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LEAD STORY Page 2-3

## Application of 'Ecosystem-based' Adaptation: The Phayeng Case

Written by:

Yumnam Shila Devi  
Dr. Nilanjana Saha



IN FOCUS Page 6

## HYDROPONICS: AN APPROACH TO CLIMATE CHANGE MITIGATION

Written by:

LAWRENCE ASHEM

## BIODIVERSITY OF MANIPUR



*Dillenia indica* L.



*Dichrocephala integrifolia* (L.f.) Kuntze



*Sida rhombifolia* L.

## Application of 'Ecosystem-based' Adaptation: The Phayeng Case

### Introduction

Ecosystem-based Adaptation (EbA) is a viable and robust matrix for closing the gap between local community adaptation and global climate mitigation. By utilising biodiversity and ecosystem services to support communities' adaptation to the effects of climate change, it is an alternative to traditionally engineered adaptation measures. EbA interventions (watershed management and afforestation) have the additional benefit of providing community resilience to climate change (adaptation) while expanding capacity of ecosystems to act as carbon sinks (mitigation). There is not enough data to show how EbA operationalizes carbon positivity at the village level, despite EbA's conceptual promise. Most papers on EbA treat the concept as a project-based intervention instead of a long-term governance framework.

The village, Phayeng, located in the Kangchup foothills of Manipur, Northeast India, is an important case for these. The village suffered from significant deforestation and drying up of water sources but was ultimately designated as India's first carbon positive eco model village. This change occurred due to the National Adaptation Fund for Climate Change (NAFCC) integrating community-based forest protection efforts with state-based technical reform and support for the adoption of renewable energy [1]. Thus, Ecosystem-based Adaptation (EbA) supports human resilience mainly through ecological restoration and sustainable management of natural ecosystems. Theoretical underpinnings for EbA derive from recognizing ecosystems are not victims of climate change; but also help in strengthening ecological resilience against the impacts caused by climate-related disturbances (e.g., extreme weather events). In order to protect themselves from climate change, communities must enhance their ecosystem services (e.g., hydrologic regulation, soil stability and biodiversity) to create natural barriers that provide protection from climate-related disturbances. The framework of EbA provides a way to integrate both conservation and development in a structural manner rather than opposites to each other.



Another important theoretical contribution of EbA is the capacity to bridge the divide between climate adaptation (resilience-building) and mitigation (sequestering carbon). While EbA was originally considered to be a resilience strategy, many forms of ecological restoration generate a 'carbon dividend'. For example, by reforesting previously developed areas, these efforts create both biomass and increased soil organic carbon. The restoration of watershed areas leads to increased density of vegetation and, lastly, sustainable agriculture has the ability to lower levels of methane and nitrous oxide emissions while simultaneously increasing soil sequestration. In rural landscapes, the land use is the main variable that determines the flow of carbon. Carbon positivity is instead be viewed as an outcome of the condition/use of the ecosystem. This is in contrast to urban-industrial solutions that focus mainly on the energy transition; as such, rural areas will need to re-define 'carbon neutrality' as an extension of beyond net-zero balance to be considered as a net-carbon sink.

Phayeng is an example of a governance-mediated ecological transition as it combines multiple layers of community forest committees, state-supported multi-departmental coordination, and changes to community livelihoods. This article uses Phayeng to assess whether EbA can be replicated as a model to achieve rural carbon positivity. The carbon positive aspects of rural communities will be understood within the context of climate change from an EbA perspective. It will present a new perspective of climate change based on a rural rather than an urban focus, as the article will demonstrate the Himalayan region of rural communities produces a substantial amount of carbon. As a result, carbon positivity will be shown to be a product of integrated governance process as opposed to simply a theoretical or conceptual phenomenon.

### Materials and Methods

The article evaluates the Ecosystem-based Adaptation (EbA) and rural carbon positivity as being implemented in Phayeng, Manipur. The village is selected as the primary unit of analysis due to its designation as India's first carbon-positive eco model village and because of its integrated into the National Adaptation

Fund for Climate Change (NAFCC) framework. This study is based on a systematic review of secondary sources and published official documents where no primary field-based data collection (interviews or surveys) was conducted. The data used for the study are:

1. *Primary Policy Documents* such as: the Detailed Project Proposal (DPR) submitted to NAFCC; gazetted documents of the Directorate of Environment and Climate Change, Government of Manipur; and Climate Change Action Plans developed by the state government.
2. *Institutional Records* such as funding mechanisms, inter-sectoral integration reports and recorded environmental results held by governmental archives.
3. *Secondary Literature* such as peer-reviewed journal articles and guides on the governance of climate change provide additional context for understanding EbA, hybrid governance, and socio-ecosystem resilience.

### Results and Discussion

The regeneration in Phayeng village is viewed as reversing long history of ecological decline within an ecosystem. The local villagers experienced significant systems decline as a result of past felling of trees and soil degradation. The declines created a "vulnerability feedback loop"; leading to reduced groundwater recharge and dry hill stream flows making rain-fed agriculture extremely vulnerable to erratic monsoon rainfall. The village regeneration was initiated by the shift from passive degradation to active socio-institutional stewardship. In the beginning, the community started reviving traditional norms related to the protection of forests, which were supported by NAFCC (National Adaptation Fund for Climate Change) [2]. Unlike typical government driven (top down) afforestation projects, Phayeng's approach focused on planting indigenous species that helped regulate water, improve soil stability, and restore ecosystems. Therefore, the restoration of forests served a dual purpose of building resiliency through adaptation (protecting water and soil resources) and mitigating environmental damage through biomass carbon sequestration.

To date, Phayeng has derived benefits from the combination of traditional indigenous ecological normative behaviour, and the actions taken by the governments to support traditionally and environmentally friendly approach to land management. As such, it is very difficult to establish the arrangement of "hybridity" that have experienced considerable fragmentation of land ownership/use. Therefore, the case of Phayeng should be viewed through the lens of its local context; however, it provides a framework for



## LEAD STORY

developing/rural landscapes that includes additional components that may not be found in Phayeng. Meanwhile, there is a gap in the climate literature regarding the dual structure described above, where central-level policy lacks local legitimacy, and grassroots organizations do not have sufficient resources to conduct long-term monitoring of carbon-insensitive activities. The emerging climate mitigation and adaptation relationship provides important insights to construct efficient policy solutions. The village shows that integrating ecosystem-based adaptation techniques produces "natural co-benefits" in terms of cost effectiveness: For example, reforestation helps stabilize hydrologic cycles (i.e., adaptation), while simultaneously providing carbon sequestration services (i.e., mitigation). Through Sustainable Agricultural Development (SAD), food security is improved (i.e., adaptation), and methane emissions are reduced (i.e., mitigation). Finally, renewable energy sources provide reduced energy costs (i.e., adaptation), and decrease CO<sub>2</sub> emissions (i.e., mitigation) [3]. Through this integration process, conflicts are reduced and local involvement can be encouraged by achieving global mitigation goals which in turn tangible benefits at the local level. Financial sustainability and scalability are two critical perspectives of the Phayeng model, which is successful but experiences constraints at both the structural and operational level. At the village level, carbon accounting continues to rely on modelled (or estimate-based) rather than high-frequency, empirical verification to substantiate actual emissions. This, in turn, presents a major challenge to the financial sustainability of NAFCC gains, which may vanish absent the support of government funding cycles or other state priorities.

Hence, the contribution of the Phayeng case is most importantly a challenge of urban bias in carbon discourse and climate policy. The dominant storyline focused on decarbonizing industrial activity within cities and transitioning to smart grids, but instead, Phayeng redirects attention to rural landscapes as being regenerative contributors towards establishing a global carbon budget. As a result, the Phayeng case shows that EbA is a proactive way of reducing carbon emissions and additionally, it is a valid way to sequester carbon. While previous research has tended to be limited by focusing on resilience building through interventions such as slope stabilization and watershed protection; the results from Phayeng show there is an increase in potential for carbon sinks when using these interventions. The Phayeng village created three separate types of carbon sinks (e.g., carbon sequestration from forest regeneration, increased organic and carbon content in soils, and the use of decentralized mitigation technologies) collectively. This demonstrates that EbA provides a framework for implementing rural-scale mitigation strategies. Also, our results support the idea that managing and mitigating carbon footprints is not only an urban issue.

Moreover, the following are some of the limitations to this approach.

1. Reliance on Data: The data for USDA and CARB's carbon sequestration and reductions in emissions are based on reported institutional data. As such, these reports do not have a basis in independent, primary biophysical measurements.
2. No Field Confirmation: The lack of ethnography precludes any depth of analysis regarding the movement of individuals within households and community or internal power dynamics.
3. Time Limitations: The study only reviews

the project in the timeframe of its documented implementation cycle. Therefore, ecological and/or financial sustainability will not be empirically able to be verified long-term.

Despite the issues, a systematic analysis of policy and program documentation represents a valid and widely-accepted methodology for the evaluation of governance structure. By placing these documents in a structured theoretical framework, this study assists in the provision of an evidence-based evaluation of the transformation of Phayeng as an EbA governance-mediated model.

### Conclusion

This article provides adequate details on EbA as an alternative way in creating rural carbon positive trajectories. Similarly, this article has transitioned from providing environmental descriptions of the area to focusing on carbon positive as an outcome of socio-ecological governance. The findings demonstrate that Phayeng's transformation resulted from many factors, not only from technological advances and perceived environmental enhancements, but also from a combination of serious ecological regeneration of the landscape, intentional approaches to reducing carbon emissions at all levels of the economy, and effective interaction among diverse institutions. The Phayeng case supports the theory that EbA can integrate both mitigation and adaptation policies into a single governance structure. Instead of treating adaptation as a resilience-building strategy and mitigation as a separate commitment to reduce emissions, the above model prescribes how ecological restoration provides synergies or co-benefits to both streams of benefit. Forest restoration resulted in increased carbon storage and also provided water resources; Sustainable agriculture resulted in reduced methane emissions and increased livelihood stability; and renewable energy reduced dependence on fossil fuels and improved the resiliency of households. The combined interrelationship of mitigation-adaptation in this case demonstrates the unique cost-effectiveness and policy cohesion of ecosystem-based approaches to climate change governance in rural areas.

Even so, this study presents some important caveats. Rural carbon positivity is still dependent on an ongoing commitment by key institutions, sustainable financing, and strong monitoring capacity. Gains from sequestering carbon are reversible from both biological and political perspectives and are therefore at risk of being undone by a decline in the strength of governance or an increase in land-use pressure. Additionally, carbon accounting at the community level usually relies on modelled rather than directly observed data. In addition, the Phayeng village is a model for replicability, not a template that can be used everywhere [4].

The study has made three main contributions to the literature. It has reconceptualized rural carbon positivity from being solely a technical metric for measurement (or measuring the carbon dioxide in the atmosphere) to being a broader definition based upon governance (i.e., an ecological state of being). Additionally, it has built upon existing research of ecosystem-based adaptation (EbA) to demonstrate that EbA can deliver successful integrated climate outcomes through its operational capabilities. Lastly, this work demonstrates how hybrid governance/partnerships are fundamental in sustaining long-term carbon positive trajectories. Future studies should continue to develop these themes with both longitudinal

carbon measurements and comparative studies across the entire Eastern Himalayas. Phayeng ultimately concludes that rural carbon positivity is an actual phenomenon when ecosystem restoration, institutional coordination, and participatory governance all come together in a systematic framework.

Ecologically, the restoration of tree cover and conservation of soil will result in carbon stocks and thereby aid in sequestering carbon, while stabilising hydrology and microclimate. Decentralised renewable energy systems, methane reductions in wet rice production and livestock management have all contributed to decreased emissions of greenhouse gases and have supported through these processes. The success of all these strategies in terms of their long-term viability and effective operation relies upon governance elements aligning with local stewardship that are part of the national and state climate action plan.

The Directorate of Environment and Climate Change, Government of Manipur has provided financial and scientific support through the National Fund for Climate Change, but it is the local forest community committees and village institutions who made right on a day-to-day basis and complied with the rules. Thus, this joint approach was critical for continuing to achieve results from regenerative actions.

### References

1. The Manipur Government. (2013). Regarding climate change, the Manipur government has released a state action plan: The State of Manipur.
2. The Intergovernmental Panel on Climate Change. (2022). The IPCC releases publications on climate change; These reports contain data on the consequences of climate change on people as well as the various forms of human adaptation to climate change due to their significance to society. Cambridge University Press is the publisher of The Climate Change Report Number 2022: Impacts and Adaptation.
3. Government of India's Ministries. (2014). The Government of India has released Operational Guidelines that give direction on how to run the National Adaptation Fund for Climate Change.
4. Sharma and Thomas (2023). In the hamlet of Manipur (Gateway: International Journal of Innovative Research 2(2), 8-24), the first model eco village in Phayeng has been built as a case study of how we may react to climate change.

**\*Research Presentation:** The Phayeng example illustrates how rural carbon density can be achieved through environmental vulnerability when implemented as an ecosystem-based adaptation strategy via the use of hybrid governance models, resulting in the combined benefits of both mitigation and adaptation.



**Yumnam Shila Devi**  
Masters in Political Science,  
Amity Institute of Social  
Sciences, Amity University,  
Uttar Pradesh Noida  
Email: yumnashila13@gmail.com  
Phone No: 6909014834



**Dr. Nilanjana Saha**  
Assistant Professor, Amity Institute  
of Social Sciences, Amity University,  
Uttar Pradesh Noida  
Email: sahanilanjana.05@gmail.com

# TIME SERIES ENVIRONMENT DATA

## A) Water Quality of Iril river (12/02/2026)

SI.No	PARAMETERS	(SITE 1) SAWOMBUNG	(SITE 2) MOIRANGKAMPU	(SITE 3) NAHARUP	(SITE 4) IRILBUNG	(SITE 5) KEIRAO LITAN
1.	WATER TEMPERATURE (°C)	16.00	16.50	17.00	16.50	16.50
2.	TOTAL SOLID (mg/l)	197.40	230.00	206.00	211.00	216.80
3.	TDS (mg/l)	178.00	179.00	180.00	182.00	184.00
4.	TSS (mg/l)	19.40	50.00	26.00	29.00	32.80
5.	EC (µS/cm)	251.00	253.00	254.00	256.00	258.00
6.	TURBIDITY (NTU)	6.40	7.20	6.00	7.20	8.00
7.	pH	8.46	8.18	8.17	8.12	8.07
8.	FREE CO <sub>2</sub> (mg/l)	4.40	5.50	7.70	6.60	6.60
9.	DO (mg/l)	8.51	8.31	7.50	7.60	7.30
10.	BOD (mg/l)	1.82	2.13	1.98	1.82	1.98
11.	COD (mg/l)	3.06	3.88	3.29	3.10	3.52
12.	T. HARDNESS (mg/l)	112.00	113.00	114.00	114.00	116.00
13.	CALCIUM (mg/l)	22.44	21.64	22.44	22.04	22.44
14.	MAGNESIUM (mg/l)	13.64	14.37	14.13	14.37	14.62
15.	T. ALKALINITY (mg/l)	165.00	205.00	215.00	210.00	250.00
16.	CHLORIDE (mg/l)	36.92	39.76	31.24	32.66	35.50
17.	INORG.PHOSPHORUS (mg/l)	0.08	0.09	0.07	0.09	0.08
18.	SULPHATE (mg/l)	23.80	22.13	22.22	21.85	22.96
19.	SODIUM (mg/l)	4.40	4.50	4.50	4.60	4.60
20.	POTASSIUM (mg/l)	1.40	1.50	1.50	1.60	1.60
21.	FECAL COLIFORM (MPN/100ml)	13.37	45.2	27.74	27.74	88.34

## B) Weather Report of Manipur During Jan.- Feb. of 2026

Weather Data for January and February of the Year 2026					
District	Max.Temp (°C)	Min.Temp (°C)	Max.RH (%)	Min.RH (%)	Rainfall (mm)
Bishnupur	30.14	7.46	99.77	18.36	0
CCPur	30.1	6.86	97	21.22	1
I/East	30.62	7.58	90.47	19.54	0
I/West	28	5.14	100	20.22	0.3
Kakching	28.39	8.24	100	20.84	0.9
Kangpokpi	28.08	6.9	86.93	17.74	0
Noney	41.91	8.43	100	21.76	0.1
Senapati	22.32	5.18	100	25.26	0
Tamenglong	25.3	6.56	99.62	22.9	0.1
Tengnoupal	23.08	9.3	100	37.1	0
Ukhrul	21.51	6.2	99.12	20.46	0

Source : State Environment Laboratory, Directorate of Environment & Climate Change, Government of Manipur.

**1. Scientific name** : *Dillenia indica* L.  
**Local name** : Heigri  
**Class** : Magnoliopsida  
**Phylum** : Tracheophyta  
**Order** : Dilleniales  
**Family** : Cornaceae

**Description:** *A. Dillenia indica* is a medium-sized evergreen tree, reaching up to 15m. Leaves are large (15–36 cm), alternate, with a distinctive corrugated (crinkled) surface and prominent veins. The flowers are large, about 15-20 cm in diameter, with five white petals and numerous yellow stamens. Its characteristic round fruits are large, greenish-yellow, and have many seeds. The fruit is a 5-12 cm diameter aggregate of 15 carpels, each carpel containing five seeds embedded in a fibrous pulp.

**Uses:** Fruit decoction is anti-dandruff and helps prevent hair fall. Fruit juice is a laxative and tonic. Decoction of bark and leaves is astringent. Bark and leaves are boiled for consumption. Fruit is crushed for juice extract. Fruit is edible.

**Distribution:** India, Nepal, Indonesia, Malaysia, Sri-Lanka.



*Dillenia indica* L.

**2. Scientific name** : *Dichrocephala integrifolia* (L.f.) Kuntze  
**Local name** : Lalukok  
**Class** : Equisetopsida  
**Phylum** : Streptophyta  
**Order** : Asterales  
**Family** : Asteraceae

**Description:** *Dichrocephala integrifolia* (L.f.) Kuntze is an erect herb, typically 30-90 cm tall, often branched, appearing in wet, shady places, stream banks, and disturbed ground. Stems are glandular pubescent (hairy with sticky glands). Leaves are opposite leaves with toothed margins, small white flower heads (capitula) in branched clusters, and tuberculate achenes with club-shaped pappus elements, commonly found in wet areas.

**Uses:** *Dichrocephala integrifolia* (L.f.) Kuntze is a traditional medicinal herb used across Asia and the Pacific for treating fever, inflammation (lung, liver), diarrhoea, edema, coughs, and injuries, with extracts showing antioxidant, anti-inflammatory, and antibacterial properties due to compounds like flavonoids and terpenoids, also serving as animal fodder and dye. Leaf paste is used for fresh injuries and skin diseases. Plant is occasionally used as an ingredient in the preparation of traditional hair shampoo.

**Distribution:** It is native to tropical Asia (Indian Subcontinent, Southeast Asia, East Asia) and Pacific Islands.



*Dichrocephala integrifolia* (L.f.) Kuntze

**3. Scientific name** : *Sida rhombifolia* L.  
**Local name** : Uhan  
**Class** : Magnoliopsida  
**Phylum** : Anthophyta  
**Order** : Malvales  
**Family** : Lamiaceae

**Description:** *Holmskioldia sanguinea* Retz. is a woody, climbing or erect shrub that can grow up to 2-3 meters high. Leaves are simple, opposite, and broadly ovate to elliptic-ovate. The plant is primarily known for its unique and showy flowers, which resemble a "Chinese hat" or "cup-and-saucer".

**Uses:** Crushed fresh leaves and shoots of *Holmskioldia sanguinea* Retz are applied in rheumatism and rheumatoid arthritis; extracts of leaves and stem bark are taken for dysentery, headaches, while leaves are boiled as part of a blood-purifying concoction.

**Distribution:** Native to the Himalayas, India, and Myanmar but is now a widely cultivated ornamental, naturalized globally in warm regions like Southeast Asia, the West Indies, Mexico, parts of Africa (Mozambique, Zambia), and the Americas (Hawaii, Venezuela, Costa Rica).



*Sida rhombifolia* L.

**Photo by:** Oinam Romila Devi, Information Officer, EIACP Hub Manipur

**Species Identified by:** Dr. Deshworjit Singh Ningombam, Assistant Professor, Department of Botany, Jadonang Memorial College, Longmai, Noney

## HYDROPONICS: AN APPROACH TO CLIMATE CHANGE MITIGATION

Climate change is no longer a distant threat; it is a measurable and ongoing global phenomenon. According to the Intergovernmental Panel on Climate Change (IPCC), there is about a 50% probability that the global mean temperature will exceed the 1.5°C threshold above pre-industrial levels within the next few decades if greenhouse gas emissions continue at the current rate. Crossing this threshold is associated with increased frequency of extreme weather events, reduced agricultural productivity, water stress, and risks to food security. At present, agriculture is highly sensitive to climatic variability. Rising temperatures, irregular rainfall, floods, and droughts directly affect soil fertility, crop yield, and farming livelihoods. Therefore, there is a growing need to shift from conventional soil-based agriculture toward climate-resilient and resource-efficient production systems. One such approach is vertical farming integrated with hydroponic technology.



**Fig: Chilly plant**

Hydroponics is the latest trend among the urban community and is referred to as 'smart farming'. It is also known as vertical or indoor farming and is occasionally, also referred to as Controlled Environment Agriculture (CEA) when done for commercial purposes. The method is not only adopted for increasing the crop yield through sustainable options but has become a necessity in places like Holland where soil and sunlight are limited. Hydroponics which uses shades, LED lights, fans and

water pumps, can deal with hotter and wetter conditions of climate change. The risks of invasion of weeds and infection by bugs and insects are minimized, making the process simple and clean. Hydroponics offers the possibility of growing crops all twelve months of the year. With impacts of climate change predicted in all sectors of life, agriculture faces new challenges from rising temperatures. The pollinator behaviour will change and so will the crop yield. It is time to look for unconventional food production systems and hydroponics is one such promising practice

Hydroponics has many advantages, but it also has scientific and practical limitations. First, not all crops can be grown efficiently using hydroponic systems. Leafy vegetables (such as lettuce, chilly and spinach), herbs, and some fruiting crops grow well, but major staple crops like rice, wheat, and maize are not yet economically viable under hydroponic conditions at a large scale. Second, hydroponic farming requires a relatively high initial investment for structures (greenhouse or protected units), pumps, pipes, nutrient tanks, and sometimes artificial lighting. It also needs technical knowledge for monitoring nutrient concentration (EC), P<sup>h</sup>, temperature, and water quality. However, if these technological and economic constraints are reduced through innovation and low-cost system design, hydroponics has strong future potential. Although hydroponics cannot fully replace traditional agriculture, it can support future food security by producing high-quality, nutrient-dense food in a resource-efficient and climate-resilient manner.

Hydroponics provides a climate resilient, water efficient and low carbon pathway for sustainable food production. By reducing water use, limiting traditional soil-related emissions, and enabling controlled production even under erratic weather, it addresses multiple climate change impacts afflicting the state's agriculture sector. With supportive policies, technical training, and local innovation, hydroponics can become part of a diversified agricultural future in Manipur—bolstering both environmental sustainability and food security in the face of climate uncertainty.

Most plants are capable of tolerating a rather wide range of temperatures since they naturally grow in an uncontrolled environment with significant fluctuations present. Still, there is a range of optimal growth for each species. Temperature can be easily measured and it would be entirely feasible to implement a regulator. However, indoor temperature regulation is a well-studied subject with numerous effective solutions readily available. Temperature regulation is not an issue specific to hydroponics and therefore not included as a distinct variable.

*Written by:*  
**LAWRENCE ASHEM,**  
Msc Horticulture, HNB Garhwal University

# ENVIRONMENT EVENTS

## A. Mission LiFE Poster Campaign At Wangjing Bazar and Thoubal Bazar, Thoubal District, Manipur 15<sup>th</sup> January 2026



On 15 January 2026, the EIACP Hub Manipur under the Directorate of Environment & Climate Change, Government of Manipur organised a one-day Mission LiFE poster campaign at Wangjing Bazar and Thoubal Bazar to raise awareness about sustainable living and environmental responsibility among the public. The campaign aimed to educate citizens about Mission LiFE and its seven themes, which promote environmentally conscious lifestyles through simple daily behavioural changes and encourage community participation in sustainable practices.

During the campaign, EIACP staff interacted with street vendors, shopkeepers, women, customers, visitors and students. Through direct conversations, poster distribution and brief explanations, they highlighted the importance of adopting eco-friendly habits in everyday life.

## B. WEBINAR on “Wetlands and Climate Resilience” 19<sup>th</sup> February 2026

On 19 February 2026, the EIACP Hub Manipur under the Directorate of Environment & Climate Change, Government of Manipur organised a webinar on “Wetlands and Traditional Knowledge: Celebrating Cultural Heritage”. The session was delivered by Mohd. Habibullah Khan, Programme Officer, Directorate of Environment & Climate Change.

The speaker highlighted the ecological importance of wetlands and the impacts of climate change on these ecosystems. He discussed the consequences of wetland degradation and emphasised the need for conservation, restoration and rehabilitation. The talk also covered community-based wetland management,

the role of local communities, relevant policies and legislation, and existing challenges and opportunities. Examples of successful initiatives, along with the potential of ecotourism and sustainable livelihood opportunities, were also shared, with special focus on wetland management in Manipur.

## C. Painting Competition At Special Regular English School, Nambol 26<sup>th</sup> February 2026

On 26 February 2026, the EIACP Hub Manipur under the Directorate of

Environment & Climate Change, Government of Manipur organised a painting competition on the theme “Life Around Wetlands” at Special Regular English School, Nambol, Bishnupur District, as part of the month-long observance of World Wetlands Day. Students participated enthusiastically, expressing their ideas through creative artworks. The top three students were awarded cash prizes and certificates. An awareness session on the ecological importance of wetlands and the need for their conservation was also conducted.

## D. TREE PLANTATION PROGRAMME At Leimapokpam Mayai Leikai 2<sup>nd</sup> March 2026.



On 2 March 2026, the Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP) Hub Manipur organised a Tree Plantation Programme at Leimapokpam Mayai Leikai in collaboration with the Leimapokpam Social Development Club. The initiative aimed to promote environmental awareness, increase green cover and encourage community participation in sustainable development. A total of 100 saplings of different species were planted along roadsides and selected sites. Volunteers, club members, local residents and EIACP staff actively took part. The programme also included a brief awareness session highlighting the role of trees in maintaining ecological balance, preventing soil erosion, improving air quality and combating global warming.

## E. Mission LiFE Poster Campaign Bishnupur District 2<sup>nd</sup> March 2026



The Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP) Hub Manipur organised a Mission LiFE Poster Campaign on 2 March 2026 at Nambol Bazar on the theme “Say No to Single Use Plastic.” The campaign aimed to raise awareness about the harmful effects of single-use plastics and encourage the adoption of sustainable alternatives. EIACP staff distributed informative posters and interacted with shopkeepers, vendors and the public, highlighting the need to reduce the use of plastic carry bags, disposable cups and packaging materials. Participants were encouraged to use reusable bags and eco-friendly alternatives. The campaign generated positive responses and promoted a sense of shared responsibility towards environmental conservation and a sustainable future.

## ISSUES AND CHALLENGES FACED BY FISHERMEN IN THANGA

Salam Sanathoi Singh Research Scholar, CSSEIP

Thanga has a high rate of unemployment. Many families live in poverty. Majority of the residents rely on fishing in Loktak Lake as their primary or exclusive source of income. To protect the ecosystem, the state government has issued restrictions restricting fishing in the Lake. For example, in November 2011, the State, represented by the Loktak Development Authority (LDA), began evicting Loktak fishers from the lake region under the provisions of the new law, claiming that the fishers were illegally inhabiting shelter huts built on floating biomass for fishing purposes. In 2022, the LDA issued a fresh notification requiring all Athaphum to be removed within 15 days following notification. The fishermen have opposed the State's move, citing it as an effort by the government to fully restrict their access to the lake. They saw the government's actions as a violation of their fundamental rights to life and access to natural resources. When their access to fishing is restricted, it has a direct impact on their livelihood. They struggle to meet their fundamental necessities, such as food, shelter, and medical treatment. They are dissatisfied with the government initiatives for restricting their livelihoods. This leads to disagreements, protests, and even illegal fishing activities. The restriction has a cultural impact. People who live near the lake believe that restrictions on fishing undermine traditional ways of life and fishing-related cultural traditions. Another issue is a lack of other ways of income. It exacerbates their economic issues, resulting in poverty and migration from afflicted areas. It also leads to a change in their lifestyle. Though the government has prohibited fishing in Loktak Lake to protect its environment, resolving the concerns and challenges faced by the people who rely on the lake for a living is critical for overall growth. To address these concerns, a balanced approach is required that takes into account both ecosystem conservation and fishermen's livelihoods. This can include developing sustainable fishing practices, offering alternative livelihood opportunities, assisting with community development activities, and ensuring that restrictions are effectively enforced.

**KEYWORDS:** Ecosystem, Fishing, Loktak Development Authority, Loktak Lake, State Government

## ENVIRONMENT NEWS

### 1. Awareness campaign on migratory waterbirds held at Thinungei

**Bishnupur, January 04 2026:** A one-day sensitization and awareness campaign titled "Welcome to Migratory Waterbirds 2025-26", was held at Starland Academy, Thinungei on Sunday, under the theme "Human-Bird Co-existence: Let's Save Our Birds, Our Ecosystem and Our Environment (BEE)". As per a release issued by the Manipur Bird Club, the programme was organized by the Manipur Bird Club (MBC), in collaboration with Pole Star Guardians Association, Thinungei Makha Youth Club (TMYC), and Loyalakpa Youth Association, Thinungei. The programme was graced by Dr Khangembam Shamungou, President, Manipur Bird Club; N Rupachandra, Principal, Starland Academy, Thinungei; and Hidangmayum Geetchandra Sharma, Range Forest Officer (RFO), Moirang Range, as the functional presidium members.

Source: The Sangai Express

### 2. E-Waste Awareness Workshop held

**Imphal, February 11 2026:** The Manipur Pollution Control Board (MPCB) and the Directorate of Environment & Climate Change jointly organised a 1-day workshop on "Understanding of E-Waste Information, Education & Communication (IEC) Programme for College Students" at Porompat today. The event was attended by RK Amarjit Singh, Special Secretary ((Forest, Env & CC); Dr T Brajakumar Singh, Director, Environment & Climate Change; and Dr W Roshan Singh, Member Secretary, MPCB as presidium members.

Source: The Sangai Express

### 3. CAU Imphal wraps up faculty training on "Natural Farming"

**Imphal, March 22 2026:** A ten-day Faculty Training Programme on "Bio-inputs Mastering in Natural Farming" successfully concluded at the College of Agriculture, Iroisemba, Central Agricultural University (CAU), Imphal. The programme, conducted from March 10 to March 19, 2026, aimed to strengthen sustainable agricultural practices among academic professionals in Manipur. The initiative brought together 25 faculty participants from 13 constituent colleges, aiming to equip them with indepth knowledge of eco-friendly farming techniques that address climate change challenges while simultaneously enhancing soil health and productivity. The comprehensive curriculum featured 14 theoretical lectures and 11 hands-on practical sessions. Key focus areas included integrated farming systems, carbon sequestration, and the scientific validation of traditional organic formulations.

Source: The Sangai Express

Note: Full news are available at <https://eiACP.moef.gov.in/drc/eiACP/centre/Manipur>

**For further information, please contact**

The Coordinator, EIACP-IMPHAL, Manipur, e-mail: [man@envis.nic.in](mailto:man@envis.nic.in)

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