

# Scaling Ecosystem-based Adaptation to Climate Change in Maharashtra, India

## An Analysis of Policies and Programmes



May 2020



based on a decision of the German Bundestag

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## List of acronyms

ABY	Atal Bhujal Yojana
ACWADAM	Advanced Centre for Water Resources Development and Management
BMC	Biodiversity Management Committee
BMZ	German Federal Ministry for Economic Cooperation and Development
CAN	Climate Action Network
CANSA	Climate Action Network South Asia
CARIAA	Collaborative Adaptation Research Initiative in Africa and Asia
CbA	Community based Adaptation
CBD	Convention on Biological Diversity
CDKN	Climate and Development Knowledge Network
CGWB	Central Ground Water Board
COP	Conference of the Parties
CRIDA	Central Research Institute for Dryland Agriculture
CSO	Civil Society Organisation
CSR	Corporate Social Responsibility
DDP	Desert Development Programme
DFID	Department for International Development
DPAP	Drought Prone Areas Programme
DRR	Disaster Risk Reduction
DST	Department of Science and Technology
EbA	Ecosystem-based Adaptation
EDLDD	Economics of Desertification, Land Degradation and Drought
ELD	Economics of Land Degradation
FEBA	Friends of Ecosystem-based Adaptation
GCF	Green Climate Fund
GDP	Gross Domestic Product
GIZ	German Corporation for International Cooperation GmbH
GoI	Government of India
GoM	Government of Maharashtra
Gram Panchayat	Village panchayat—the only formalised local self-governance system in India at the village or small-town level
GSDA	Groundwater Surveys and Development Agency
NAQUIM	National Project on Aquifer Management
NBA	National Biodiversity Authority
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organisation
NICRA	National Innovations on Climate Resilient Agriculture
NIE	National Implementing Entity
NITI Aayog	National Institution for Transforming India (policy think tank of the Government of India, established with the aim to achieve sustainable development goals)
NRAA	National Rainfed Area Authority
NRM	Natural Resource Management
ODA	Official Development Assistance
PBR	People's Biodiversity Register
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
PoCRA	Project on Climate Resilient Agriculture
Rabi	Winter cropping season in India
RRA	Revitalising Rainfed Agriculture
SAPCC	State Action Plan on Climate Change
SDG	Sustainable Development Goal
SKMCCC	State Knowledge Management Centre on Climate Change
SMART	State of Maharashtra Agribusiness and Rural Transformation

## Introduction

Across the world, climate change is already affecting societies in various ways, more frequently and severely than predicted. The impact of climate change in India is especially acute. The Global Climate Risk Index ranked India as the fifth most affected country worldwide. In 2018 alone, climate-related hazards including heat waves, storms, floods and droughts caused more than two thousand deaths in India and an economic loss of USD 37.8 billion in purchasing power parity. (Global Climate Risk Index, 2020)

According to the Intergovernmental Panel on Climate Change (IPCC), average global temperature will rise by 2.6°C to 4.8°C degrees Celsius above pre-industrial levels by 2100 if no drastic climate action is taken soon (IPCC, 2014). Under these circumstances, governments and societies will have to bear enormous social and economic costs. India is already spending about USD 9 to 10 billion annually on dealing with extreme weather events (Mohan, 2017). This figure may well rise to 1.8% to 8.7% of the annual GDP later in the century.<sup>4</sup>

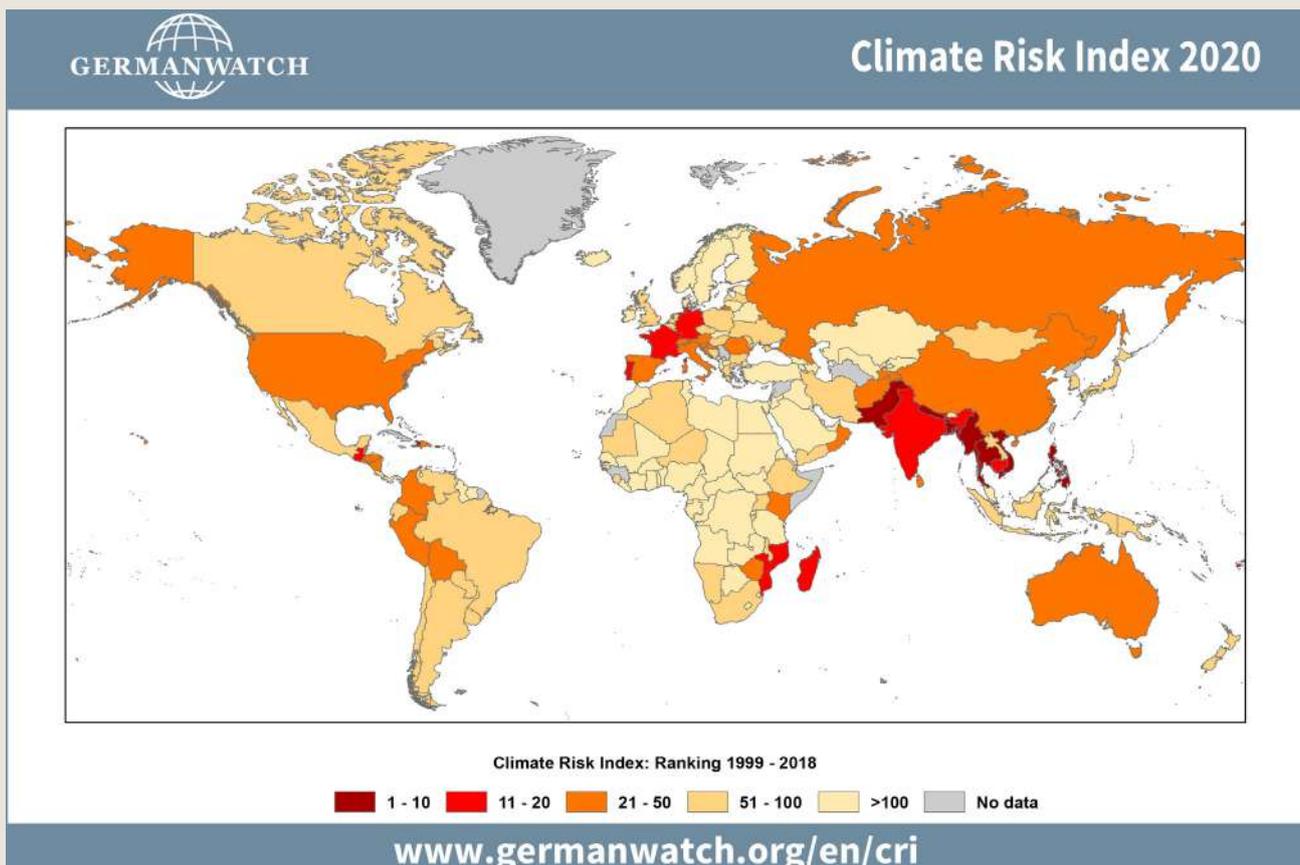


Figure 1: Global Climate Risk Index: Ranking 1999–2018 (Source: Germanwatch)

India is predominantly an agrarian country. Agriculture contributes 15% to India's Gross Domestic Product (GDP), and over half of the country's total workforce is employed in the farm sector.<sup>5</sup> Maharashtra which is mostly semi-arid encompasses a quarter of India's drought-prone districts and faces frequent crop failure. Nearly a third of the state's territory falls within the rain shadow and suffers from scanty and erratic rainfall.

<sup>4</sup> <https://www.adb.org/sites/default/files/publication/42811/assessing-costs-climate-change-and-adaptation-south-asia.pdf>

<sup>5</sup> <https://www.financialexpress.com/budget/>

In Maharashtra, the focus area of the present paper, agriculture is heavily dependent on groundwater. However, with nearly 92% of its geographical area covered by hard rock, the availability of groundwater is limited (Geological Survey of India, 2017). Overexploitation of groundwater has led to depleting aquifer stocks which threaten the sustainability of the agricultural economy.

Crucially, climate change is likely to worsen the situation in the near future. Rising atmospheric temperature compounds the situation of decreased crop

productivity. Maharashtra has recorded meteorological, hydrological and agricultural droughts<sup>6</sup> with increasing intensity in recent years. This can be attributed to heightened weather variability and poor water management and crop planning policies. The vulnerability of the state's farm sector to climate change is considered medium to high, as seen in Figure 2.

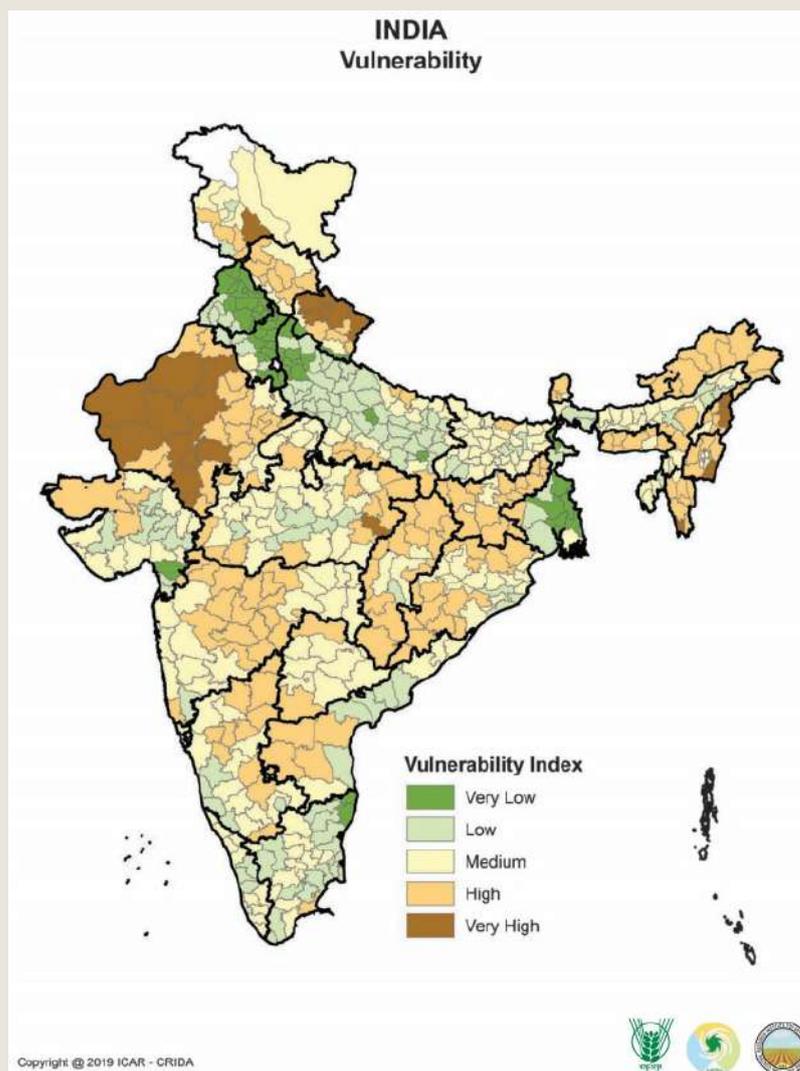


Figure 2: Vulnerability of Indian agriculture to climate change (Source: ICAR & CRIDA, 2019)

<sup>6</sup> <https://www.ncdc.noaa.gov/monitoring-references/dyk/drought-definition>

Falling water tables will have far-reaching impacts on drinking water supplies, ecosystems such as wetlands and rivers, as well as agricultural output and food security. Water scarcity will put people's livelihoods at risk, leading to social dislocations and upheavals.

Ecosystems—the basis of livelihoods for millions of people in India—are further degraded by flawed land management and agricultural practices such as deforestation, intensive cultivation on marginal lands, excessive chemical fertiliser use, and improper irrigation practices. Arguably, healthy ecosystems and the services they provide are vital to the resilience of nature and people against the effects of climate change (Srinidhi & D'Souza, 2018).

**Ecosystem-based Adaptation (EbA) as a nature-based and human-centred approach** to tackle the impacts of climate change can help countries to effectively scale climate change adaptation measures while meeting goals of environmental conservation and socio-economic development. In Maharashtra, EbA can be exemplified by participatory watershed development—soil and water conservation from ridge to valley with afforestation—together with other climate adaptive measures such as sustainable agriculture, weather-based agro-advisories, water budgeting and biodiversity conservation.

## Understanding Ecosystem-based Adaptation

Ecosystem-based adaptation enhances societal resilience to climate change by preventing degradation and the concomitant loss of ecosystem services. It focuses on increasing the adaptive capacity of people through the sustainable use, conservation and restoration of ecosystems, their services and biodiversity. Further, EbA works towards improving coordination at different policy levels among sectors and actors to create an integrated sustainable development model (Epple et al., 2016).

The United Nations Convention on Biological Diversity (CBD) defined EbA as “the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people adapt to the adverse effects of climate change” (CBD, 2009).

Ecosystem-based Adaptation consists of (1) helping people adapt to climate change by (2) sustainable use of the ecosystem services and biodiversity of the particular agro-ecological region, while following (3) participatory governance, as seen in Figure 3.

## Ecosystem-based Adaptation

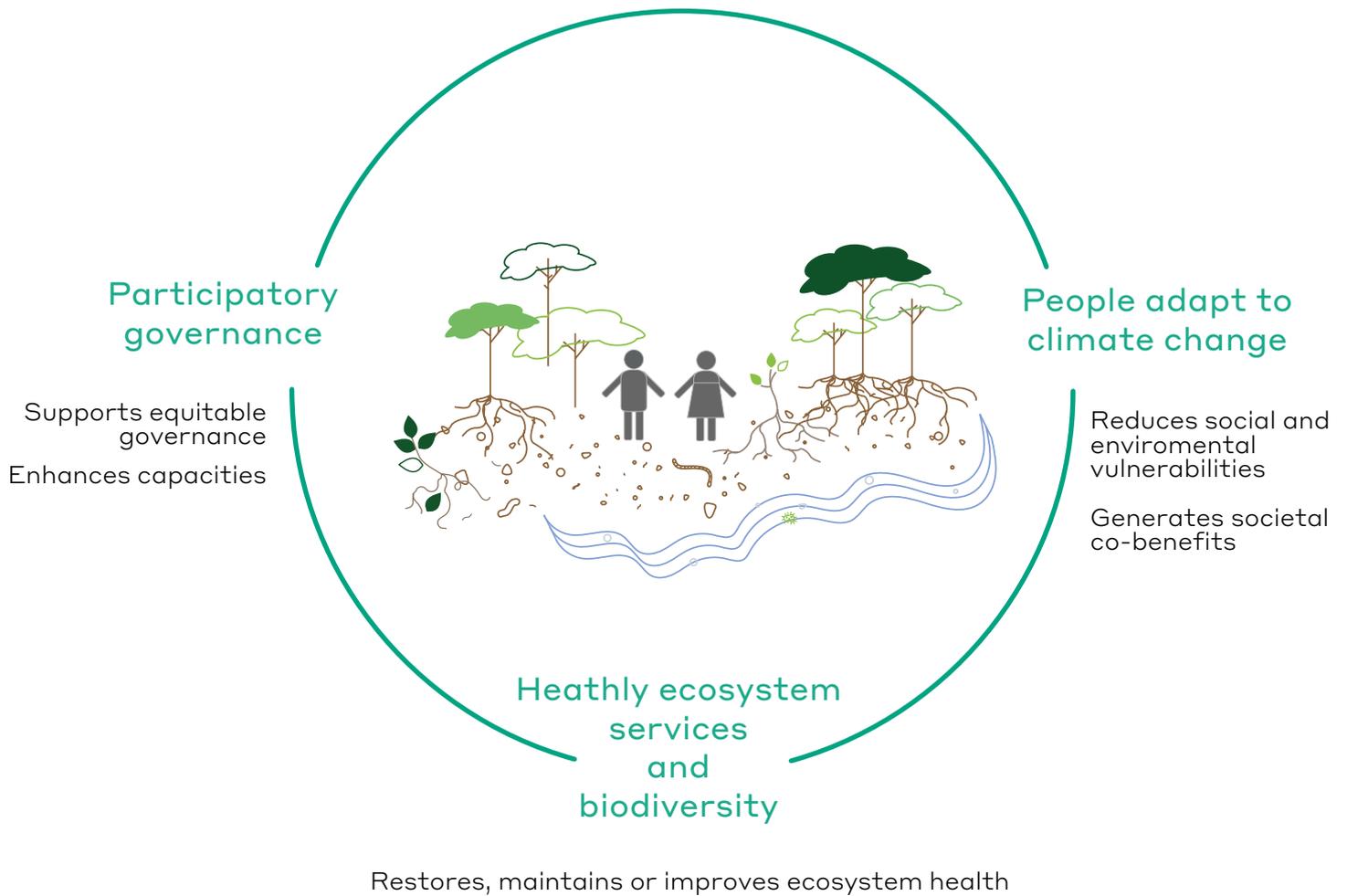


Figure 3: Conceptualisation of Ecosystem-based Adaptation © P. Korneeva/ TMG Research gGmbH 2020

Ecosystem-based Adaptation addresses sustainable development and environmental conservation in an integrated manner. EbA holds the potential to help governments achieve both the UN Sustainable Development Goals (SDG) of the Agenda 2030, the Nationally Determined Contributions (NDC) of the Paris Agreements, the goals of the UN Convention on Biological Diversity as well as Land Degradation Neutrality (LDN) targets, as summarised in Table 1.

Sectors	Links to EbA (an indicative list of activities)
Land, eco- systems & forests	Restored watersheds enhance ecosystem services which contribute to sustainable living and livelihoods (VR, AB and EH).
Biodiversity	Conservation of biodiversity leads to more resilient ecosystems (VR, EH). Community-based methods (PG, CB).
Climate Change	Vulnerability assessments help to identify climate risks and take appropriate action (VR). Livelihoods diversification (AB). Awareness building, Disaster Risk Reduction (DRR) activities (CB).
Water	In-situ surface and sub-surface water harvesting; increasing water-use efficiency in drought prone areas and better planning (VR). Community engagement for management methods (PG, CB). Awareness on groundwater exploitation (EH). Ensuring drinking water (AB). Community-based methods (PG, CB).
Agriculture and Livestock	Use of sustainable, eco-friendly farming practices (EH, CB). Access to weather-based advisories protects crop damage (AB, VR). Controlled grazing (EH) and services (CB).
Disaster Risk Reduction	Improving efficiency in the water sector (VR). Vulnerability assessment (VR). Access to weather-based advisories protects crop damage (AB, VR). Crop insurance (VR). Awareness building activities (CB). Evacuation infrastructure; Early warning systems (VR).

Table 1: Sectors, Activities and Links to EbA

Abbreviations used for the qualifying elements and criteria are: 1. Reduce social and environmental vulnerabilities (VR), 2. Generate societal co-benefits in the context of climate change adaptation (AB), 3. Restore, maintain or improve ecosystem health (EH), 4. Support equitable governance (PG), and 5. Enhance capacities (CB).

## Objective and scope

This scoping paper attempts to understand the landscape of existing EbA initiatives and identify entry points for their effective scaling up in Maharashtra.

Actions that contribute to achieving EbA objectives are already being practised, including watershed development (WSD), natural resource management (NRM), integrated water resource management, community-based adaptation (CbA), ecosystem restoration, as well as combating land degradation and desertification. The intention here is to leverage the potential of existing actions and stakeholders to address the gaps highlighted above. While the paper focuses on the semi-arid region of Maharashtra which covers 73% of its geographical area (Adaptation at Scale in Semi-Arid Regions CARIAA Consortium Inception Report, 2014), the lessons learnt would be applicable to other parts of the country

and to other developing countries that have similar agro-climatic, local governance or socio-economic conditions.

This paper aims to outline the Windows of Opportunity for scaling-up EbA in rainfed Maharashtra and the stakeholders who can contribute to it.

The paper is organised into four sections.

**Section 1** analyses existing government policies and programmes towards climate change adaptation.

**Section 2** explores non-state actors and initiatives.

**Section 3** discusses the gaps in the review of policies and programmes, and

**Section 4** examines opportunities for various actors to scale up EbA in Maharashtra. The paper concludes with recommendations for upscaling EbA.

# 1 Governmental programmes, policies and actors

## 1.1 International Frameworks

### Nationally Determined Contributions (NDCs)

Under the Paris Agreement on Climate Change, India submitted its Nationally Determined Contributions (NDCs) including a 33% to 35% reduction in emissions intensity by 2030 as compared to the 2005 levels, an increase in its share of renewables in electricity generation capacity to about 40% of the total by 2030, and an increase in forest area to create a carbon sink equivalent to a cumulative 2.5 to 3 GtCO<sub>2</sub>e by 2030 (Gol Environment Ministry, 2015). Along with these commitments towards a low-carbon development pathway, India estimates a requirement of USD 206 billion for the 2015–2030 period to deal with the impacts of climate change. These commitments and expectations provide a context for India's policy landscape, especially in responding to climate change.

### Sustainable Development Goals (SDGs)

It is equally important in the current context to consider India's position with regard to the 2030 Agenda for Sustainable Development. In achieving the SDGs, the priorities are poverty reduction, economic growth, health, nutrition, gender equality and quality education (NITI Aayog, 2018a). India's internal procedure for monitoring progress on SDGs—through the SDG India Index—does not highlight climate change as a core area for monitoring progress. Possible interpretations of this stand could be (a) that India's climate change agenda is implemented through a sectoral approach handled by different ministries—Renew-

able Energy, Transportation, Forestry, and others and/or (b) that considering India's poor development indices such as access to primary health, education, malnutrition levels, sex-ratio and incomes, the government clearly prioritises the immediate concerns.

### Land Degradation Neutrality (LDN)

Responding to land degradation and desertification has been a priority for India for decades (e.g. the Desert Development Programme, Drought Prone Area Programme, Integrated Watershed Management Programme) and has gained greater importance since the 2019 United Nations Convention to Combat Desertification (UNCCD) Conference of the Parties (COP) 14 in Delhi. The Indian government has increased its target of restoring degraded lands to 26 million ha, with a focus on degraded wastelands, forests and agricultural lands.<sup>7</sup> Watershed development, afforestation and biodiversity actions are typical EbA activities that contribute to restoring degraded lands and ecosystems.

## 1.2 Frameworks for climate change and Ecosystem-based Adaptation

### National Action Plan on Climate Change (NAPCC)

Action taken towards addressing climate change in India began in 2007 with the constitution of the Prime Minister's Council on Climate Change. This was followed by the adoption of a National Action Plan on Climate Change (NAPCC) in 2008. Recognising that climate change is cross-sectoral, the Indian government

<sup>7</sup> <https://www.thehindu.com/sci-tech/energy-and-environment/india-to-raise-target-for-restoring-degraded-land-pm-modi/article29374484.ece>

developed eight national missions under the NAPCC, each anchored under a ministry responsible for its implementation. The NAPCC covered both adaptation and mitigation considerations. It also developed the State Action Plans for Climate Change (SAPCC). Since then, decentralised action and locale specific adaptation has been prioritised and India's 29 states are updating their state action plans (WRI, 2019) The Ministry of Environment, Forest and Climate Change (MoEFCC) coordinates the agenda and actions of the SAPCC. The missions that specifically aim at adaptation are Sustainable Agriculture, Water and Sustaining the Himalayas (Rattani, 2018).

The NAPCC is strategically focused on 'co-benefits', which are "measures that promote development objectives while yielding co-benefits for addressing climate change effectively".<sup>8</sup> However, with the 15 diverse agro-climatic zones, 127 sub-zones and 28 states with varying vulnerabilities in the country the NAPCC remains an overarching guiding document, leaving it to each state to devise specific State Action Plans on Climate Change (SAPCC).

#### Maharashtra's State Action Plan on Climate Change (MSAPCC) and Climate Change Policy

The Maharashtra SAPCC covers eight key areas: agriculture, water, forest and biodiversity, health, rural development, urban development, energy and disaster management. In line with the recent commitments made by India towards SDG and NDC targets, Maharashtra is working to update its SAPCC. It plans to include additional sectors such as industries, transport, tribal development and tourism and the two cross-cutting sectors of finance and planning in the revised SAPCC. This provides an opportunity to engage with the Maharashtra SAPCC and integrate EbA within the plan.

#### Maharashtra State Disaster Management Plan (MSDMP)

The revised 2019 Maharashtra State Disaster Management Plan (MSDMP) provides climate change related information and attempts to mainstream strategies like EbA for preventing loss and damage from various disasters. It suggests that integrated ecosystem management—including restoration of wetlands and natural waterways combined with land-use planning—as an important element for disaster risk mitigation. This offers an entry point to mainstream EbA through various sectoral actions.

#### Maharashtra Biodiversity Strategic Action Plan (MBSP)

The Maharashtra State Biodiversity Board (MSBB) developed the 10-year Maharashtra Biodiversity Strategy Plan (MBSP) in December 2018 and has recently called for inputs from subject experts and civil society organisations. This provides an opportunity for integrating biodiversity inputs related to EbA in this plan with a potential to encourage the Agriculture, Animal Husbandry, Fishery, and Forestry departments to cooperate towards biodiversity conservation.

### 1.3 Important Programmes in Maharashtra Related to EbA

Numerous high investment government programmes aim to drought proof villages. They are related to the key thematic areas for building resilience through EbA—land, ecosystems and forests, biodiversity, water, agriculture and livestock, as well as food and nutrition security—with the intention of addressing developmental gaps and climate change. A few examples of such programmes are listed below to indicate the backward and forward linkages which may work for, or contrary to, the overall purpose of EbA.

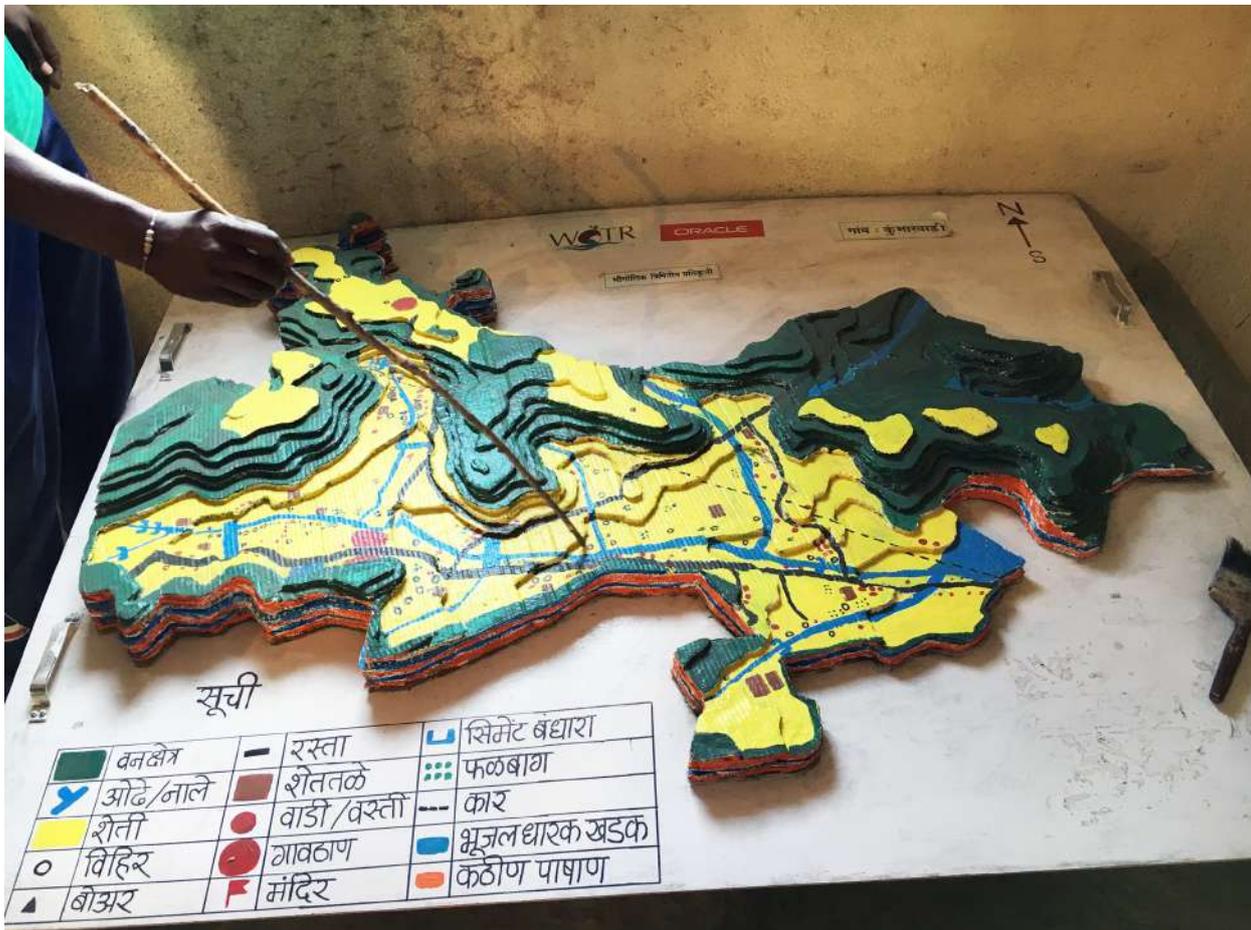
<sup>8</sup> <https://www.downtoearth.org.in/news/climate-change/india-s-national-action-plan-on-climate-change-needs-desperate-repair-61884>

The **Integrated Watershed Management Projects (IWMP)/Watershed Development (WSD) Projects** regenerate degraded lands from ridge to valley to conserve soil and water while enhancing green cover through afforestation.

The 2016 **Jalyukt Shivar Abhiyan (JSA)** scheme focuses on deepening rivers and streams and constructing water harvesting check dams to store more water locally. This scheme is implemented in isolation, i.e. without land and drainage

line treatments and with little community engagement. Thus, it conflicts with the healthy ecosystems approach of WSD and the participatory governance principle of EbA. It also generates social inequality as it benefits only the valley areas and upstream farmers (Bhadbhade et al., 2019; Kale et al. 2019).

Sustainable land management practices including afforestation provide an opportunity to incorporate local **biodiversity** concerns which are important for EbA.



3D model of a micro-watershed as a training tool for building capacities about responsible water governance in the context of WOTR's water stewardship initiative

© Larissa Stiem-Bhatia/ TMG Research gGmbH

However, while the People's Biodiversity Register (PBR) has been enacted, and the Biodiversity Management Committees (BMC) of villages provide a space to work on biodiversity, this opportunity is rarely used in WSD/IWMP and agricultural projects.

The **Gaalmukt Dharan Gaalyukt Shivar** scheme to desilt tanks and thus increase the water harvesting potential of villages is now gaining ground and can contribute to EbA. However, when WSD treatments in the upper catchments are done, desiltation will be required less frequently. In the current practice, the structure of the scheme benefits rich farmers who can afford to invest in transport (W-CreS & WOTR, 2020).

To secure agriculture, the **Pradhan Mantri Krishi Sinchayi Yojana (PMKSY)** promotes the construction of farm ponds across the country. Besides the PMKSY, there are many schemes in Maharashtra that promote farm ponds. However, the thousands of farm ponds constructed in the state have been converted into surface storage tanks with plastic lining, and filled with groundwater. Farmers who can afford such measures can protect their crops and are even assured a summer harvest. However, environmental losses due to evaporation, excessive exploitation of groundwater aquifers and the capture of groundwater by a few farmers are not addressed in programme design (Kale, 2017; W-CreS & WOTR, 2020). The depletion of groundwater by excessive exploitation presents yet other challenges (Srinivasan and Joy, 2019).

Several joint initiatives of the state government, international aid organisations and corporate agencies such as the **State of Maharashtra Agribusiness and Rural Transformation (SMART)** project<sup>9</sup> in 10,000 villages, the **Project on Climate Resilient Agriculture (PoCRA)** in 5000 villages, and the **Village Social**

**Transformation Mission (VSTM)** in 1000 villages provide an opportunity for holistic implementation. In this context, adequate attention should be paid to EbA components, especially participatory governance.

## 1.4 Other National and State Actors in Maharashtra

**Department of Environment, Government of Maharashtra** is the nodal department for climate change in the state. It has established the State Knowledge Management Centre on Climate Change (SKMCCC) and is in the process of establishing a Climate Change Cell.<sup>10</sup> The SKMCCC will serve as a knowledge hub on climate change and act as a nodal centre for conducting climate change research and capacity building. The SKMCCC is also mandated to establish a State Consortium for Climate Change Assessment consisting of research and academic institutions, individual experts, NGOs and corporate sector actors to strengthen the knowledge base and support the implementation of relevant policies and plans.

**The National Biodiversity Authority (NBA) and Maharashtra State Biodiversity Board (MSBB):** The National Biodiversity Authority, a statutory autonomous body under the MoEFCC, was established in 2003 to implement the provisions of the 2002 Biological Diversity Act after India signed the Convention on Biological Diversity in 1992. In Maharashtra, the MSBB is set up under the state Revenue and Forest Department. Its primary missions are to implement community-based conservation measures through Biodiversity Management Committees (BMCs), and to create the People's Biodiversity Registers (PBRs).

With the aim of sustainable development and management of groundwater resources of the country, the **Central**

<sup>9</sup> State of Maharashtra's Agri-business and Rural Transformation Program (SMART) Project <http://www.smart-mh.org/en/smart/aboutsmart>

<sup>10</sup> <http://mahenvis.nic.in/Pdf/skmccc/Expression%20of%20Interest%20-%20Organisation%20Empanelment%20notice.pdf>

**Ground Water Board (CGWB)** develops and disseminates technology, and monitors and implements national policies for the scientific and sustainable development and management of groundwater. This includes exploration, assessment, conservation, augmentation, as well as protection from pollution and distribution, based on principles of economic and ecological efficiency and equity.

**Maharashtra Water Resources Regulatory Authority (MWRRA)** is responsible for administrative and legal reforms in the water sector and reviews the Maharashtra Groundwater Development and Management Act that came into force in 2014.

The **Groundwater Surveys and Development Agency (GSDA)** develops minor irrigation schemes based on groundwater levels in the state. The GSDA is engaged in the exploration, development and augmentation of groundwater resources and in enhancing these resources through conservation and artificial recharge projects. It also conducts studies on the periodic status of groundwater availability.

The **National Rainfed Area Authority (NRAA)** envisions making rainfed agriculture an economically viable enterprise for improving livelihood and welfare of the farming community, by adopting appropriate strategies compatible with agro-ecology, agro-biodiversity and sustainability. It aims to promote the prosperity of farmers and ensure inclusive growth in rainfed areas on a sustainable basis.

**National Bank for Agriculture and Rural Development (NABARD)** is an apex Development Financial Institution in India. NABARD is responsible for supporting various programmes in the area of watershed development, agriculture, crop insur-

ance, and livelihood improvements. NABARD is also the National Implementing Entity (NIE) for the central government's National Adaptation Fund<sup>11</sup> and the Green Climate Fund. NABARD implements projects in collaboration with NGOs, private sector and development organisations. It remains an important actor for upscaling EbA activities because of its position as a government development bank and its presence across all states.

The Department of Animal Husbandry and Dairying of the central government has initiated the National Livestock Mission in 2014. This mission attempts to fill a major gap in the scarcity of grazing resources through increasing fodder production from non-forest wasteland. The **Livestock Department** of Maharashtra is the coordinating agency in the state. The department is also responsible for implementing the 2010 Maharashtra State Livestock Policy and the 2014 Rashtriya Gokul Mission that aim to conserve indigenous breeds and valuable animal genetic resources which are better suited to specific agro-climatic conditions and have the ability to sustain and cope with climatic change.

The **NITI Aayog**<sup>12</sup>, a policy think tank of the central government, coordinates the monitoring and evaluation of progress on SDGs. The NITI Aayog organises several consultations between central ministries, states, union territories (UTs), civil society organisations, academia and the business sector to assess the achievement of India's SDG targets. Hence it is an important stakeholder to engage with on the SDG agenda. The **2019–20 SDG India Index** developed by NITI Aayog is intended to provide a holistic view of the social, economic and environmental status of the country.

<sup>11</sup> The Adaptation Fund is an international fund that finances projects and programmes aimed at helping developing countries to adapt to the harmful effects of climate change. It is set up under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC).

<sup>12</sup> The National Institution for Transforming India, NITI Aayog is the premier policy think tank of the Indian government. It provides both directional and policy inputs; designs strategic, long-term policies and programmes for the government; and provides relevant technical advice to the centre and states.

## Windows of Opportunity in State Programmes at a Glance

National/ State Agenda	Objectives/ Activities Related to EbA
Paris Agreement and NDC	Increase forest area to create a carbon sink equivalent to a cumulative 2.5-3 GtCO <sub>2</sub> e by 2030.
Agenda 2030 and SDG	Opportunity to promote inclusion of SDG 13 into the SDG Index (currently missing), besides contributing to many other SDGs.
Land Degradation Neutrality	Target of restoring degraded lands of 26 million ha, with focus on degraded wastelands, forests and agricultural lands. Watershed development, afforestation and biodiversity actions are typical EbA activities that contribute to restoring the degraded natural resource base—lands and ecosystems.
National Action Plan on Climate Change	Strategic focus on ‘co-benefits’, i.e. measures that promote development objectives while yielding co-benefits for addressing climate change effectively.
Maharashtra State Action Plan on Climate Change	Action Plan currently under revision and open for contributions (e.g. integrating EbA into the action plan).
Maharashtra Biodiversity Strategic Action Plan	Strategy Plan currently under revision and open for contributions (e.g. integrating EbA into the action plan).
People’s Biodiversity Register Act	Biodiversity Management Committees of villages provide a space to include biodiversity into local initiatives.
State Knowledge Management Centre on Climate Change	Mandated to establish a State Consortium for Climate Change Assessment consisting of research and academic institutions, individual experts, NGOs and corporate sector actors to strengthen the knowledge base and implement key policies related to climate change.

Table 2: National/ state commitments and broad plans to achieve them

## 2 Non-state actors and interventions associated with EbA

Global agendas bring countries to work together more than ever before to achieve common goals. Diverse actors, such as local and national Civil Society Organizations (CSO), international development cooperation agencies, the private sector, research institutions and think tanks play a significant role in shaping policy and guidelines that impact development, which today includes climate change adaptation. This section identifies the role and scope of influence of each of these non-state actors and helps identify windows of opportunity to engage with them in upscaling EbA efforts in Maharashtra.

### 2.1 International Actors

Various international agencies such as DFID, KfW and GIZ (German Federal Ministry for Economic Cooperation and Development, BMZ), IFAD, UNDP, and the World Bank play important roles in promoting climate change adaptation, sustainable agriculture, water security, social security and livelihood generation in India and Maharashtra. Large-scale projects in Maharashtra with Official Development Assistance (ODA) funding include the One World No Hunger Initiative, the Cyclone Mitigation Project, PoCRA, the Atal Bhujal Yojana for groundwater management, and the SMART project.<sup>13</sup> The international agencies either work with the state government (as in the PoCRA project), through NABARD (for example Climate Proofing WSD), or directly through NGOs. A core challenge, however, is to ensure collaborative action and cross-learning in these large-scale initiatives.

### 2.2 Civil Society Organisations (CSOs) and Non-government Organisations (NGOs)

While government agencies remain by far the largest receivers of ODA in India, various donors engage CSOs and NGOs to help realise their objectives at the grass-root level. The strength of the CSOs is their ability to communicate with people at the local level. They understand the local milieu, are flexible in finding appropriate responses, work with small or large projects, and can link with other institutions, thereby making them important stakeholders in EbA actions (Srinidhi, D'Souza & Lobo, 2019). Thousands of CSOs and NGOs in the state are engaged in various aspects of EbA such as natural resource management, biodiversity conservation and agriculture.

### 2.3 Private Sector

The corporate sector is engaged in promoting sustainability, either for their own business interests or as part of its Corporate Social Responsibility (CSR) activities, which became mandatory after the Companies Act was passed in 2013 (Companies Act, 2013).<sup>14</sup> Over the years, CSR spending has been steadily increasing in India. In 2017–18, corporations spent 47% more on CSR than that in 2014–15 when CSR was initiated (KPMG International, 2018b). Companies are increasingly aligning their work with the SDGs and climate change targets. The 'Bridging the Gap: CSR to SDGs' report recommends that CSR follow an SDG target-oriented approach in corporate policy (KPMG International, 2018a).

<sup>13</sup> <https://india.smartcitiescouncil.com/article/10k-maharashtra-villages-get-smart>

<sup>14</sup> In India, companies which have a net worth of over INR 500 crore, a turnover of INR 1000 crore or more, or a net profit of INR 5 crore or more in a given year are required to abide by CSR rules (Section 135 of the 2013 Companies Act and the 2014 Companies Rules). They are to spend at least 2% of their average net profits of the preceding three years on projects that will benefit either the society or the environment. Activities permissible for funding are listed in Schedule VII of the CSR rules (Section 135, 2013 Companies Act).

Public-private partnerships and public-private-CSO partnerships like the VSTM can contribute to progress. (For VSTM, see Section 1.3). Since some companies focus on the environment as part of CSR, their funds are directed towards watershed development, afforestation, improving water-use efficiency, agriculture productivity, and livelihoods, thus offering important opportunities for upscaling EbA actions.

## 2.4 The Primary Stakeholders: The Watershed/Village Institutions and Communities

Participatory governance is the third element of EbA. Local, participatory governance requires that the local institutions (Gram Panchayat, Watershed/Village Development Committees (VDCs), women's groups, Joint Forest Management Committees, Biodiversity Management Committees, and other local bodies) work together with the respective block and district authorities.

The experience of actively engaging Gram Panchayats and VDCs is well understood in the Indo-German Watershed Development Programme (IGWDP)<sup>15</sup> as well as the IWMP (NABARD, 2005; GoI 2011). However, management of the regenerated resource base is insufficiently addressed during the post-project period. Besides, some measures to manage groundwater resources, the Water Users Associations and Paani Panchayats have been implemented (D'Souza et al. 2019; GoM, 2005; Thakur and Pattnaik, 2002). The link with the local block and district authorities beyond the annual district level plans is however missing. These plans are made based on the various programmes driven by the state and central government initiatives.

## 2.5 Networks

While there are many CSOs/NGOs involved in successful projects, often stronger policy influence comes from a larger group of organisations. Some of these which have worked in India and/or Maharashtra include the Indo-German Watershed Development Programme (IGWDP), Climate Action Network South Asia (CANSAs)<sup>16</sup>, Climate and Development Knowledge Network (CDKN)<sup>17</sup> and the Revitalising Rainfed Agriculture (RRA) Network.<sup>18</sup>

Networks offer the opportunity to pool together experiences and evidence to create a more compelling case for policy and upscaling, as well as to disseminate good practices among the stakeholders. The work of the IGWDP and its contribution to the National Watershed Guidelines is a case in point. Networks such as the Climate Action Network (CAN) and their regional chapters like CAN South Asia (CANSAs) take this collective approach to the international level by coordinating the position and advocacy demands of groups like African and South Asian nations, and by leading advocacy efforts at events like the UNFCCC COPs. Demand for an increase in adaptation funds as part of the Green Climate Fund (GCF) and for appraisal of loss and damage due to climate change are examples of the collaborative efforts of such networks.

## 2.6 Knowledge Institutions

Considering the size and diversity of India and the stakeholders involved, it is important to have actions and strategies endorsed by credible science. Hence, knowledge-based institutions play an important role in advocating and providing evidence for EbA.

Some research institutions exclusively focus on thematic areas such as groundwater, agriculture, climate science, and

<sup>15</sup> <https://india.diplo.de/in-en/themen/igwdp/1992818>

<sup>16</sup> <https://www.cansouthasia.net/>

<sup>17</sup> [https://cdkn.org/?loclang=en\\_gb](https://cdkn.org/?loclang=en_gb)

<sup>18</sup> <http://www.rainfedindia.org/>

meteorology, like the Indian Institute of Science Education and Research (IISER), Indian Institute of Tropical Meteorology (IITM), Indian Meteorological Department (IMD), and the Indian Council for Agricultural Research (ICAR) institutes. Knowledge institutions also include academic institutes such as the Indian Institute for Technology Bombay (IIT-B) with whom state governments and NGOs engage. Such institutes are also commissioned for specific research studies for the government.

Though each institute works in isolation, they may collaborate with other agencies including NGOs. An example is the development of an IT enabled Decision Support System for the scaling up of locale-specific crop weather advisories—a collaborative effort of IMD, the Central Research Institute for Dryland Agriculture (CRIDA), the Mahatma Phule Krishi Vidyapeeth (MPKV), the Vasant-rao Naik Marathwada Krishi Vidyapeeth (VNMKV) and Watershed Organisation Trust (WOTR). These agencies also draw on the strengths of other non-state actors who have thematic knowledge and capacity building skills.

## 2.7 Media

The media—including print, audio-visual, and e-media—plays an important role in communications. With the widespread use of mobile phones, and access to television in remote villages, the media has a defining impact.

**Television:** National and state (Doordarshan) channels show documentaries related to rural areas such as good practices in agriculture and water manage-

ment. Other channels promote useful concepts such as the Save Water Mission (Pani Mission of CNN IBN).

**Print Media:** Newspapers are a good medium for the dissemination of local, state and national information. ‘Agro-One’, a weekly agriculture related newspaper in Maharashtra, is widely read in rural areas.

**E-media:** The portal Vikaspedia<sup>19</sup> shares good agriculture and allied practices followed by farmers and communities in Maharashtra in the local language. The India Water Portal shares experiences and information on water issues at the national level. Knowledge is shared in English, Hindi and other state languages which helps to reach more people.

**Radio:** The radio is also an important source of information and knowledge for many people in villages. However, over the years, the use of the radio has declined to a large extent with the incoming of TV and smart phones.

**Smart phones:** It is estimated that there are over 500 million smart phones in India and the number is growing. Despite bandwidth issues and connectivity, people in villages are using the smart phones not just for making calls, but also for purposes of information, commerce, entertainment, communication and knowledge acquisition and sharing.

As the importance of EbA is yet to be fully understood, there is much to be done to utilise media as an outreach strategy to mobilise a wider range of people for EbA.



Group discussions at village level to understand the governance conditions for watershed development and ecosystem-based adaptation approaches

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## 3 Gaps and challenges for scaling up EbA

The previous sections outlined the concerted efforts by state and non-state actors to address the developmental challenges and adaptation needs of the country. However, there exist gaps, challenges, and unforeseen side effects in the backward and forward linkages of programmes that diminish the desired impacts. Some of these gaps and challenges are summarised as follows:

**The SDG Index in India does not include SDG 13 on Climate Action:** SDG 13 is therefore not integrated with other developmental goals, like No Poverty, Zero Hunger, Good Health and Wellbeing, Clean Water and Sanitation, Decent Work and Economic Growth. Reporting on climate adaptation efforts may therefore be compromised.

**Lack of integrated approaches:** Many programmes view impacts in isolation, which may work for or contrary to the overall sustainability goals in the medium or long term. An integrated systems approach to EbA is required.

**Little cross-sectoral collaboration:** Most programmes continue to be implemented in isolation as departmental projects. Also, various state and non-state actors work in silos with limited opportunities to collaborate with one another. This poses a challenge to upscaling EbA.

**Rigid monitoring of project targets:** Often the effectiveness of programmes is measured in terms of their outreach as well as the direct and economic impacts. However, long-term sustainability of the resource base is often compromised as important characteristics of adaptively

managed socio-ecological systems are ignored. (Samuel et al., 2015).

**Insufficient consideration of ecosystem conservation:** Farmers' distress due to frequent droughts, climate variability and agricultural losses has placed the policies aimed at water security and agricultural productivity high on the political agenda. Various programmes like Doubling Farmers' Income by 2022, Jalyukt Shivar Yojana, Pradhan Mantri Krishi Sinchayee Yojna (PMKSY), and Magel tyala Shet-tale are being implemented across the state. However, there are gaps in linking these to the sustainable management of the natural resource base.

**Standardised methodologies in implementation:** Methodologies are developed, standardised and applied across the country and state during large-scale project implementation, which may not be effective given the differences in socio-economic, agro-climatic, ecological and geographical contexts.

**Lack of adequate finance and capacities:** Insufficient financial resources and weak organisational capacities among various actors constrain the scaling actions related to EbA.

**Missing data:** There are gaps in the availability of data and information owing to uncertainties arising out of climate variability which pose a challenge in meeting adaptation objectives on the ground. In addition, data about the social, ecological and environmental effectiveness of EbA across different ecosystems in Maharashtra is scarce.

## 4 Strategies for effective upscaling of EbA

The climate change challenges experienced in Maharashtra urgently call for action to enhance the adaptive capacities of landscapes and people. Work to restore degraded lands, including watershed development, continues to be done on a large scale by various agencies including national and state governments, NABARD, the private sector and NGOs. Interventions to enhance water availability through wells and tanks, find solutions to the agricultural crisis, and to a lesser extent help to preserve biodiversity have

also been implemented. However, ensuring sustainability of the impacts remains to be addressed.

Achieving success with EbA at scale requires widespread adoption of the lessons learnt from successful and unsuccessful stories across rural Maharashtra and beyond. Scaling up does not only entail the coming together of multiple actors, but also the convergence of complementary actions to ensure resilience of the community and ecosystem.

**Upscaling** refers to “increas[ing] the geographic scale, policy scope or institutional scale by applying successful activities and approaches at different levels” (SOPAC/UNDP/UNEP/GEF, 2011). This includes both vertical (top-down or bottom-up, influencing policy reforms) and horizontal (replication across people and geographies) scaling, also referred to as outscaling. A key instrument for (especially vertical, government-driven) upscaling is mainstreaming.

**Mainstreaming** in the development assistance business means the widespread adoption of a new policy, a new approach to the delivery of public services or a new method of program management, taking full account of the state / country context.

Figure 4 Terminologies: Upscaling and mainstreaming

Scaling efforts require that policies and programmes that align with the concept of EbA be identified, and that the potential of concerted action by various actors be leveraged. Finally, political will must be ensured to drive decision making and assign budgets towards EbA for sustainable development and the preservation of natural resources. Many entry points exist for moving towards EbA which need to be tapped. Some of these are:

**Convergence with national and sub-national targets and commitments:** Various international and national commitments of the Indian government such as the SDGs, LDN targets under the UNCCD, the NDCs, CBD, the Doubling of Farmers' Income by 2022 and the Maharashtra government's targets through programmes like JSA, PoCRA or policies like MSAPCC and SDMP need to converge. All these offer entry points for integrating EbA concepts. Moreover, highlighting the benefits of EbA interventions and their linkages and contributions in achieving many sustainable development and adaptation targets will help pool resources and bring in strategic coordination between various government departments.

**Bringing convergence across the impacts of the sectors:** At the national level, the

Niti Aayog is responsible for assessing the achievement of the SDG targets, the MOEFCC for the LDN and NDC targets, and the Jal Shakti Ministry for water. There is a need to assess the impacts through a quantification of the target achievements systemically by integrating various sectors, rather than that of individual sectors in isolation. This may be initiated at a block or district level and necessarily requires contribution from various actors of the state, thematic sectors, research

agencies and practitioners. The Jal Shakti Abhiyan<sup>20</sup>, a campaign that brought different ministries and departments related to water resources to work together under the Jal Shakti Ministry, is an example. A consultation organized in Pune on "Indian Agriculture under 1.5 degrees temperature rise", Oct 2018 provided initial thoughts on these aspects. Other studies on the Economics of Land Degradation (ELD), the Cost Benefit Analysis of land and climate related projects and impact assessments of the numerous donor, government and NABARD funded projects have much to contribute in this direction.

Upscaling of EbA at the all-India and Maharashtra levels can happen in various ways. There is no one-size-fits-all solution. Some key strategies are:

- Engage with relevant ministries and departments as an expert or consultant
- Provide implementation and technical support to government programmes and practitioner organisations
- Develop a pedagogy for large-scale capacity building
- Align the programmes and policies with national targets and commitments
- Provide strategic policy advocacy through policy briefs and stakeholder dialogues
- Undertake action research and develop innovative approaches
- Engage with international donors and corporate houses to support projects that address last-mile connectivity and research and innovation needs
- Disseminate knowledge through the media, and
- Leverage the potential of networks.

Figure 5: Strategies for upscaling

### 4.1 Partnerships and Collaborations

To scale up climate change adaptation across rural Maharashtra, requires that the different stakeholders work in collaboration. Some of the key stakeholders in scaling-up EbA in Maharashtra are:

- Villages and communities, including vulnerable groups
- Field level institutions like community-based organisations (e.g. self-help groups, village development committees, and cooperatives)
- Local administration (e.g. Gram Panchayat members, block and district officials)
- Ministries, departments and line departments at the state and national levels
- CSOs/NGOs, think tanks, research institutes, influential experts and public figures
- Private businesses and companies engaged in agriculture and allied sectors
- Foundations, trusts and corporate social responsibility (CSR) units of private companies
- International development cooperation (e.g. multilateral and bilateral organisations, UN bodies)

### Partners, stakeholders and roles for promoting EbA

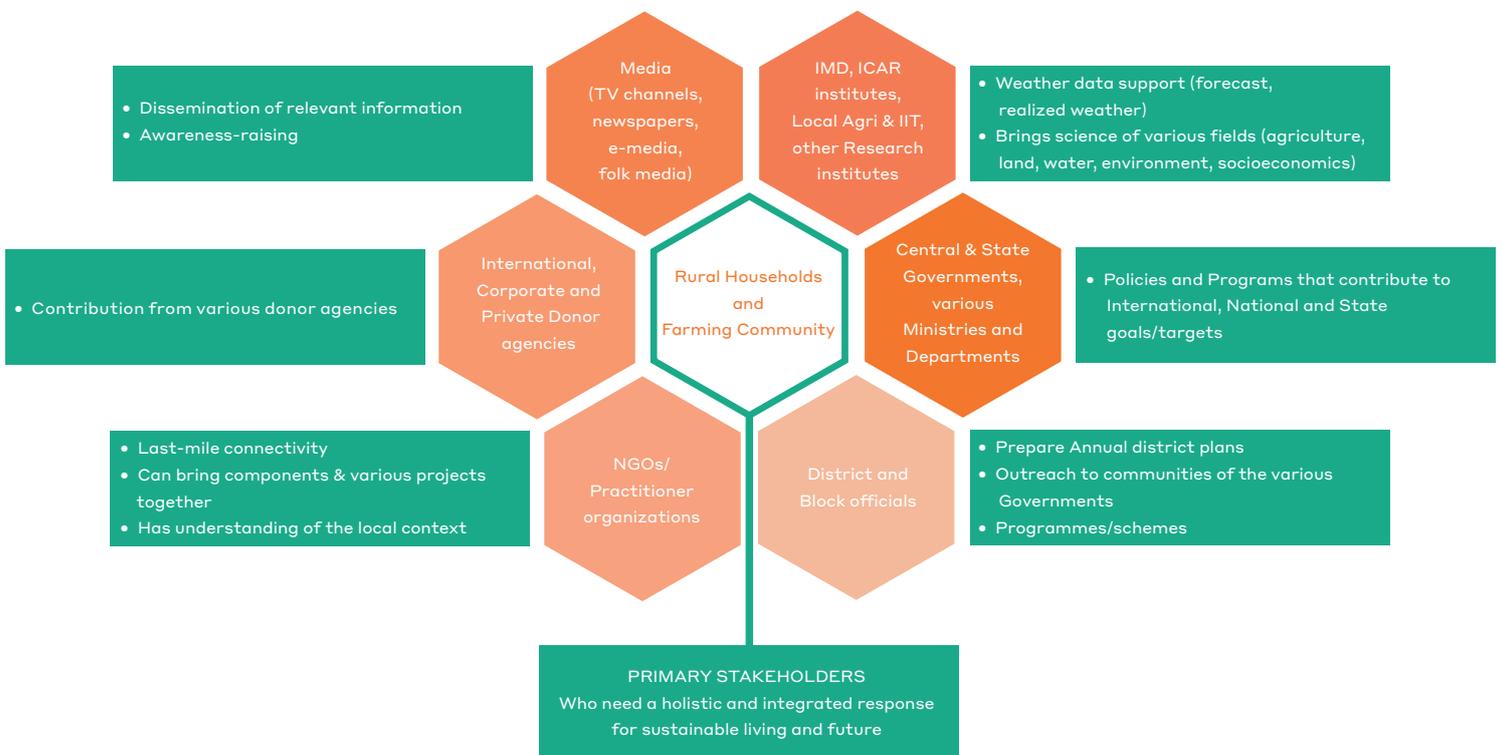


Figure 6: Partnerships for Ecosystem based Adaptation © WOTR 2020

An important step for upscaling is to align policies, programmes and action to implement EbA at the state and national levels. This can be realised through various working groups together with government agencies such as the Central Ground Water Board<sup>21</sup>, MWRRA, SKMCCC, MSBB<sup>22</sup>, NABARD and various state departments for watershed development, disaster management, forestry and livestock. The private sector, thematic experts, experienced practitioners, CSOs and NGOs, as well as research organisations and think tanks should be invited to participate in the process.

Upscaling EbA requires working in partnerships and drawing on the strengths of different institutions and individuals from various fields. See Figure 6 to understand how each actor can potentially contribute to upscaling EbA.

## 4.2 Knowledge Management, Learning and Dissemination

Good EbA practices may be successful in a particular context, but need to be adjusted when replicated in another. Upscaling of successful, local initiatives therefore requires the provision of robust data and contextual knowledge. Research organisations that combine scientific data with local knowledge can provide lessons and methodologies for practitioners and programme designers. Research publications and reports as well as stakeholder dialogues (workshops, seminars, conferences) are some routes to mobilise stakeholders for EbA. Outreach to the primary stakeholders by engaging them in research and displaying the findings through infographics play an important role in mobilising them for constructive action.

## 4.3 Connecting the Dots between Practice and Policy Making

Agricultural distress and frequent droughts are important issues that frequently emerge during elections, and hence are key focus areas for the current governments (Sikawar, 2019). A number of programmes have been launched, targets proposed and budgets allocated to respond to these distress signals, such as Doubling Farmers' Income by 2022. To meet the target requires

convergence with the water sector (e.g. PMKSY)<sup>23</sup>, and projects (e.g. National Innovations on Climate Resilient Agriculture, NICRA) that include technical knowhow. Hence, reaching out to political leaders with data and information to engage them in holistic and sustainable impacts is important.

Engaging with decision making bodies in thematic committees at the state and national levels, as well as providing evidence-based feedback for implementation guidelines can help to promote EbA. Obtaining the consensus of all political parties for their continued support towards fundamental programmes such as Ecosystem-based Adaptation is essential. Hence, measures such as reaching out to politicians, informing them of successful initiatives, gaining their support, and sharing research and impact findings are essential for promoting and sustaining EbA actions.

## 4.4 Approaches towards Ecosystems-based Adaptation

As we move towards upscaling EbA, an awareness of climate change and developmental lacunae is important. In order to address these challenges, the following recommendations are important:

<sup>21</sup> <http://cgwb.gov.in/>

<sup>22</sup> <http://maharashtrabiodiversityboard.gov.in/>

<sup>23</sup> Pradhan Mantri Krishi Sinchayee Yojna: <https://pmksy.gov.in/>

**A systems approach:** Adopt an integrated systems perspective towards EbA that contributes to sustainability through low/no regret impact interventions i.e. by nudging the developmental programmes or policies. Interventions need to be designed from the respective agro-climatic sub-zone perspective and its linkages, interactions and outcomes amongst various sub-systems and their components in the watershed. Practically, it means not just looking at the sectors in isolation, but more holistically over a few decades. This will also help in mainstreaming EbA in the planning and budgeting processes.

**Institutional and governance structures that are inclusive and have a mechanism for continuity:** Formal structures need to be linked to local, endogenous institutions, without bypassing the latter in the name of efficiency. Considering the size and scale of vulnerable communities to be reached, certain socio-economic groups like tribal communities, landless communities, and women are to be actively included in mainstream government programmes.

**Technological innovations to hasten adaptive pathways:** Regulation of groundwater in the face of increasing climate risks and its governance are in line with drought proofing. These objectives are important at the levels of the central government, many international agencies, and several states including Maharashtra. Aquifer-based water management is gaining importance in the Central Model Bill for Groundwater Regulation, National Aquifer Man-

agement Programme (NAQUIM)<sup>24</sup>, Atal Bhujal Yojana (ABY)<sup>25</sup>, and the Maharashtra Groundwater Act, 2009.<sup>26</sup> Action research and innovative socio-technical strategies such as those implemented by WOTR, the Advanced Center for Water Resources Development and Management (ACWADAM) and others to mobilise communities for aquifer management are proving effective.

**Contextual methodologies:** For implementation of large-scale projects, the methodology needs to be contextual, i.e. suitable to the geography and socio-cultural characteristics, rather than being generalised for the entire state.

**Adequate capacity building:** Scaling up requires adequate and continual building of capacities of all actors particularly of practitioner agencies, with the focus on developing capabilities of communities and the village governance instruments.

**Collaboration of different stakeholders in EbA:** To adopt EbA, we need the involvement of all agencies, from the planning stage, through to its implementation and assessment of impacts. An example of this is the management of the Murray-Darling river system that spreads across three states of Australia, where the state governments, research institutes and CSOs came together to manage their natural resources.<sup>27</sup>

**Continuous learning and project adaptation:** With exposure to an increasingly unreliable climate, fast growing economies, rapidly changing market dynamics, globalisation, the availability of new

24 National Aquifer Management program (NAQUIM): <https://aims-cgwb.org/>

25 Atal Bhujal Yojana: <https://pib.gov.in/newsite/PrintRelease.aspx?relid=196118>

26 Maharashtra Groundwater (Development and Management) Act, 2009: <https://bombayhighcourt.nic.in/libweb/acts/Stateact/2013acts/2013.26.PDF>

27 <https://www.mdba.gov.au/managing-water>

technology, and access to large amounts of data, it is essential that adaptation is considered as a pathway. Hence, a continuous search for more appropriate actions is important. Therefore, adaptation is not a one-time effort or a 'project' with a 3 to 5 year timeframe, but a continuous process. Space for mid-course corrections is often lacking when programmes are standardised. Therefore, goals and outcomes need to be kept in focus and monitored regularly.

**Collaboration between implementation and research:** Keeping in mind the EbA context, evidence will substantiate how the various components of programmes contribute to the resilience of the resource base and its people. This requires regular action and applied research as a feedback mechanism.

## Conclusion

Various studies have shown that India and Maharashtra are particularly vulnerable to climate change. Different governmental and non-governmental actors are working towards EbA, i.e. the restoration of ecosystems and building people's resilience to climate change. However, in most cases, the work is being carried out in silos and at pilot levels. Often, the fact that EbA, climate change, and disaster management are overlapping areas is ignored. Various policy frameworks are in place at the national and state levels that offer opportunities for integrating EbA actions. At the same time, challenges exist in terms of capacity, technical know-how and financing for achieving desired results at scale.

As work is increasingly being undertaken to align the state priorities with national goals and international frameworks related to climate change and sustainable development, examining the mechanisms that could help in upscaling EbA is of fundamental importance. Recognising the complexities involved in addressing the challenges in scaling EBA identified in this paper, strong collaborations between government and non-government players is critical. Partnerships between actors, as well as knowledge sharing and engagement with decision makers and communities, in order to bridge the gap between policy and practice are key ingredients towards the upscaling of EbA in the future. Against this background, the Climate-SDG Integration Project will build and strengthen multi-stakeholder platforms to develop a roadmap for upscaling EbA that will contribute to achieving the SDG and NDC targets while developing a sustainable future in the context of a changing climate scenario.

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## About us

### WOTR and W-CReS

Established in 1993, the non-profit organisation [Watershed Organisation Trust \(WOTR\)](#) works at the intersection of practice, knowledge and policy to ensure food, water, livelihoods and income security to disadvantaged communities on a sustainable basis. Headquartered in Pune, Maharashtra, WOTR has a physical presence in eight states and provides occasional services to agencies across all states of India and from twenty-eight countries. The organisation aims to develop ecosystems in an integrated manner for the well-being of poor communities.

The [WOTR Centre for Resilience Studies \(W-CreS\)](#) was set up in 2016 with the objective to provide robust, adaptive responses to mitigate the impacts of climate change on ecosystems, water resources, agriculture, food and nutrition, health, livelihoods, gender, governance and local institutions. The Centre conducts trans-disciplinary, applied research to contribute grounded insights and learnings towards policy formulation, programme design and implementation, capacity building as well as behavioural change processes.

### TMG Research gGmbH

[TMG Research gGmbH](#) is a Berlin-based organisation working on sustainability issues in the areas of food systems, natural resource management, climate and energy. As an organisation, TMG Research gGmbH brings sound knowledge and practical experience to the management and consulting of national, European and international processes and is dedicated to the analysis and solution of new and complex challenges. As an independent partner, TMG Research gGmbH works with actors from science, politics, the private sector and civil society. Key areas of work include the sustainable use and management of natural resources, social innovations and digitalisation, and transformation processes towards sustainable agriculture and food systems.

## Brief note on the Project

“Climate-SDGs Integration Project: Supporting the Implementation of the Paris Agreement and the 2030 Agenda Through Ecosystem-based Adaptation”

Funded by the International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Germany, this project seeks to understand the criteria and preconditions for Ecosystem-based Adaptation (EbA) measures to contribute to both intended Nationally Determined Contributions (NDCs) and Sustainable Development Goals (SDGs) through participatory, multi-stakeholder dialogues at local and state levels.

This project is envisaged for Maharashtra, India, and aims at developing a Roadmap for upscaling EbA in the state. This paper highlights the Windows of Opportunity or the entry points for scaling-up EbA that exist. Other steps to arrive at the roadmap include: (a) A communication and outreach strategy for the Windows of Opportunity (focus of this paper); (b) A set of case studies that highlight effective EbA measures and conditions for creating an enabling environment; (c) Workshops to raise awareness about the benefits and impacts of the on-going EbA related actions in different parts of the state and to build capacities of local communities to understand the concerns and express their expectations from the perspectives of adaptation programmes and (d) Stakeholder engagements at the state-level to bring together a wide range of actors to discuss the windows of opportunities, evidence on EbA effectiveness provided by case studies, and inputs for experts and policy makers.

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