Community Participatory Approach to Reverse Climate Change

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Abstract

The geography and economy of Meghalaya have some serious paradoxes. For instance, despite having high rainfall, many areas in the state are confronted with serious water scarcity, largely due to deforestation and soil erosion. Despite having a wealth of natural resources, almost 50% of the population lives below the poverty line [1]. Meghalaya as a state has a strong knit community, and this paper attempts to study the community participatory approach adopted by local people, who, in several instances, have come together to tap the tremendous potential of water conservation, especially in the Mawsynram C&RD block, hailed as one of the wettest places on earth. Alternatively, the research also delves deeper into how the State, in its attempt to reverse climate change with the help of a unique initiative called Community Conservation Corps, plans to engage and train a massive pool of young volunteers by raising at least one person from every household, motivated towards protecting the environment. Given that Meghalaya is largely an agrarian state and dependent on natural resources for livelihood [2], the implications of this study could be valuable to assess the potential opportunities of the collective community approach driven towards climate change reversal. Moreover, it will also be interesting to note how, in the course of community participation to reverse climate change, the State is also living up to its matrilineal status wherein women are seen to exercise authority and decision making at the local level, which, otherwise, is not the case in higher authoritative realms of the State.

1. Introduction

Northeast India, which is often considered the carbon sink of the country, is rapidly losing forest cover. As per the Indian State of Forest Report (ISFR) 2019 [3], forest cover in Meghalaya has decreased by 27.21 sq km compared to the previous assessment. Meghalaya is a forest-rich state and has 488.98 sq km under very dense forest (VDF), 9,267.29 sq km under moderately dense forest (MDF) and 7,362.52 sq km under open forest (OF). As a predominantly tribal state, the lives of rural people are significantly dependent on forests in socioeconomic and sociocultural contexts.

In terms of water resource availability, the state has approximately 3,300 km of rivers, 8,400 ha of reservoirs, 3,734 ha of tanks and ponds, 390 ha of swamps, 63.20 BCM available surface water and 1.15 BCM available ground water [4]. It is one of the key biodiversity hotspots (one of 34 in the world) with a very fragile ecosystem. The state is also rich in mineral resources such as limestone, coal, granite and clay. Meghalaya, also referred to as 'The Abode of Clouds', is highly vulnerable to climate change due to its geoecological fragility. It shares over 443 kms of international border with Bangladesh. Since over 70 percent of its population is dependent on agriculture and natural resources for livelihood [5], its economy is mostly dependent on its natural resources. The state is already facing the brunt of climate change in ways more than one.

An average rainfall of approximately 2,818 mm falls on Meghalaya annually and Cherapunji/Mawsynram with more than 11,000 mm annually [6]. 31.6 The BCM of water flows into the Meghna basin of Bangladesh annually through 29 major tributaries. More than 30 BCM of water flows

into the left bank of the Brahmaputra basin in the State of Assam. Meghalaya acts as a catchment for the unique *Haor* wetland ecology in Bangladesh [7]. The rivers coming down from the Khasi and Jaintia hills in Meghalaya carry particularly high volumes of water as they come from some of the rainiest places in the world. [8]

Despite heavy rainfall, most villages face water scarcity during dry seasons in Meghalaya. Unscientific mining has heavily impacted water sources with acid mine drainage. A 2019 study by IISC Bangalore showed that climate change is expected to have an adverse impact on the forest and biodiversity of Meghalaya [9]. The state is witnessing significant deterioration of water, forest and soil due to unsustainable agriculture and economic practices. The implications of climate have already made inroads into the State. In 2019, Mawsynram and Cherrapunjee, which held the record for receiving the heaviest rainfall on earth, lost status to Mahabaleshwar, Maharashtra [10].

As per a 2015 report by the Meghalaya Institute of Natural Resources (MINR), the state is heavily dependent on springs and groundwater. Nearly all 6500+ villages access spring water for household and irrigation use. Water demand is on the rise, but supply is declining due to anthropogenic and changing climate factors. A sample survey of 1100 springs revealed that over 54% of the springs have either dried or impaired.

Since it is a 70-pc agrarian economy, the development and conservation of water resources is crucial. Agricultural and industrial development requires cheap power and irrigation, rendering water conservation all the more significant. Major stumbling blocks faced by the state in this regard include rapidly growing populations, uncertain impacts of global climate change, rapid urbanization and industrialization, destruction of spring sheds, catchment areas, mining and quarrying of minerals, destruction of forests and possible conflicts over the share and distribution of fresh water resources.

This paper assesses several interventions carried out in the state to restore the ecosystem, most of which are ongoing and have yielded positive results. It explores actions aimed at ecosystem restoration through ecosystem-based adaptation (EbA), which involves the conservation, sustainable management and restoration of ecosystems, especially with respect to water conservation through adaptive community participation. Furthermore, it also delves deeper into how community participation in the realm of climate change is proving to be an impetus to matrilineal Meghalaya's women by placing them in leadership roles, which, otherwise, is not the case in the mainstream decision-making domain.

2. Method Used For Analysing The Case Study

In this paper, policies and interventions based on active community engagement aimed at natural resource management (NRM), especially water conservation, have been analysed in the State of Meghalaya. The policies and interventions have been highlighted based on their current relevance and large-scale impact on NRM, especially with respect to community participation. Case studies have been highlighted to assess the impact of cited interventions—both government- and community-level initiatives. Community participation, exercise of field-level leadership, gender equality and leveraging

technology enable observability of on-ground activities and visibility to people and their capabilities while creating and vetting technical plans at scale. Field interviews were conducted with individuals and focus groups involved with local communities, including feedback from key informants and stakeholders involved in ecosystem preservation initiatives in Meghalaya.

3. Unique Initiatives To Address Water Scarcity In Meghalaya

Meghalaya has a fragile ecosystem with bountiful water resources that need to be harnessed. Hydrologically, the state comprises two basins, viz., the Left Bank of Brahmaputra Basin (11220.11 km²) and the Brahmaputra Tributaries Basin (11208.89 km²), three catchments viz., Kalang to Dhansiri Confluence (approximately 4499.61 km²), Bangladesh Border to Kalang Confluence (approximately 6720.50 km²) and South Flowing Drainage of Meghalaya (11208.89 km²), eight subcatchments with a size range of 2.08 to 2.46 lakh hectares and 35 watersheds with a size range of 0.03 to 0.22 lakh hectares. Meghalaya shares water resources with Assam and Bangladesh, with Meghalaya being located upstream. The state has 3300 km of rivers and 390 ha of swamps. Rivers and streams in Meghalaya are generally fast flowing [11]

There is a very high density of drainage network systems in Meghalaya, but most of the rivers and streams have water only during the rainy season, and many streams dry up or their flow dwindles during the summer, leading to water scarcity. Groundwater is the largest accessible and yet underdeveloped resource in the entire state. Regional water shortages and water crises can only be met with rational and sustainable use of this untapped freshwater reservoir. The importance and contribution of groundwater has been felt in recent years to cope with development and scarcity situations, particularly to meet drinking water needs.

3.1. Field Level Leadership Model (FLL)- A Bottom-up, Adaptive, Participatory Approach

A 2016 study suggests that strategies focused on building infrastructure or providing innovations, developed externally and delivered locally (to local communities, for example), seldom realize lasting impacts and/or do not bring benefit to the poor and marginalised. It is often assumed that more investments are needed in infrastructure and services, but in practice, many of the barriers have to do with the hierarchical nature of the government, especially with how the prepackaged “solutions” are often flown in and dictated from the top. To tackle this, the field-level leadership (FLL) model is being implemented in Meghalaya for ecosystem-based interventions by creating a parallel organization, specifically to address ecosystem restoration and livelihood interventions.

What is Field Level Leadership (FLL) Model?

FLL is not a usual training where individuals are instructed to pass on specific knowledge of ‘how’ to solve a problem by applying ‘best practice’. Instead, with FLL, officers are invited to think ‘why’. Why are they working in public service? What will make their work more meaningful for them? What are the root

causes for gap between their ambitions and their performance? For many staff, this space for reflection unleashes their intrinsic motivation to do good in the community around them. In addition, then they are given space to work out the 'how' for themselves. This lets them experiment and iterate on different solutions, and since they are the closest to the problems, they can find solutions that are feasible and most appropriate for the context they live in. Hence, FLL is not passing a message from top-down but empowering a reflection process bottom-up.

It was found that FLL created the space for officials in the front line - right down to the junior draftsmen - to start engaging with the communities and develop citizen-centric initiatives. One interesting example was the engineers starting to prioritize investments in traditional types of water retention structures, co-designed and co-implemented with local communities. There was a noticeable culture change, in how the relations between the two organizations improved at the ground level. This encouraged more agencies through the FLL process in order to expand cooperation between them, and hence it was expanded to the Water Resources Department and the Community and Rural Development Department. The FLL Coaches from Meghalaya Basin Development Authority (MBDA) led this roll-out successfully, and as a result of these activities, Meghalaya is the first state in India to have an effective ground-level coordination in place between the different departments, for integrated water and basin management.

A research article published in 2020 [13] argues that long-lasting capacity is necessarily embedded in the institutions governing cooperation between state and non-state actors. This institutional capacity for cooperation is determined by the two interactive processes of conception and calibration, where the state plays a definitive role in mediating between competing interests. In conception, the state uses its discretionary power to set the long-term vision, whereas during calibration it exercises flexibility to accommodate concerns and capacity of other actors. It is in this calibration process that a need was felt for creation of MBDA, solely focused on ecosystem restoration and sustainable livelihood promotion.

CASE STUDY 1: Implementing FLL on ground to create ecosystem champions through the Meghalaya Basin Development Authority (MBDA)

Creating Ecosystem Champions in Meghalaya through MBDA

In April 2012, a dedicated organizational set up was established with an aim to create an institutional ecosystem for ecologically sustainable and inclusive development in Meghalaya. This was known as the Integrated Basin Integrated Development & Livelihood Promotion (IBDLP) programme. It sought to redefine the relationship between the citizen and state and bring a paradigm shift by moving towards a demand driven partnership model of development. It was not prescriptive but created space for the choices regarding planning and implementation of by the people. IBDLP focused on building an inclusive framework which was sustainable and people-centered [14].

For this, exercise of effective leadership was the need of the hour and a change in leadership to drive impact at the ground level was strongly felt through a convergence of several departments working towards common objectives. For implementing IBDLP programme, an organization called Meghalaya

Basin Development Authority (MBDA) was created with a vision for it to be an inclusive organization that would be able to include every member of the State of Meghalaya. The aim was to bring every citizen of the state together to become part of a common development initiative. In this regard, it was realized that 'Water' as a resource is an element that binds the State and its residents together. Therefore, any person who lived in the river basin by default, became a part of the programme. This is how the Integrated Basin Development Promotion Programme (IBDLP) derived its name.

In due course of time, a strong need for convergence was felt among various State departments and the silo approach was increasingly seen to be ineffective. Talks and discussions were held with several organizations including the Centre of Excellence (CoE), Chennai. It was found that CoE Chennai had taken great strides in bringing together various line departments resulting in improved institutional deliveries through the '*Team leadership development initiative*'.

Taking cues from CoE, Chennai, the '*Team leadership development initiative*' was adopted by the MBDA in Meghalaya and termed as *Field Level Leadership (FLL) programme*. This programme was organized with various State Departments who portrayed a cutting edge in terms of natural resource development. At the onset, four departments were merged for implementation of this programme-Soil & Water Conservation, Water Resources, Community & Rural Developments and MBDA. For starters, a group of master trainers were created among officers in each of the four departments to take this forward at the grassroots.

The FLL was guided by a strong belief that if the capacity of people at the grassroots are built and the quality of leadership is imparted onto them, they will be able to deliver all activities pertaining to climate change reversal, preservation of ecosystem through protection of natural resources or water conservation including any other governance mechanism that must percolate to the grassroots.

As part of FLL, self-help and developmental trainings were held including self-introspection & transformation, need for behavioral change and sensitization on various stages of learning, personality improvement and development, bringing about cohesion through a common vision, thereby motivating each individual to effectively work towards realizing the goals of each of their departments, within their individual capacities. Following the implementation of the FLL programme, each person then came out with a commitment as an individual and as an organization.

Key outputs of FLL programme in convergence with line departments:

- Improved awareness on importance of instilling and practicing value systems in work space, family, and inter-personal relations as a whole.
- Improved working environment among staff members in each department through improved leadership, mutual support, inter and intra-departmental convergence for implementing several projects.
- Most importantly, better communication and repo among the field officials and target rural communities. Accountability and transparency among each functionary, including at the field level

resulted in improved good will among the communities, leading to improvement in reputation of government line departments- MBDA, MBMA, Soil & Water Conservation, Water Resources and C&RD department.

This convergence approach ultimately imparted a sense of unity and cohesion among leaders of various departments, and this led to proper service delivery and implementation pertaining to improvement of natural resource management in State.

The strength of this initiative lies in the development of an integrated development model which makes it highly replicable for others states as well. For any state to replicate this model, it is important to train people, government functionary, and the community at large. These factors make the initiative economically viable and sustainable. Furthermore, the initiative proved its social relevance by providing an opportunity for the government to provide a well-balanced development to its citizens.

Through the FLL programme under MBDA, a social capital of approximately 1400 Green Volunteers or Green Ambassadors have been mobilized in several villages across the State making environmental protection a people's movement, involving every individual in the state. Green Volunteers are provided with an opportunity to help rural innovators set up renewable energy projects, work with rural entrepreneurs to run their farm-business and market their produce, lead initiatives in rural schools to set up organic kitchen gardens, or even helping MBDA with GPS tracking of springs, rivers and forests across Meghalaya. This in turn helps each volunteer develop their leadership potential, acquire a deep knowledge of development issues in the state and make a significant positive change to the people and state of Meghalaya.

Implementation of IBDLP through MBDA has been unprecedented in thus far as the entire government of a state has rallied around a programme and carried out the reforms necessary to achieve its goals. The IBDLP's aims are also extremely ambitious, as it attempts to change the mindset of an entire state in a mission-mode manner. The programme is still underway but has set a powerful precedent in livelihoods management for other states that seek to raise their citizens out of poverty in a manner that conserves the environment and is driven by the local community.

"I consider myself fortunate to have been part of the FLL development programme because it gave me an opportunity to interact with various people working in the organization at the administrative level, inter-personal level, community level and at the resources level which gave me a clear and concise picture of the issues and initiatives that needs to be taken up to address them and ensure that we travel on a path that leads us to progress and prosperity".

- Mr. Aiban Swer, Director Meghalaya Basin Development Authority (MBDA) & Meghalaya Institute of Governance (MIG).

3.2. Problem-Driven Iterative Adaptation (PDIA) Approach to Solving Meghalaya's Water Crisis

Despite being home to one of the wettest places on earth, Mawsynram and Sohra, many parts of the state ironically suffer from scarcity of water. To address this situation, in 2016, a PDIA approach was adopted by the State administration. This involved extensive participatory rural appraisal (PRA) exercises by stakeholders and officials from the community and rural department to villages falling under each of the subdistricts every year. The aim was to interact with the village council leadership and better understand the ground reality, and this was done with a vision to build FLLs by helping them devise strategies and models to address the problem of scarcity, while the officials played the role of facilitators in implementing the strategies best suited for each subdistrict.

The community members were sensitized on how best they could leverage resources available to them to meet the end goal. For this, under a parallel scheme called the Mahatma Gandhi Rural Employment Guarantee Act (MGNREGA) [15], which is a rights-based entitlement programme in India, definitive resources are made available to villages. Out of these, a 60:40 ratio of the resources is divided accordingly to address important developmental challenges unique to each village or sub district. Hence, a fixed percentage of MGNREGA resources was allotted to solve the water scarcity problem and other NRM interventions.

During one such field visit in 2018 covering approximately 6500 villages of Meghalaya, a striking revelation was made. Over 50% of the villages were seen to be facing water scarcity, and water scarcity was deemed to be the number one problem, even surpassing unemployment. This was a clarion call for having a policy in place, specifically to address Meghalaya's water problem.

3.2.1. Spearheading India's Jal Shakti Abhiyan (JSA): Inception of Meghalaya's Water Policy 2019

Following the collaborative PDIA approach and ground visits since 2016 and realizing the need for having a dedicated water policy in place, a resource process and priority (RPP) framework was put in place to effect initiatives aimed at solving water problems. In May 2019, India as a nation took a strong stance for water conservation and launched the Ministry of Jal Shakti, a ministry under the Government of India. This was soon followed by the launch of Jal Shakti Abhiyan (JSA) in the same year. It was a campaign for water conservation and water security through convergence of various ministries of the Government of India and State governments.

Following this, in July 2019, Meghalaya became the 1st in India to have an integrated approach to solving water problems and brought about the state water policy. The State Water policy 2019 aimed to address water issues, conservation, and protection of water sources in the state, in line with JSA.

3.2.2. Framework for implementing State Water Policy 2019

To implement the policy, all Village Executive Councils (VECs) that were instituted to implement the MGNREGA were notified as Village Water Resource Councils (VWRCs). An important feature of the VECs is that each member here is democratically elected by the village members. In 2014, the amendment to MGNREGA Schedule-I was done, which mandated that at least 60% expenditure will be

on agriculture and allied activities be done. Consequently, a list of permissible works under the Act now has nearly 75% activities that directly improve water security and water conservation efforts. All PRAs were aimed at strengthening various levels of implementation and building the capacities of all functionaries at the field level.

- Identification of two Water Volunteers (WVs) in each VEC
- Formation and activation of the VWRC. VECs have been vested with the responsibilities and roles of the VWRC.
- Formation of the District level JSA Committee
- Training and capacity building of WVs by the Meghalaya Basin Development Authority (MBDA)

An interesting feature of the VWRCs is that approximately 3351 VWRCs adopted a resolution known as the 'water resolution'. Through this, community members laid down their resolutions on paper and resolved to act upon achieving their resolve of solving the water crisis while taking part in other NRM interventions.

MAIN OBJECTIVES OF MEGHALAYA's WATER POLICY 2019

- Provide equitable, sustainable, economical and efficient allocation of water as a provision of water for life;
- Provide safe and hygienic water for drinking, domestic and sanitation and livelihood development to all residents of the State;
- Ensure protection and conservation of catchments all water sources to prevent degradation of the quantity and quality of water sources and promote principle of 3Rs- Reduce, Recycle and Reuse.
- Enhance resilience to disasters and the impacts of climate change;
- Ensure convergence of all water related interventions and activities
- Promote latest tools, technologies, dynamic and easily accessible data and information for use by the community and other stakeholders.
- Promote and support community participation in development and management of water resources;

Setting up of an efficient and effective regulatory framework for the water sector in order to realize the economic value of water.

Decisions taken by the Village Water Resource Council, Mawkyrdep

The Village Water Resource Council, Mawkyrdep in the meeting held on 10.7.2020 has taken the following decisions to conserve water in the village: -

1. The committee will take full responsibility to preserve/conservate water for the generations of today and tomorrow.
2. The committee will take responsibility in taking up plantation works to conserve water

3. The VWRC along with the village dorbar will take full responsibility to maintain cleanliness in the village and to disallow using chemicals for agricultural activities
4. To preserve the water sources and to prohibit deforestation within 50 meters of the source
5. To prohibit the villagers from using harmful and poisonous chemicals which is a thread to aqua life and to preserve the water resource

Likewise, several other VWRCs adopted their own resolutions.

Table 1 shows the status of functionaries for the implementation of water policy until now in Meghalaya.

No. of District Committees	Water Volunteers (WVs) identified	Formation of Village Water Resource Councils (VWRCs)		No. Of VWRC that adopted Water Resolution	Number of people trained on JSA
		No. of VECs	VWRCs formed		
11	11545	6325	4937	3351	2740

Source: State Rural Employment Society (SRES), Meghalaya[3][23]

Following extensive PRA exercises in all VECs, water scarcity, mostly drinking water scarcity, was identified as a major concern in more than 1874 VECs. Exercise led to a reprioritization of works in VECs.

Table 2 shows the top ten works demanded by the VECs during 2019-20 in Meghalaya.

Work identified and implemented under Water Policy	Number of works
Afforestation and plantation	1356
Check dam	745
Fishery/Farm/Dug out pond	329
Well	329
Spring chamber	252
Water tank	242
Trenches	181
Canals	62
Bunds	61
Spring sheds	41
TOTAL	3598

Source: State Rural Employment Society (SRES), Meghalaya[4][23]

3.2.3. Impact of Water Policy

Since the inception of the Water Policy in 2019, a considerable amount of progress has been made.

Table 3 shows progress under water policy made thus far in Meghalaya.

Interventions under Water Policy	Number of interventions		
	2019-20	2020-21	2021-22
Water Conservation and Rainwater harvesting measures	9179	12113	9810
Rejuvenation of traditional and other water bodies/tanks	1089	1272	825
Reuse and recharge of borewell/other ground water	54	18	18
Watershed Development	413	606	515
Intensive afforestation	3791	5188	4657
TOTAL	14526	19197	15825

Source: State Rural Employment Society (SRES), Meghalaya[5][23]

Initiation of Climate Change Reversal Project

A significant outcome of the State Water Policy through the PDIA approach was the launch of the Climate Change Reversal Project in December 2020. This aligns with the State's larger vision of collaborative people-driven action to address climate and its adverse impacts, Statewide coordinated action to address and reverse climate change and its impacts with a focus on sustainable agriculture and natural resource management that will lead to sustainable livelihoods. Despite the existence of several initiatives aimed at ecosystem restoration, the silo approach of each of these initiatives often does not present a sustainable solution to the problem of climate change. This project is part of *Meghalaya's State Capability Enhancement Project (SCEP)* [16] where the idea is to bring all relevant departments together in a convergence model. Under the project, natural rural management committees (NRMCs) will be formed as subcommittees within the VECs, and the existing VWRCs will be strengthened.

Efforts are currently underway to implement the Meghalaya Climate Change Reversal Project with the district and block task forces already in place. A unique feature of Meghalaya's Climate Change Reversal Project is an ambitious goal of creating a huge social capital of Community Conservation Corps (CCCs), a cadre of natural resource management volunteers in each of the 6500 villages across the State. Each CCC is trained and empowered to integrate traditional knowledge and modern technology to solve the challenges of climate change. Such a massive initiative towards climate change reversal is being undertaken for the first time in any state of India. The CCCs would comprise youth (aged between 14 and 25 years) motivated and passionate towards the environment and will form an integral part of the State's Climate Change Reversal Process, which is currently underway.

CASE STUDY 2: The Mawsynram Declaration- A Positive Deviance of PDIA approach to solving Meghalaya's water crisis

24 villages unite to address Water Woes in one of the wettest places on Earth- Mawsynram

Mawsynram village is located on the southern hillocks of East Khasi Hills district of Meghalaya. Situated at a distance of 65 kilometers from state capital, Shillong, Mawsynram is famed to receive the highest average rainfall on Earth. The village receives an average of 467 inches of rain per year (as per Meteorological sources). Despite this status, it ironically suffers water shortages, especially in the winter months. This can be attributed to a number of causes, most notably the lack of infrastructures related to water conservation and retention as well as severe deforestation in some parts of the region. Soil erosion during monsoon due to high velocity of rain water flow and water scarcity (drought like situation in some areas) during winter seasons is the major issue faced by the community people at large here.

Although some interventions were taken up by MGNREGA and subsequently by the Community Led Landscape Management Project (CLLMP) under Meghalaya Basin Management Agency (MBMA) which bolstered the conservation process to a fair degree, there was lack of a cohesive effort from all villages under Mawsynram Block to tackle this common problem. Realizing this, a PRA visit was undertaken to Mawhiang village in the block by officials of Community & Rural Development Department as part of JSA under MGNREGA on August 21, 2019. An inspection and interaction by the then Commissioner Secretary of Community and Rural Development (C&RD) brought into fore the acute water scarcity in the block.

Therefore, realizing an urgent need to mitigate this problem, it was suggested that all the VECs of the villages come together to solve their common issue under one banner and call it – *The Mawsynram Declaration*.

Extensive community mobilization

A block level meeting was organized with the VECs by Rural Development Officials to seek the participation & involvement of the VECs relating in the Mawsynram Declaration. Local communities of several villages were sensitized on the need to acquire and conserve more catchment areas that belong to individuals as a solution to long term conservation and environmental sustainability. Some villages/VECs who obtained catchment areas took up conservation activities under MGNREGA by constructing check dam and water harvesting structures. Steps were also taken to promote awareness on water campaign at grassroots level making the community to understand the importance of water conservation by conducting participatory rural appraisal (PRA) and focus group discussion within the VEC and similarly encouraging women participation through Self Help Groups (SHGs).

The Impact

Following this, a number of villages turned up with the land documents and the file work for the Declaration soon began. A majority of the villages signed memorandums with their respective village institutions since community lands are available whilst a handful no. of villages even purchased lands from private parties. As part of the broadcasting process, the village institutions also held meetings to discuss on where and how the interventions can be taken up. Letters to the BDO, etc. were also sent stating they wish to initiate the Declaration straight away with the constructions of ponds, check-dams, jalkunds, and other measures to preserve water.

A total of twenty-four villages in Mawsynram came forth and signed up to be a part of the Mawsynram Declaration. These villages are: Mawteibah, Pongkung, Langsymphut, Mawryngkang, Mawlynnu, Mawhiang, Weiloi, Mawtangor, Lumdiengngan, Mawsynram, Kmawanrum, Mawrapad, Mawlyngbna, Phlangwanbroi, Kenbah Mallai, Kenbah Synteiñ, Kynmynsaw, Nongdommawria, Mawkasaiñ, Pyndensohsaw, Wahmawpat, Tynger, Lyngkhom and Synnei Nongthymmai. The VECs of these villages have expressed desires to expand the sites in some form. Whilst some villages aim to expand the size of the structures, others wish to convert it to a tourist attraction while some plan to put forth land development interventions to further enhance the aesthetic as well as conserve the natural landscape of the place.

Notable Results

As part of Mawsynram Declaration, the village of Langsymphut has taken great strides and the VEC members have spoken at length about how the construction of the check dam (in convergence with Community Led Landscape Management Project -CLLMP) in their village has greatly benefitted the

community. The village now hopes that the work undertaken with the help of the Declaration shall be fruitful and would ease the community of its water woes.

Another village that greatly benefitted from the Mawsynram Declaration is Mawteibah Village. The VEC of this village spoke about the history of the site. The former headman of the village was the owner of the land and upon seeing the potential of it, gave away a portion of the plot to the village *Dorbar* for public use. In conjunction with a water harvesting structure, the village of Mawteibah has also started afforestation and land development approach such as recharge pits and in the vicinity of the site.

“The Mawsynram Declaration has put in that cohesion that was missing amongst all the villages of Mawsynram”- VEC Secretary, Pongkung village (One of the 24 villages that signed the Mawsynram Declaration).

IN PICTURES

3.3. Creating Resilient Local Institutions to Imbibe Sustainable Climate Change Reversal Actions

Local institutions play a crucial role in not only sensitizing but also building resilience among communities to further ecosystem-based adaptations (EbAs). A 2018 study [17] revealed that social networks form an essential source of resilience, especially in tackling climate change. The role of social networks remains underexplored, as there is only limited empirical evidence of their benefits, particularly for research on adaptation to climate change in developing countries. The study results highlight how the process of diversification is dependent on household participation in various group activities and formal and informal social networks. Furthermore, the households participating in several group activities and social networks were seen to adopt diverse livelihood strategies and were found to be more resilient to perceived climate change because they had access to the critical resources (material and nonmaterial) essential for diversification through their networks. These local institutions act as platforms for discussing crucial issues ranging from finance, government schemes, climate change actions and even health-related issues. They act as drivers of change for any project implementation.

As per data from the Meghalaya State Rural Livelihoods Society (MSRLS), the State currently has a network of more than 35000 Self Help Groups (SHG) spread across all eleven districts. These SHGs further come together to form village organizations (VOs), which are approximately 2354 in number. VOs further culminate in becoming part of cluster-level federations (CLFs). In addition, there are more than 6000 village employment councils (VECs) in every village. The VECs were constituted under MGNREGA in 2006 in every village and comprise all male and female heads of each household with the traditional headman generally heading the Council.

Furthermore, institutions such as the Village Natural Resource Management Committees (VNRMCs) under projects such as the Community Led Landscape Management Project (CLLMP) are currently being implemented in approximately 400 highly degraded villages across the state and act as platforms to

create local institutions for communities to develop and implement community-managed NRM plans for reclaiming and restoring degraded landscapes.

3.4. Viewing Ecosystem-based Interventions through Gender Lens

A study conducted in 2019 [18] revealed that institutions created to enhance community participation aimed at reversing climate change are often seen to reinforce the larger patriarchal societal structure that is deeply rooted and manifested in everyday practices. An increasing need is felt for forest management and adaptation policies and practices to better recognize, appreciate and address gender inequality.

Meghalaya is one of the few existing matrilineal societies in the world, and although it is assumed that women would have more decision-making roles, the issue of authority and power is still a widely debated topic. The matrilineal system followed by the three main indigenous communities of Meghalaya – the Khasi, Garo and Jaintia – have their share of limitations. The tribes pass their lineage maternally, but in regard to decision making in the matters of public affairs, women do not have much say in issues related to the local governance system. The World Bank Funded Community Led Landscape Management Project (CLLMP), being implemented by MBDA, is an example of one such intervention, among others, that ensures women's participation in decision-making processes.

3.4.1. Bolstering women's empowerment through environmental conservation interventions

As part of CLLMP [19] an inclusive community project, a Village Natural Resource Management Committee (VNRMC) is formed that comprises the entire adult population of the village, and with many village communities in the state having close-knit relationships; this enables the entire community to participate in the project. There needs to be a minimum of 50 percent female participation in VNRMCs. The aims are to emphasize women's empowerment by putting women in key power positions in the project. Although the head of the council is the Headman of the village, the other top positions always include women members.

VNRMC requires one adult male and one adult female from each household as its members, and the bank account signatories mandatorily comprise one male and one female member as signatories. The project, which is by and large for the community, has come a long way in setting a perfect example of inclusivity and equity whereby a sense of responsibility is bestowed upon the participants, thereby ensuring its higher success rate.

A 2021 study [20] indicates that rural women are often seen to be absent from climate change interventions at professional, practice and personal levels. The precarious impacts of climate change disproportionately affect women, particularly those in rural communities. Women's vulnerability to climate change emanates from exclusion in climate change decision-making processes, cultural norms and

patterns, which confines them to household responsibilities, lack of adaptive capacity, low literacy levels, patriarchal dominance and high poverty levels.

As per the Meghalaya MGNREGA report, in a few VECs where female members hold the position of Chairperson (112) and Secretaries (260), the execution and maintenance of works and record-keeping was found to be exemplary. To further strengthen women's role in the decision-making domain, Meghalaya Cabinet approved the 1st ever policy for the Reservation of 50 pc seats for women in local council elections [21]. It perhaps became the 1st such state in India to approve a policy for reservation of 50 pc seats, only for women. The post of the secretary of VEC will be reserved for women members on a rotational basis, and the position of Chairperson will be reserved for women in VECs where the post is not held by the traditional heads. This will also be on a rotation basis.

CASE STUDY 3: Women of Jani Mawiong village in Meghalaya Break the Glass Ceiling

Women Leadership at Meghalaya's Jani Mawiong village

Jani Mawiong village, under Mawphlang C&RD Block, East Khasi Hills District is located just approximately 30 kilometers from state capital Shillong has made great strides towards realizing the twin goal of not only ecosystem conservation but gender equality as well. Not only is the Secretary a woman, but they have also chosen the President as well as the Treasurer of the VNRM to be represented by women as well. This has been the first instance in all the villages of the state of Meghalaya implementing the project where all three of the important positions have chosen women representatives. It has indeed been a landmark occasion NRM related interventions in as far as women participation is concerned.

A conversation with Kong Buldahun Langstieh, who is the President of the Committee reveals that it is indeed an imperative issue in their village as women are not yet allowed to attend the main *Dorbar* meetings (which is held once a year) in their village but through the VNRM, the perception of the male residents of the village has gradually begun to change, and a realization has been set in that women can bring forth issues which are not only different but nonetheless pertinent as compared to men. The VNRM of the village was formed in July, 2020.

She emphasizes that perhaps in the near future, things would eventually change in her village as well as other villages in the State where women participation is virtually non-existent, especially in decision-making areas.

Kong Fulsida Sunn, the Secretary of the VNRM expressed that this is her first-time taking responsibility of her village of this magnitude and whilst slightly nervous, she is also excited at the prospect of taking up this challenge and has even given a few innovative ideas for the purpose of afforestation in their village by suggesting to use hay to better protect the saplings from the frost during winter. She also mentioned that there is mutual understanding and camaraderie amongst all the three female members as they are also close friends outside of work. "A Secretary is the backbone of any committee hence, I feel

there is an added responsibility to my work, besides managing my day-to-day affairs as a school teacher and a mother.” she quipped.

The Treasurer, Kong Lucky, who is also the daughter of Mrs. Langstieh, expressed her eagerness in taking up the mantle. “Our VEC treasurer has always been a male, hence it is something of a momentous occasion for me as well as for all the females in Jani Mawiong village. Indeed, this has been the much-needed catalyst for the women of the village”.

While the road is long and arduous towards the representation of women, especially in the socio-political sphere of Meghalaya’s indigenous tribes, villages like Jani Mawiong is making strides in bringing in inclusive development into the fold.

3.5. Leveraging Technology to Effect Climate Change Reversal Actions among Communities

Building social capital is one of the key elements that can ensure the success of any NRM intervention. However, over time, the technical aspects of NRM interventions have led to a disconnect between the community at the grassroots level and stakeholders facilitating the implementation of various interventions. Unless social capital is built at the community level to empower and keep them informed of the latest technologies, the sustainability of any NRM intervention in the long term will be doubtful.

The implementation of any NRM model requires efficient use of technology, especially among communities. This is where the state of Meghalaya stands out, among others, in the use of technology in scaling best practices at the grassroots level. The state has been using various technological applications, such as the *Composite Landscape Assessment and Restoration Tool (CLART)*, *Participatory Digital Attestations (PDA)*, *Airtable* and *virtual platforms for training and guided mentoring sessions*, among others. The aim is to ensure scalable practices across all communities. This is also leading to collaboration between various agencies, which is part of the greater goal of Meghalaya’s SCEP. Meghalaya is a resource-rich state and convergence between different state agencies and stakeholders to bring about a convergence between human, financial and technical resources, while leveraging the use of technology can prove to be a game changer in realizing and taking steps towards the State’s Climate Change Reversal goal.

3.5.1. Technologically empowering communities to lead landscape management projects

Interventions such as Meghalaya’s Community Led Landscape Management Project (CLLMP) aim to manage and conserve natural resources to support accelerated economic growth and to institutionalize and demonstrate a model for governments (both state and central) to support the “community-led management of natural resources” in the country. To realize this objective, community members are being extensively engaged through several technological interventions through the following applications:

1. *Composite Landscape Assessment and Restoration Tool (CLART)*

A geographic information system (GIS)-based composite landscape assessment and restoration tool or CLART is being used to aid in the planning and implementation of natural resource management (NRM) interventions in the state. This mobile application provides crucial advisory and supports target communities in planning actions to effect maximum impact. This has allowed decentralization and democratization of the planning process, thus enabling us to achieve scale in the least amount of time and cost. This is being used by MBMA to train two to three village facilitators across all villages so that CLART can be used to prepare NRM implementable plans for each village.

2. Participatory Digital Attestations (PDA)

PDA is an application especially created to create digital signatures of cadres who are going through the capacity building process. PDA has been creating the data exhaust (i.e., data generated with each interaction of Village Community Facilitators (VCF) with the program either through trainings or content usage) of CLLMP's trained cadre (CLLMP staff, Master Trainers and Village community facilitator) through attesting the presence of participants during every capacity building session. Through attestations, participants and targeted communities not only record their presence but also obtain easy access to the content used during the training (which means all the participants carry the content in their smartphones, which is just one touch away).

At the state level, the decision maker (State Project Management Unit) is able to visualize and track the progress of capacity building sessions through PDA and evaluate the usage of content. This level of data helps in making decisions such as which village/district needs what kind of training and what kind of content is more user friendly to them. As per data from MBMA, thus far, CLLMP has been able to use 1826 PDA licences and will be looking forward to procure more as per the need of scale.

CASE 4: Use of PDA on ground among communities in Meghalaya*

Participatory Digital Attestation (PDA) is an application created by Socion used under CLLMP. The deployment of this app started in January 2020. When this app was introduced, the features under it was very limited and as the application requires internet connectivity through a smartphone to Sign-in and Sign-out, there was many challenges faced at the village level. However, from time to time the app was upgraded which became very useful for the project. All trainers are now registered under PDA.

Benefits of PDA among target community members:

- Adapting to the new change by the beneficiaries
- Using PDA in CLLMP helps to create repurposable data and assets, transforming Meghalaya into a resource state for Natural Resource Management in India
- PDA is a digital tool that's used for tracking training journey of CLLMP participants and share training content
- Leave behind repurposable/reusable assets

- Create assets in the form of identifiable trained cadre in CLLMP and content that can be repurposed for NRM or other programs.
- Increase community engagement and promote ownership through ready access to content: Share and provide on demand access to content through PDA will helps in improving community engagement and ownership
- Automatic collection and easy access to training data for reporting and management purposes reduces workload on DPMU staff
- Create data as exhaust to increase visibility in program

PDA records contemporary data from ongoing activities that can be used not just by CLLMP program but by other departments/programs and community as well. For, e.g., training attestations can be used as data to make program decisions by CLLMP and community to understand and assert their learning journey for better livelihood opportunities-

- Helps to know who the participants are and where they are from (district, block, etc.)
- Helps in making training decisions based on the geographical location of the participants (Master Trainers or VCFs) in the state/districts.
- Helps CLLMP identify participants for training based on their qualifications. For, e.g., 8th Pass, 10th Pass, 12th Pass, B.A. Commerce, B.Sc. Physics, etc.
- Will help CLLMP identify individuals in project for training or work more specific and contextual to their qualifications. Combined with training received in CLLMP, VCFs will have access to potential newer opportunities in the future.
- Helps CLLMP to identify the participants of the project training based on their roles. For, e.g., VCF-KM and M&E, VNRMC- Bookkeeping, etc.
- Helps to identify individuals with specific roles for further training or other purposes, thus also opening new opportunities for VCFs in or outside project or state.

In CLLMP, all trainings and Guided Mentoring Sessions are now deployed on PDA as seen in the image below:

**** Information Source: Capacity Building and Training Component, CLLMP, MBMA***

3. Airtable

Airtable is a digital library where links of contents that are stored on different storage platforms (e.g., Google Drive, Onedrive, etc.) and can be indexed and then shared. Using this platform, content curators of projects such as CLLMP are able to create and manage lists of content links efficiently. Airtable has provided easy access to content by creating a centralized repository of all the knowledge resources of CLLMP based on natural resource management. Presently, 98 content pieces are present on Airtable that are regularly accessed by state and district staff and can also be accessed by anybody across India or the world.

Access to the content across storage spaces is given to the content consumer through the sharing of the link available on Airtable. This content library on Airtable for NRM that is being used by CLLMP is published on CLLMP's website, thus helping to make Meghalaya a resource state that makes training content on spring shed management available for all mountainous and hill states.

Airtable also acts as a digital natural resource management resources library. This library that is tagged to the thematic areas of NRM is also making content available easily while scaling from 400 springs to spring shed management work across 6000 plus villages, thus saving time on trying to find content for larger use.

4. Leveraging Virtual Platform for Training and Guided Mentoring Sessions

Guided mentoring sessions are the opportunity through which an environment cadre (which is part of the capacity building process) participates in virtual sessions where opportunity of frequent access to experts is provided and a platform where peer learning is accessible.

CLLMP has been able to conduct weekly guided mentoring sessions with community cadres since November 2020. In these sessions, every week, VCFs present his/her challenges, and their peers (other VCFs) solve the respective problems. These engagements help VCFs develop their problem solving and leadership skills at the community level, which leads to the proactiveness of VCFs to implement CLLMP in their respective villages.

CLLMP has also started fortnight guided mentoring sessions with 89 identified Master Trainers. During these sessions, Master Trainers are able to solve their challenges from experts (placed in different states) and their peers (placed in different blocks and districts). The project plans to now lead Guided Mentoring sessions for the community cadre from across 6000+ villages, in convergence with the Soil and Water department.

[3] State Rural Employment society: <https://megsres.nic.in/>; Contact: iarapdiengdoh@gmail.com

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4. Conclusion

Humans have a competing interest in nature, which has resulted in mass disruption of the ecosystem—a rate that disallows timely replenishment of lost ecosystem habitat. A decent standard of living has become synonymous with ecosystem exploitation. Therefore, it is imperative that each individual belonging to every community understands the natural balance to be able to foresee the horizon in the long term. Although several community-centric policies, as analysed above, are seen to be working

towards realizing the goal of an informed and aware community in terms of ecosystem-preserving actions, the young and old together must be able to perceive a wider horizon through a 'Balcony Approach'. Understanding the gravity of the situation combined with a 'strong willingness' to address the situation—political willingness and willingness from civil society are crucial. Communities in Meghalaya are close knit and have shown the willingness to come together for preserving their ecosystem after understanding the gravity of the situation (as seen from the Mawsynram Declaration Case).

Furthermore, Meghalaya is currently leveraging the State Capability Enhancement Project (SCEP), whose implementation is underway. The five pillars of SCEP are building decentralized adaptive leadership, technology- and data-driven decision making, granular performance monitoring, developing responsive systems for demand-side mobilization and incubating innovations for addressing systemic issues. The same is already underway through the launch of the Climate Change Reversal Project in the State, which is still at a nascent stage. It will be interesting to note the impact of Climate Change Reversal Project in the years to come especially through the creation of a massive social capital through the Community Conservation Corps (CCCs)- a cadre of youth in each of the 6500 villages who will become champions of Meghalaya's ecosystem preservation initiatives. A resilient policy depends on resilient communities for a sustainable and long-term solution to preserve ecosystems and to create livelihoods to bring about economic development but not at the cost of ecosystem damage.

Abbreviations

ISFR	India State of Forest Report
VDF	Very Dense Forest
MDF	Moderately Dense Forest
OF	Open Forest
MINR	Meghalaya Institute of Natural Resources
EbA	Ecosystem based Adaptation
NRM	Natural Resource Management
FLL	Field Level Leadership
MBDA	Meghalaya Basin Development Authority
MBMA	Meghalaya Basin Management Agency
IBDLP	Integrated Development & Livelihood Promotion
CoE	Centre of Excellence
MIG	Meghalaya Institute of Governance
PDIA	Approach Problem Driven Iterative Adaptation
PRA	Participatory Rural Appraisal
MGNREGA	Mahatma Gandhi Rural Employment Guarantee Act
JSA	Jal Shakti Abhiyan
RPP	Resources, Processes and Priorities
VECs	Village Executive Councils
VWRCs	Village Water Resource Councils
WVs	Water Volunteers
SRES	Meghalaya State Rural Employment Society
SCEP	State Capability Enhancement Project
NRMCS	Natural Rural Management Committees
CCCs	Community Conservation Corps
C&RD	Community and Rural Development
SHGs	Self Help Groups
CLLMP	Community Led Landscape Management Project
KM	Knowledge Management

MSRLS	Meghalaya State Rural Livelihoods Society
VOs	Village Organizations
CLFs	Cluster Level Federation
CLART	Composite Landscape Assessment and Restoration Tool
PDA	Participatory Digital Attestations
GMM	Green Meghalaya Movement

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- (Government of Meghalaya)

Figures

Figure 1

shows the Kynshi River in Meghalaya's West Khasi Hills District.

Picture Courtesy: Shweta Raj Kanwar^[1]

[1] Shweta Raj Kanwar: Corresponding Author, shwetarajkanwar@gmail.com

Figure 2

shows a glimpse of Tanguar Haor, one of the largest Haor in Bangladesh. A typical freshwater swamp forest can be seen on the right side, and the Khasi Hills of the state of Meghalaya in India can be seen in the background.

Source: Oporichito anam photography^[2]

[2] Tanguar Haor Picture Courtesy: https://commons.wikimedia.org/wiki/File:Tanguar_haor.jpg

Figure 3

shows a glimpse of the Simsang River in Meghalaya, the longest river in the Garo Hills region, which originates in the West Garo Hills and flows through the East Garo Hills and thence to the South Garo Hills districts.

Source: Meghalaya Basin Development Authority

Figure 4

shows a cadre of Green Volunteers engaging in cleaning drive as part of sensitising communities on Natural Resource Management

Source: Meghalaya Basin Development Authority

Figure 5

shows a glimpse from the PRA exercises with the community members. PRAs are an integral process of putting communities at the forefront of NRM activities in the state, allowing communities to take ownership of the resources and their protection.

Source: Meghalaya Basin Development Authority

DORBAR SHNONG MAWKYRDEP

Raid Madan Kyrdep, Khyrim Syiemship
Ri-Bhoi District - 793116

4

Ref. No.

Date:

KI JINGRAI KA VILLAGE WATER RESOURCES COUNCIL MAWKYRDEP;

Ka VRWC Mawkyrdep ha ka jingialang kaba la long ha ka Dt. 10.7.2020, ka la ia shim rai lang na ka bynta ban pynneh pynsah ia ka um kumne harum :-

- 1, Ka Commiti kan shim khia ban peit ba ki tlongum kin neh kin sah na ka bynta ka mynta bad ka pateng ban wan.
2. Ka Committee kan shim khia ban thung ki dieng kiban pynneh pynsah ia ka um.
3. Ka VWRC ryngkart bad ka shnong kin shim khia ruh ban ym pynjakhlia ia ka mariang da kaba khang ba ym dei ban ai dawai (Chemical) kulmar, ia ki jingthung bad ki jhur.
4. Ban pynneh pynsah ia ki tlong um, ki jaka ba hapoh san phew meter saw dong la khang ban pom ia ki dieng, jingthung.
5. Ki Paid nongshong shong shnong kim dei ban ber dawai bih kiba pyniap ia ki dohum. Kane kan pynneh ruh ia ka jingkhuid ka um.

La pynwai ia ka jingialang da u Rangbah Shnong uba long u Chairman ka VRWC.

Dated. Mawkyrdep.
10.7.2020.

M. Khasumrud
Secretary
VRWC Mawkyrdep.
Secretary
P.E.C Mawkyrdep

[Signature]
Chairman.
VRWC Mawkyrdep
Chairman
P.E.C. Mawkyrdep

Figure 6

above lays down the resolution adopted by the Village Water Resource Council (VWRC), Mawkyrdep village. The text is written in local Khasi Language and can be translated as seen in the corresponding

Figure 7

shows villagers of Langsymphut village inspecting the site before building the Langsymphut Check Dam before 2019. Langsymphut village is one of the 24 villages that signed the Mawsynram Declaration.

Figure 8

shows water harvested at the same site at Langsymphut village after completion of the Check Dam in 2020.

Figure 9

shows training on Springshed Management for VNRMC executive members & Village Community Facilitators (VCFs) of Saipung block in Jarain village, East Jaintia Hills District of Meghalaya.

Source: Meghalaya Basin Development Authority

Figure 10

shows a glimpse of women VNRMC members signing the Green Charter as part of CLLMP in Meghalaya whereby they commit themselves to conserve natural resources. The VNRMC's Executive Committee (EC) comprises 9 members and should have at least 4 members as women.

Source: Meghalaya Basin Development Authority

Figure 11

shows women members of VNRMC in Jani Mawiong village of Meghalaya Source: Meghalaya Basin Development Authority

Figure 12

above shows PDA App being used by community members to keep track of their training as well as access their training resources and modules

Source: Meghalaya Basin Development Authority

Figure 13

shows the dashboard of the PDA App

Source: PDA App