulnerable sectors to address immediate and urgent adaptation needs of LDCs.

Prioritization of activities in NAPA

The NAPA guidelines list four general criteria for prioritization—level or degree of adverse effect of climate change, poverty reduction, synergy with other Multi-lateral Environmental Agencies (MEAs) and cost effectiveness.[188] The LDCs reviewed have used multi-criteria analysis for ranking and selecting preferred options. Fifteen prioritized projects are conducted for Bangladesh, 11 for Ethiopia and Maldives, nine for Nepal and six for Malawi (see *Table 2: Number of projects and priority sectors under NAPAs of selected countries*).

Countries have resorted to different approaches to prioritize measures. Bangladesh[189] and Nepal[190] have done so based on vulnerable areas and populations with activities like community-based coastal afforestration and integrated farming heading their list of prioritized projects. Malawi's priority list has focused on vulnerable sectors, with repetitive mention of sectors like agriculture and territorial ecosystems.[191] The prioritization of measures in Ethiopia[192] and Maldives[193] are on the basis of national priorities that are synergistic to national development goals, with measures such as insurance, disaster management and capacity building leading the list of plans.

Table 2: Number of projects and priority sectors under NAPAs of selected countries

Country	Number of final priority projects (initially proposed)	Project sectors
Bangladesh	15(40)	Coastal and Marine Ecosystems, Water Resources; Education and Capacity Building, Infrastructure, Food Security, Insurance, Mainstreaming and policy adaptation, Terrestrial ecosystems
Ethiopia	11(37)	Insurance, Early warning systems and disaster management, Water Resources, Food security, Education and capacity building, Infrastructure, Health, Terrestrial ecosystems
Maldives	11(37)	Coastal/marine ecosystems, Water resources, Early warning and disaster management, Health, Food security, Infrastructure
Nepal	9(15)	Agriculture, Forest, Disaster Risk Management, Water, Health and Terrestrial ecosystems
Malawi	5(15)	Food security, Territorial ecosystems, Early warning and disaster management

Source: Compiled from NAPAs submitted to UNFCCC

Challenges faced while implementing NAPA

The implementation of NAPA has not been smooth. LDCs have struggled with shortage of finances mostly due to the complex process for acquiring funds, lack of capacity to carry out NAPA projects even if finances are made available and the inherent complex nature of climate change that created hurdles in adaptation.

The following sections elaborate the loopholes in NAPA implementation to ensure that NAPs do not repeat them.

Funding not sufficient and timely

Timely and insufficient availability of funds for implementation of NAPA have been reported as a main challenge faced by LDCs even with establishment of financial mechanisms such as the Least Developed Countries' Fund (LDCF) and Special Climate Change Fund (SCCF).[194] Both LDCF and SCCF were created in 2001 and made operational under the Global Environmental Facility (GEF) to provide funds to countries for adaptation, with LDCF being specific for LDCs to develop and implement NAPAs. Until 2016, the LDCF directed $12.20 million for NAPA preparation to 51 LDCs and $1,029.28 million for implementing 178 projects in 41 LDCs.[195] While the status of funding seems impressive, challenges have been expresses unanimously by LDCs while acquiring funds.

Although it was committed that the LDCF would finance the total adaptation cost, for LDCs to receive funding they had to arrange for co-financing through bilateral or multilateral development assistance, government budget lines, contributions from NGOs or community groups and even in-kind contributions.[196] Also, the voluntary nature of LDCF made it completely dependent on the generosity of donor countries, creating hurdles while predicting the amount of finances available to countries.[197] LDCF's stance in slowing the allocation of funds has been the struggle of LDCs to arrange for co-financing and the lack of predictability of donor contributions.

The complex management structure of LDCF has further led to delays in projects. This sentiment was well expressed by several LDCs at COP14 in Poland in December 2008, where the management of LDCF was held accountable for the slow pace of fund allocation.[198] Such dire financial limitations have compelled LDC's to establish financial mechanisms operable within their jurisdictions, such as the Climate Change Trust Fund of Bangladesh in 2010[199] and Malawi's National Climate Change Investment Plan of 2013[200] to increase climate change investment.

Inadequacy in management of climate risk

Though NAPAs were introduced to address the most urgent adaptation needs, even the full implementation of priority projects did not guarantee the increase in climate resilience or reduction in climate risk. As in the case of Bangladesh, the country faces new climate challenges every year. For example, even after strengthening the coastal embankment was undertaken by NAPA, the intensity of soil erosion and frequency of storms continues to increase. Likewise, even after the development of salt-tolerant rice varieties, soil salinity continues to increase.[201] Similarly, the islands of Maldives that are less than 1m high are in constant threat of inundation even with slight rise in sea level.[202]

The main cause for these challenges is that NAPA is implemented through priority projects. Addressing an adaptation need cannot be undertaken as a project but is a development process where every aspect of vulnerability needs to be addressed.[203] But the priority project approach of NAPA reduced it to an outcome- or objective-oriented initiative rather than a process involved in enhancing the adaptive capacity of countries. In addition, the project approach of NAPA has hindered the linking of adaptation with other development plans and policies. For example, though LDCs have mentioned the need to address poverty in their NAPA, very insignificant measures have been undertaken to link adaptation to existing poverty reduction strategies of LDCs.[204]

Insufficient capacity of LDCs

Though progress has been made in implementing NAPA, LDCs lack capacity in both institutional and resources to navigate the complexity of adaptation. This has led to short-lived impacts of NAPA, which have failed to meet the adaptation needs of LDCs.[205] For example, although Bangladesh has received the largest funding from the Adaptation Fund, i.e. $191 million until 2015,[206] and in spite of their government's training and capacity-building efforts, lack of institutional capacity and weak governance have created obstacles in adaptation.[207]

Complexity in adaptation can arise because of the unique geography of a country. For example, the Maldives, which has an elongated island in its outer atoll and a small roundish island in its inner atoll, faced challenges in implementing adaptive measures as its needs are region-specific and complex.[208]

Countries like Nepal have struck an optimistic note by launching flagship initiatives such as the Local Adaptation Program of Action (LAPA) under the under the Nepal Climate Change Support Programme (NCCSP) to build on their limited capacity.[209] Additional institutional arrangements made by LDCs after implementation of NAPA involve Bangladesh's Climate Change Strategy and Action Plan (BCCSAP) in 2009[210] that has formed a significant foundation for ongoing climate actions; Ethiopia's NAPA replacement of the Ethiopian Programme of Adaptation to Climate Change in 2010;[211] Malawi's National Climate Change Management Policy approved in June 2016;[212] and the Maldives Climate Change Policy Framework developed in 2014.[213] Though creation of such additional capacities reiterates the commitment of LDCs to address climate change, it is not sufficient to address adaptation.

APPROACHES IN ADAPTATION PRACTICES

In recent years, development agencies and planning agencies have started to acknowledge the need to understand the cause of social vulnerability and local context of poverty to address adaptation, especially in developing countries.[214] This has lead to incorporation of community-based adaptation (CbA) in adaptation planning in developing countries and LDCs to allow local people to determine the objectives and means of adaptation practices.

Also, adaptation in the developing world cannot overlook the importance of the ecosystem for the rural poor who tend to depend on natural resources for their survival. This has led to incorporating the ecosystem-based adaptation approach.

Community-based adaptation (CbA)

CbA is larger in developing countries and LDCs in comparison to developed countries, where communities are involved only in planning and decision-making rather than implementation.

CbA has been a key approach in developing countries for natural resource management. For example, Kenya's NAP mentions the role of CbA for natural resource-based adaptation,[215] NAS of South Africa[216] mentions restoration and rehabilitation of natural systems, and Nigeria's National Adaptation Strategy[217] outlines the strategy for forestry as strengthening the implementation of the national Community-Based Forest Resources Management Programme.

Community-based NAPA projects such as Bangladesh's Community Based Adaptation to Climate Change through Coastal Afforestation (CBACC)[218] and Ethiopia's Promoting Autonomous Adaptation at the Community Level are promising.[219] Both projects have expanded national scope in involving local communities to muster climate resilience. This has led to these projects getting upscaled to the LDCF-funded 'Integrating Community Based Adaptation into Afforestation and Reforestation (ICBA-AR) ' in Bangladesh[220] and the UNDP-funded 'Upscaling Community-Based Adaptation' project in Ethiopia.[221]

Ecosytem-based approach (EbA)

With the adaptation plans of developing countries and LDCs concentrated on agriculture, natural resource management, disaster-risk reduction, water management and health management, it is clear that the EbA plays a vital role in their adaptation initiatives. For example, the NAP of Brazil defines a goal to prepare EbA strategy to measure the risk of extreme events and other climatic conditions;[222] and 50 per cent of NAPAs acknowledged

EbAs where 22 per cent of the projects used EbA, with focus on natural resource management.[223] Developing countries and LDCs have only started to draft strategies based on the EbA, with EbA gaining attention at the national level. But it has gradually been deflected at the sectoral and project levels[224] due to financial constraints. For example, the Climate Change Trust Fund of Bangladesh allocated only 15 per cent of the $279 million budget towards EbA projects such as river dredging, forestry, agriculture and biodiversity and the major 85 per cent towards infrastructural development.[225] Developing countries and LDCs have to make more efforts to promote EbA in climate change adaptation and development.

Integration of top-down and bottom-up approaches

Top-down and bottom-up are planning approaches. The top-down approach involves government-level decision-making based on long-term regional climate projections and adaptation strategies developed after assessment of technology and cost–benefits, e.g. NAPAs. The bottom-down approach involves more stakeholder involvement, with the sole aim of empowering communities, e.g. CbA. Also, adaptation planning of developed countries leans towards the top-down approach while developing countries and LDCs adaptation initiatives are bottom-up. While both approaches have their fair share of strength and weaknesses, the research world is working to foster integration of the two approaches to optimize results.[226, 227, 228]

Two notable examples of this integrated approach are Nepal's flagship initiative of LAPA, through which priority projects of NAPA[229] were implemented, and the Climate Change Adaptation in the Pacific Coral Triangle[230] involving the developing countries of the Philippines, Malaysia, Indonesia, Timor Leste, Papua New Guinea, and the Solomon Islands. At the local level, a range of traditional customs exist that can govern resource management and exhibit resilience. So it would be beneficial to expand stakeholder involvement at the local level to facilitate better input in decision-making and identify improved strategies for adaptation.

So far, there has been minimal application of the integrated approach and more research is required in this regard.

4 Emerging good practices

There is limited guidance for assessing good practices in climate adaptation.[231] This chapter, however, details adaptation practices that have evolved from a pilot scale to national-level plans. Novel approaches whose prospects seem promising have also been discussed.

Researchers have indicated the role of ecosystem-based and community-based adaptation in improving the life of resource-dependent communities via natural resource management and livelihood diversification.[232, 233]

Some good practices emerging from these approaches are discussed in the following sections.

EUROPE: ECOSYSTEM-BASED ADAPTATION

WAVE (Water Adaptation is Valuable for Everyone)

WAVE, a prominent transnational EbA plan in the UK, Netherlands, France, Belgium and Germany, conducted 13 projects (four in the UK, three in Germany, two in the Netherlands, one in Belgium, and two France) in 2008–15. It covered a large area of adaptation needs—under the project, 85 per cent of the Regge River in the Netherlands was to be replenished and extensive floodplains were constructed in Geraardsbergen, Germany to decrease flood risk. The regional project was upscaled to local adaptation plans. For example, the Somerset County Council Climate Change Strategy was based on the UK project.

Humber Flood Risk Project

The success of the Humber Flood Project of the UK[234] is attributed to the creation of new habitats, i.e. four new tidal wetlands along the estuary (with more expected upon completion). The new habitats have increased wildlife, countered the force of incoming waves and tides, and contributed to water retention and carbon sequestration. The sustainability of the project aims to provide protection from tidal flooding for the next 25 years and beyond. This is guaranteed as the new cycle period for 2015–21 has been initiated.

Biotope Area Factor (BAF) Programme

The BAF programme of Berlin, Germany was initiated in 1991 to promote urban development with respect to ecosystem management and biotope protection. Its success was based on flexibility of design where a developer can choose from an array of options such as surfaces with vegetation (both connected and unconnected to soil), rainwater infiltration, vertical greenery (up to 10 m), and green roofs for greening and making permeable surfaces. Also, the development of areas after BAF implementation can be visibly assessed, leading the programme to remain in continuum and paving the way for EbA in urban planning of other cities in Europe.

DENMARK AND KENYA: COMMUNITY-BASED ADAPTATION

The involvement of stakeholders in CbA has lead to a focus on individual and community and resulted in improved implementation of adaption initiatives.[235]

Some good practices of CbA are detailed in the following:

Cloud Burst Plan of Copenhagen

With the limited role of communities in adaptation implementation in developed countries, the 2012 Cloud Burst Plan of Copenhagen, Denmark stands out as exception. Framed after the pluvial flooding of Copenhagen in 2011,[236] the Plan set an example of efficient community participation and mobilization of private investments. It aimed at future-proofing sewerage function by separating rainwater from wastewater and implementing adaptive measures to counteract extreme rainfall events.

Copenhagen landowners have personally invested in anti-flood back-flow valves, anti-flooding valves on sewers and protection of light wells, and basement entrances for disconnecting storm water from property boundary as cloudburst management solutions. Several cities in Denmark, and Washington D.C. and New York in the US have expressed their interest in implementing similar plans, with New York going to the extent of signing an agreement with Copenhagen in September 2017.[237]

Kenya's Adaptation to Climate Change in Arid and Semi-arid Land (KACCAL) project

There are several examples in developing countries of effective community-based adaptation but Kenya's Adaptation to Climate Change in Arid and Semi-arid Land (KACCAL) has had a snowball effect. Implemented in severely drought-affected pilot areas (Mumoni and Kyuso districts of Kitui County),[238] the project focused on enhancing their adaptive capacity to drought (and flood), improving natural resource management and promoting agriculture and food security from November 2012 till April 2017.

Funded by the Special Climate Fund, the implementation status of the project of 2017 as reviewed by the World Bank has termed the project successful with all of its targets completed and some even surpassed.[239] The accomplishments are listed as the following:

- The results and outcomes from the projects were taken up by the Kitui County government and climate change adaptation was integrated into their Country Integrated Development Plan
- The four county-management plans which integrated climate-risk management activities drafted under the KACCAL has served as reference for 15 other counties as well.
- Also, the number of project beneficiaries has surpassed the target of 10,000 to 19,024 beneficiaries reported until April 2017.

The engagement of the county government and communities in adaptation projects as advocated by the KACCAL project has led to the development of community institutions. In 2012, the financial mechanism County Climate Change Fund (CCCF)[240] was set up to carry out pilot adaptation projects in arid and semi-arid counties in Kenya. The first project at Isiolo County started in 2014 was termed successful, and given an A^+ grade from funding agency UK Department for International Development.[241] This started ripple effects, with similar pilot projects with CCCF funding being replicated at Garissa, Makueni, Kuiti and Wajir under their county governments.

CbA efforts by the KACCAL project have not only led to identifying the roles of communities but also established and expanded it in developing and implementing adaptation plans. As of 2017, the counties have legislated climate change bills and regulations under CCCF, which will provide opportunities to counties to access funds from international funding (Green Climate Fund and Adaptation Fund).[242] This goes to show that communities' easy accessibility to funds and responsibility towards implemention ensures the success of adaptation plans.

BANGLADESH: INTEGRATED ECOSYSTEM-BASED AND COMMUNITY-BASED ADAPTATION

One of the good approaches identified to carrying out effective adaptation in developing countries and LDCs is to integrate EbA and CbA. The need to integrate EbA and CbA in climate adaptation stems from the fact that the adaptive capacity of any region is linked to the health of the ecosystem that delivers livelihood to the population which influences their ability to adapt. Hence to ensure the effective implementation of adaptation plans and policies, it is imperative to integrate efforts to restore and sustain an ecosystem and promote the capacity of its population to adapt.

Bangladesh's first NAPA project 'Community Based Adaptation to Climate Change through Coastal Afforestation (CBACC)' during 2009–15 is a notable example of the integrated approach. This project has expanded the country's scope in involving local communities to muster climate resilience along with accomplished afforestration along the coastline. So far, the project has afforested 6,372 hectares of coastal land, increasing the country's annual carbon sink to 637,200 tonnes, improved 20,027 vulnerable lives through livelihood diversification and enhanced the capacity of 988 government officials.[243] The result of the project has paved the way for another LDCF-funded 'Integrating Community Based Adaptation into Afforestation and Reforestation (ICBA-AR)' project to be implemented in vulnerable coastal districts, i.e., Patuakhali, Barguna Bhola and Noakhalifrom during 2016–20. In addition, a target of 30,000 hectares of coastal afforestation between 2016 and 2020 has been set in the country's Seventh Five-Year Plan.[244]

NEPAL AND THE PACIFIC CORAL TRIANGLE: INTEGRATED TOP-DOWN AND BOTTOM-UP APPROACHES

Although this approach is in an early stage of implementation, two successful initiatives—Nepal's LAPA and the Adaptation Plan of Pacific Coral Triangle have emerged.

Nepal's LAPA

Developed to implement NAPA, Nepla's LAPA, working in 14 districts (87 villages and 9 municipalities), has carried out 2,303 out of a targeted 2,680 adaptation actions, and seen 590,760 beneficiaries (50 per cent of which were women), with 358,727 beneficiaries involved in implementation.[245] Other than providing a framework for facilitating integration of top-down and bottom–up adaptation responses, Nepal's LAPA was also noted for:[246]

- Promoting community leadership and ownership project
- Linking CbA with national adaptation planning process

The LAPA framework is in continuum to identify mid-term and long-term adaptation goals for NAP formulation. Experts in the country look forward to applying this novel approach for implementation of NAP once it is finalized.
The successful implementation of NAPA through the framework of LAPA based on cumulative approaches like CbA integrated with top-down and bottom-down has set examples for linking global policies to local responses.

Adaptation in the Pacific Coral Triangle

The integrated approach applied to adaptation in the Pacific Coral Triangle has helped in:

- Identifying underlying systemic causes of vulnerability, i.e. the other drivers like population growth and cultural difference are interfering with climatic factors[247]
- Fostering social learning and knowledge exchange, followed by empowerment of all stakeholders[248]
- Creation of independent social networks, e.g. Kahua Association in the Solomon Islands for assisting in decision-making of communities[249]

NIGERIA AND INDONESIA: COMMUNITY-DRIVEN NATIONAL DEVELOPMENT PLANS

Community-driven development (CDD) operates by giving control of decisions and resources to communities to facilitate community participation and accountability, formulate plans better suited for the need of communities, and bring transparency in implementation and enhanced local capacity.[250] In the course of our study, we have come across two successful National Development Plans of Nigeria and Indonesia, operated on the principles of CDD that can be adopted by adaptation plans to harness similar impacts and achievements.

CDD projects: FADAMA and KDP

Both the FADAMA project of Nigeria in the 1990s[251] and Indonesia's Ketacaman Development Programme (KDP)[252] in 1998 aimed at alleviating poverty through improved community participation. FADAMA, started as a pilot project, is now being implemented in 36 states and the Nigerian Federal Capital Territory. It has benefited 2.3 million households, with 25 per cent (36 per cent of farmers only) increment in their income, and created 126,000 permanent jobs and additional savings of $40.8 million for the states.[253] Similarly, KDP, initially implemented in 20 provinces and 501 kecamatans (sub-districts), was doubled in three years, with coverage in 22 provinces, 984 kecamatans and over 15,000 villages.[254] KDP's core features were copied in development projects of East Timor, Afghanistan and Philippines and have resulted in some success and expansion.[255]

Impacts of FADAMA and KDP

The CDD approach of FADAMA and KDP has not only helped stir active stakeholder participation but also provided knowledge in implementing plans at the local level. The success of the projects has been attributed to the following:

- Decentralized funding strategies and multi-layered institutional structure,[256, 257] where funds were allotted to groups of beneficiaries for designing plans, and local government or traditional rulers were allotted the responsibility of implementation. Such an arrangement ensured close monitoring of projects and led to the adoption of an adaptive learning mechanism that improved the result and sustainability of the projects.
- Under the FADAMA Project, Nigeria has become successful in bringing sustainable

change in the agricultural sector, with institutional development and capacity building, and empowering communities to have a stronger voice in their development.

- In Indonesia, the KPD has been upscaled to the National Program for Community Empowerment,[258] expanding to 70,000 villages. It has led to the formulation of Village Law in 2014,[259] guaranteeing decentralization of funds towards villages to ensure development based on their needs and priorities.

CDD approach for adaptation

The National Adaptation Strategy and Plan of Action on Climate Change for Nigeria[260] and NatCom of Nigeria to UNFCCC[261] talks about the role of the FADAMA project. In addition to strengthening and reviewing the activities of programmes like FADAMA and KDP, governments should work towards tracing the design and implementation of such programmes to facilitate the integration of pilot-scale adaptation into national development plans. They should also advocate transition of community-based adaptation to community-driven adaptation for bottom-up approach in long-term adaptation.

GHANA AND TANZANIA: CO-EXPLORATION APPROACH

This approach is useful in cases where climate information is lacking or there is dilemma in assigning the right time for incorporating available climate information in decision-making. It aims to address the discrepancy in approaches by both decision-makers and scientific experts when it comes to using climate information in adaptation planning. Climate services (decision aides) that produce climate information to assist decision-makers[262] have been coming up with agendas to promote integrated decision-making involving both users and information generators.[263]

Experiences from co-exploratory workshops

The co-exploration approach was initially formulated to integrate climate information into municipal adaptation plans in the Western Cape of South Africa.[264] It has since then been perceived as promising. So far, the methodology for facilitating co-exploration of urban decision-making has been piloted through two workshops that discussed transforming peri-urban areas around Dar es Salaam (Tanzania) in 2013 and coastal flooding in Accra (Ghana) in 2014.[265] Through such arrangements, problems can be explored through different lenses and knowledge garnered through respective perceptions that can lead to increasing awareness of climate risks. The idea behind the approach is to introduce climate information in the later stages of planning so that it drives the outcome rather than the decision.

Although the act of bringing interdisciplinary groups in the same intellectual space during the workshop was challenging, significant socio-economic and socio-political concerns in various African cities were highlighted. The impact of non-climate stressors such as urban encroachment, poor transport infrastructure and improper waste disposal on amplifying vulnerability was made explicit.

Decisions made through co-exploration approaches could lead to effective adaptation plans by utilizing the climate information in the appropriate manner and amount. Despite the approach being in its initial stages, it has provided a strong base for transparent decision-making with potential for upscaling.

5 Key observations

Until a few years ago, climate change most affected vulnerable communities living along coastlines and other climate-sensitive areas. But recent extreme climate events have generated increased attention in the developed world.

As governments worldwide engage in drafting official plans for mandating and advocating mitigation and adaptation of climate change, it is important to assess whether we are doing enough.

We have presented numerous adaptation initiatives on different levels—national, regional and community. Based on our study, the following key observations have been drawn:

No one-size-fits-all approach

While the documented good practices provide some clarity in recognizing the elements required for good adaptation initiatives, there is no one-size-fits-all approach for adaptation. There are marked differences in region's and community's vulnerability to climate change along with differences in their adaptive capacity.

Laggard process

The progress made by both the developed and developing world towards addressing climate change has been limited. Developed countries are more inclined towards institutional measures, i.e. policies and guidelines, whereas developing countries and LDCs have adopted measures that are action oriented. A judicious mix of both are needed for effective long-term adaptation.

Progress on adaptation is evident from incremental, not transformational, changes.

Decentralization

It is safe to state that for an effective adaptation initiative to be sustainable, it is important for it to be community-driven, not just community-based, so that the enhancement in adaptive capacity will not be restricted to a region but to a population. Vulnerable populations should be able to draw inspiration from national-level plans to improve their ownership in planning and implementation and orient the adaptation plan towards their requirement. In the case of developed countries, communities should be encouraged to invest, as in the Cloud-burst Plan of Copenhagen, to facilitate adaptation.

The involvement of stakeholders in decision-making can also be augmented with integrated approaches like co-exploration, which can navigate the entry point of scientific information in decision-making.

Integrated approaches

Two integrated approaches have come to our attention as having secured the objectives of adaptations. More research and technical exercises with regard to them, however, need to be carried out. The approaches include:

- **Integrated EbA and CbA:** Adaptation initiatives, especially in developing countries and LDCs, which integrate EbA and CbA have exhibited effective results. Integrating these two approaches has lead to benefits like community ownership, spread environmental concerns in community and development in capacity.
- **Integrated top-down and bottom-up approach:** Currently, most approaches are top-down, while the case studies have shown that the bottom-up approach, where communities take direct ownership in planning, implementation and budgeting, is most effective. However, top-down elements of monitoring and evaluation cannot be ruled out. It is best then that top-down and bottom-up approaches converge.

Mainstreaming climate adaptation

Effective mainstreaming of adaptation in the relevant policy frameworks and effective implementation need to be ensured at the multiple levels of policymaking, planning, programming, budgeting and implementation. Integrating adaptation into relevant sectors, ministries and national plans can provide an enabling framework and direct funding towards implementation.

Paramountcy of policies and legislatures

Polices and Acts on climate change can mandate adaptation in sectoral and regional planning. Moreover, existing legislature, including Acts, on climate change result in better mainstreaming of climate change adaptation. Countries lacking climate change legislature should initiate the process for developing policies and Acts. Adaptation should also begin to feature in the macroeconomics of countries.

Addressing the funding gap

Lack of sustainable and assured funding for adaptation and complex funding structures limit adaptation activities in the developing world. These can be addressed by better synchronization among national agencies involved in planning and implementation, and their coordination with global agencies, namely UNFCCC, Adaptation Fund, Special Adaptation fund, Green Climate Fund, Least LDC Expert Group and LDCF.

Sharing best practices

Adaptation initiatives that yield success or even meaningful results need to be documented, highlighted and shared among communities. This should be encouraged to facilitate learning from experiences in order to avoid repeating past mistakes. NAP and the Paris Committee on Capacity-building established under Paris COP can also serve as a useful platform for sharing knowledge on best practices of adaptation.

NAPs not to be just a concept

The NAP process, despite its complex and detailed guidelines, can serve as a platform for countries to document and report adaptation at all levels of governance. Countries should work towards developing and submitting their NAP. They should work towards implementing their NAP rather than treating it as a national-level exercise to fulfil international obligations.

For NAPs to serve their purpose, they should be revisited in light of other global processes such as GGA and Sendai Framework for DRR and SDGs.

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Increasing extreme weather events globally necessitate the need for more adaptation. While the developing world engages in identifying and prioritizing adaptation needs owing to their greater vulnerability to climate impacts, the developed world has also come to terms with the need for adaptation.

This report details the approaches of different countries—Developed, Developing and Least Developed Countries—for adaptation planning. It also identifies and examines good practices for adaptation planning that have increased the resilience and adaptive capacities of communities.

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