Department of Science & Technology
Ministry of Science & Technology
Government of India
NMSHE NATIONAL MISSION FOR SUSTAINING THE HIMALAYAN ECOSYSTEM

MIZORAM STATE CLIMATE CHANGE CELL
MIZORAM SCIENCE, TECHNOLOGY & INNOVATION COUNCIL

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CLIMATE ACTION IN MIZORAM

Newsletter

Tri-annual newsletter published by Mizoram State Climate Change Cell

MIZORAM STATE CLIMATE CHANGE CELL

Climate Change is being recognized as a major threat to present day society because of its adverse impacts on ecosystem, agricultural productivity, water resources, socio-economy and sustainability. The present efforts in the country and especially the state, to deal with climate change issues which previously lack integration and networking, now has been realized by different stakeholders by coming to a consensus on working together and sharing and pooling resources and knowledge. Even so, limited and fragmented knowledge hinders the efforts made towards tackling climate change issues. Climate change calls for an informed and an integrated decision making. Interdisciplinary approach with multi-stakeholder platforms are necessary to the face of threats posed by climate change.

The Environment, Forest & Climate Change Department, Government of Mizoram has prepared the second version of State Action Plan on Climate Change (SAPCC) ready to be approved by Government of Mizoram. The state intends to start the process of implementation of this action plan. The course of steps taken during the previous action plan and the process of preparing this new action plan has been a repository of knowledge for different stakeholders and line departments.

The State Climate Change Cell of Mizoram which taken up the responsibility of leading the Strategic Knowledge Mission requires enhancing its capacity to provide technical support and act as knowledge source for nodal agency and line departments to enable them to follow climate resilient action by supporting them with research, knowledge base and data to develop policy, proposals and action agenda. The cell will support not only the state agencies/departments but also other states of Indian Himalayan Region. This will be a multi-stakeholder platform. The centre will network with various Central Government Departments like Department of Science and Technology, Department of Earth Science, ICAR, Indian Institute of Tropical Metrology, Indian Institute of Technology(s), Indian Institute of Science, etc. It will also network with different agencies working on climate change adaptation and mitigation including NGOs, bi-lateral and multi-lateral agencies.

The programme aims at constituting and strengthening the state climate change cell. The cell will act as a multi-stakeholder platform and coordinate with line departments on various missions. The cell aims to strengthen its capacity as a single window repository of climate change. The data information generated within this programme will help in regular updating of the knowledge base on local climate issues and develop or revise models through collaborative networks developed with specialised research and climate analytics agencies. The cell is expected to build human capacity, generate additional resources for the state and facilitate interfacing with national and international agencies to reduce vulnerability of the state, preserving the ecosystem and enhancing resilience.

The Mizoram State Climate Change Cell has the following main objectives:-

1) Vulnerability and Risk Assessment - To study the climate data and project the climate changes for the vulnerability assessment at the regional and local level.

2) Institutional Capacity building and R&D for data-base/Information generation as per the SAPCC and NMSHE requirements - Mapping of the knowledge base and data resources relevant to climate change for the mobilization of state specific strategic knowledge, institutional support to be provided for the formation of state-wide knowledge network and networking of the state level institutions.

3) Training programmes for stakeholders including Government officials, researchers, community based organizations, media, etc. - Training programme to be essentially imparted over climate change causes and impact, adaptation and mitigation strategy, climate change action plan, convergence amongst line departments, source of funding and development of proposal for funding.

4) Public awareness for community - On adaptation and mitigation strategy, causes and impact of climate change to build up their adaptive capacity.

Activities of EF&CC Department for Climate Change

Climate Change: With the co-operation of IORA Ecological Solutions, A 14-page report on comparative analysis of Vulnerability Assessment of Forest and Biodiversity due to Climate Change inm 8 districts of Mizoram was prepared in May 2021. This report gives an in-depth study of the Vulnerabitlity Assessment of Forest and Biodiversity due to climate change in the then 8 districts of Mizoram.

Green India Mission: This is one of the missions covered under climate change during 2020-21, 2231 hectares of land was covered under this mission.

National Afforestation Programme (NAP): This programme is undertaken through Village Forest Development Committee (VFDC). Creation of new plantations and maintenance of old plantations were taken up under this program. During 2021-22, 1960 hectares of new plantations were created while 2655 hectares of old plantations were maintained.

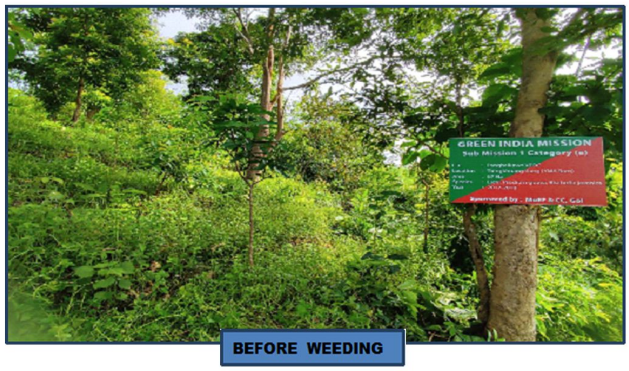
Forest Fire Prevention & Management Scheme: Various works were undertaken under this scheme for prevention of forest fires awareness campaign, creation and maintenance of fire lines, building of infrastructures etc. Rs 126.98 lakhs had been spent under this scheme during 2020-21.

Wildlife Conservation/Protection: 10 Protected Area have been created in Mizoram thus far. Under CSS: Integrated Development of Wildlife Habitats (IDWH), Rs 377 lakhs was sanctioned and Under CSS: Project Tiger, Rs 173.62 lakhs was received during 2020-21. Serhmun Village was relocated under Project Tiger.

Green Mizoram Programme: Initiated on 18th June 1999, a total number of 4,140,652 seedlings have been planted so far. During 2020-21, 258,4000 seedlings were planted.

Compensatory Afforestation Management & Planning Authority (CAMPA): A total of Rs 25.99 Cr was received during 2020-21. 4264.519 Hectares of plantation is being taken care of using this. Further, 500 Hectares of Community Forests in 10 villages (which are natural forests) are being taken care of using this fund.

PANGBALKAWN VFDC(GIM) Sub Mission 1, Cat. (a)
Area=11 Ha, Location= Thingkhuangtlang (YMA Ram)
GPS = N: 24° 12' 47.327" E: 092° 36' 39.467"

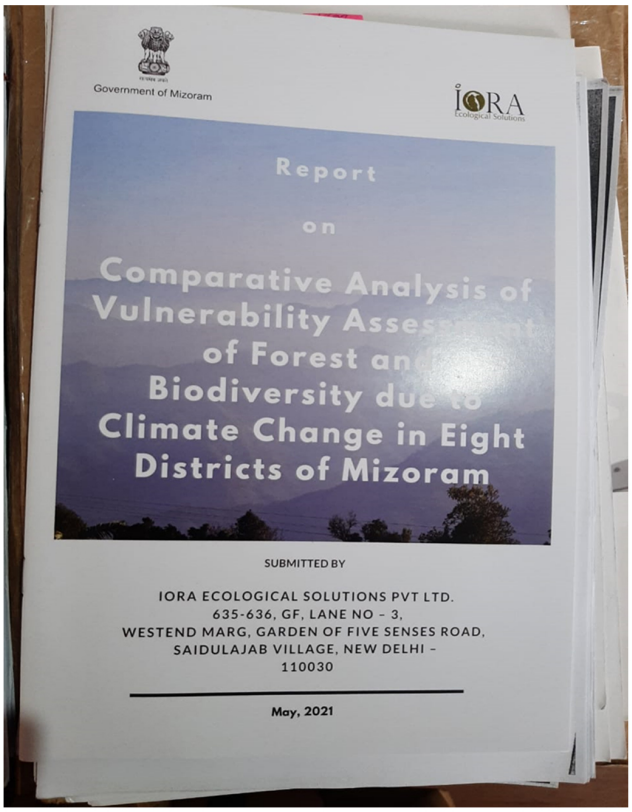


VANCHENGPUI (L3)
1 (b) Type A : Lungkhawdur : 40 Ha

Activities of EF&CC Department for Climate Change

Thingdawl VFDC (GIM)
Sub. 1 (b) - Eco-restoration of degraded open forest. Type C.
Location : Damdiai , Area : 8 ha.

Vulnerability Assessment of Forest and Biodiversity due to Climate Change in eight districts of Mizoram



Kawnpui VFDC (GIM)
Sub. 4 (c) - Road side Plantation
Location : Kawnpui quarry to Pualhrang lui
Area : 3 ha

Before Weeding

After Weeding

Vacancy Filling

Conservation of Soil & Water through CAMPA Project & SEDP

Various Soil & Water conservation works have been taken up by the Department of Land Resources, Soil & Water Conservation, Govt. of Mizoram which include catchment area treatment plan of Tuirial Hydro-electric Project (CAMPA) 2021-22.

Under CAMPA project, soil and moisture conservation works was carried out in an integrated manner under watershed approach on some degraded forest (coversing Tuirial Cathcment). The approach aimed at focussing on assisted natural regeneration through afforestation, rejuvenating various potential and degraded ecosystems in the catchment area, groundwater recharging and dcreasing run off by construction on conservative measures such as:-

1) Bench Terrace
2) Contour Trench
3) Gabionic Checkdam
4) Loose Boulder Checkdam
5) Vegetative Spur

Meanwhile, under Socio Economic Development Policy (SEDP), State Government's falgship programme, the Department has already implemented Arecanut Plantation within Aizawl, Mamit & Kolasib districts covering 300 families under SEDP 2021-22. The number of beneficiaries are proposed to be increased to 1500 families during 2022-23. This plantation will primarily increase vegetative cover within the astate, preventing run off and different kind of erosions, maintaining the microclimate witihin the area and thereby generating income for the farmers.

Bench Terrace

Contour Trench

Gabionic Checkdam

Loose boulder Checkdam

Vegetative Spur

New initiative taken up by Fisheries department

Experimental culture of Pengba:

The College of fisheries were currently pursuing the center of Excellence of Fisheries and Aquaculture Biotechnology Phase-II for development of Fisheries in the North East region. Under the project, the college has developed several technology for adoption by the farmers and entrepreneurs for the sustainable growth in the region. Collaborating with Fisheries Department Mizoram, they have organized a technology dissemination programme entitled. *"Technology dissemination and capacity building for sustainable fisheries and aquaculture with local resources in the state of Mizoram"* on 8th March, 2022.

Since, the temperature/ climate condition are safe to say similar in all North East region and the CAU is desirous to introduce Pengba in Mizoram and ready to provide technological supports The department has considered, after in shallow study, that experimental culture may be done. They have release 500 no. of Pengba sp. of fingerling size to observe and carry out trails at Govt. Fish Seed Farm Lengpui whether the species will thrive in Mizoram climate.

Osteobrama belangeri is a medium carp which is locally known as Pengba, State fish of Manipur has high demand in the state. *Osteobrama belangeri* is herbivorous and is migrated from the Chindwin River of Myanmar of the rivers of the Manipur valley where they settle for breeding and growth.

As the breeding protocol for seed production is simple as well cost-effective, it can be easily practised by small and marginal farmers. Pengba is a highly priced fish ranging from Rs. 650-800 per kg depending on season and availability of the fish. It is not found in abundance in the market unlike other IMCs. Due to its high price, many people in the state cannot afford to buy the fish.

Pengba is suitable for pond culture because it is herbivorous and thus can be included in composite fish culture in place of grass carp. It has also been possible to produce most of its preferred foods through fertilization of culture ponds and provision of supplementary artificial feeds.

IWRD - contribution and path in providing reliable data in respect of Climate Change

It is said that hydrological and meteorological (or "hydromet") hazards are responsible for 90% of total disaster losses worldwide which is expected to become more severe due to climate change. Long term hydromet data can be used to compare emerging trends to past variability to determine if something outside past experience is occurring. Detection of climatic change effect in streamflow and water quality records can have direct benefits for water management strategies and decisions. It is necessary to know the effects of climate on hydrologic parameters such as the timing and magnitude of peak flows, base flow etc. The measurement of streamflow will become more and more important because it provides an indication of the extent of the impact of climatic change on water resources. The effects of climatic change on water quality is also important. Generally, water quality deteriorates as streamflow decreases. Water temperatures, which respond to air temperatures, are also expected to increase with global warming. From this perspective, hydrologic and hydrometeorological indicators of climatic change could be very useful in combating the challenge the world is facing now due to Climate change.

AWS (Non Telemetry)

Multiparameters Water Quality Probe (Sonde)

In order to generate the much needed reliable and real time hydrometeorological data, Irrigation & Water Resources Department, Government of Mizoram is establishing RTDAS (Real Time Data Acquisition System) for Mizoram by installing 23 AWLRs (Automatic Water Level Recorder) for GD (Gauge & discharge) stations across 18 major rivers, 10 AWS (Automatic Weather Stations) and 27 ARG (Automatic Rain Gauges) under National Hydrology Project (NHP), a Government of India undertaking. These stations will send data round the clock telemetrically to the 'State Hydrogeological Data Centre (MzWRIS)' using state of the art technology. These data will, after validation, be sent to IndiaWRIS (India Water Resources Information System). These hydrometeorological will be freely available to different departments, institutions and public, except discharge data of some rivers that are classified under 'Data dissemination Policy'.

Water Quality Testing Laboratory (Level II), Full Climatic Station (FCS), AWS (Non- Telemetry), Acoustic Doppler Velocimeter, Current meters, Acoustic Doppler Current Profiler, Water Quality Sonde and twenty piezometers in different location for monitoring of ground water level will also enrich the state hydrometeorological data. The hydrometric and hydrometeorological data will play an important role in detecting climatic change, fill a gap in climate information and more information on hydrological cycle.

Discharge measurement by ADV and Current meter

Climate Change and its impacts on Fisheries

- Zomuansangi
Fisheries Extension Officer

The warming of the climate system is no doubt unequivocal. The atmosphere, ocean, rivers lake have warmed, amount of snow and ice have diminished and sea level has risen. The uptake of additional energy in the climate system is caused by the increases in the atmosphere concentration of carbon dioxide (CO_2) and other greenhouse gases. Temperature of water bodies is increasing across the global, result in stratification of the water column, leading to dramatic consequences for freshwater ecosystem because of their shallowness and lower buffering capacity comparing with the oceanic water.

DO_2 levels decrease with increased temperature and we all know that the absorption of increasing amount of CO_2 results in acidification of water with potentially detrimental impact on shell-forming aquatic life i.e – Zooplankton etc., mostly food for the fishes.

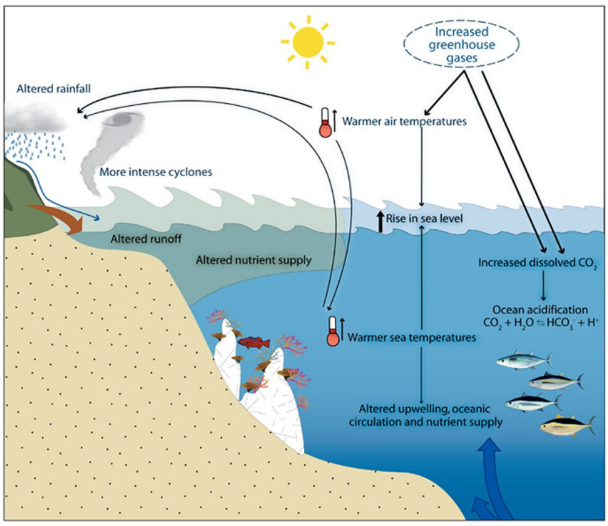
Beyond climate and non-climatic impacts on habitats, fish do not exist in isolation in freshwater ecosystem, but exist within communities made up of other taxa and functional group, which will also be impacted by climate changes, ranging from microbes, parasites, primary producer, fish, predators and humans including fishers. Individual life stages and genotype of fish taxa and non-fish taxa will display different proximate responses to climate changes,

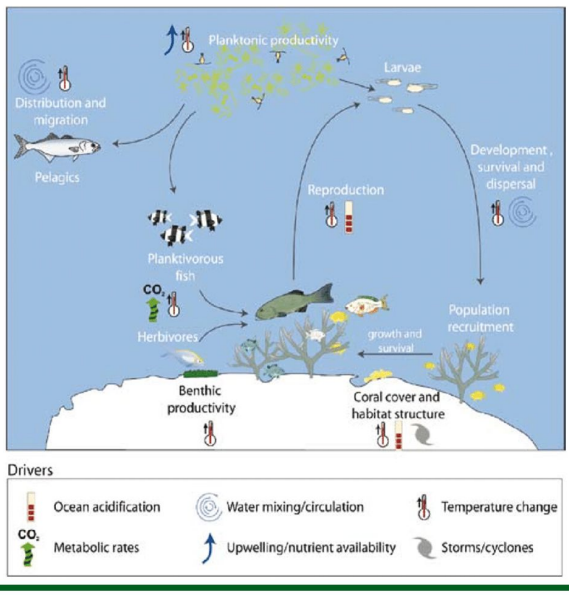
the resulting emerged ecological responses (predators prey relationship, competition, parasitism, fish yield) will likely change as condition and ecological interaction change under climate change and shift in environmental condition as human respond to climate change.

Climate has a strong controlling influence in physical, chemical and biological process in freshwater ecosystem. The link between air and water temperature has long drives mostly physico - chemical and biological progress in aquatic system. Abiotic and biotic conditions are both sensitive to water temperature. Chemical reaction rates double with every 10^0C increases in temperature

As such, the most obvious environmental shift associated with global climate change is in temperature which will increases globally with prediction varying by present scenarios. The aquatic animals/fresh water fishes and shellfishes are poikilotherms or thermal conformers, the changes in water temperature have subsequent impact on almost every component of the ecology of freshwater fishes/shellfishes since they have specific temperature requirement base on the species and even life-stages.

The impact and consequence of climate change on aquatic ecosystem and on the people that depend on them remain uncertain and less-well known. The adverse influence of climate on future fisheries production may be severe.





The Sixth Assessment Report of the IPCC

The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP). The IPCC is an organization of governments that are members of the United Nations or WMO and currently has 195 members. For the assessment reports, experts volunteer their time as IPCC authors to assess the thousands of scientific papers published each year to provide a comprehensive summary of what is known about the drivers of climate change, its impacts and future risks, and how adaptation and mitigation can reduce those risks. The IPCC does not conduct its own research.

Comprehensive scientific assessment reports are published every 6 to 7 years; the latest, the Fifth Assessment Report, was completed in 2014 and provided the main scientific input to the Paris Agreement. The IPCC is currently preparing its Sixth Assessment Report (AR6). The Sixth Assessment Report (AR6) comprises three Working Group contributions: Working Group I (the physical science basis), Working Group II (impacts, adaptation and vulnerability) and Working Group III (mitigation) and a Synthesis Report (SYR).

The Working Group I contribution to the Sixth Assessment Report addresses the most up-to-date physical understanding of the climate system and climate change. The key findings of the Working Group I (WGI) can be summarized as follows:

i. The increase in well-mixed greenhouse gas (GHG) concentrations due to human activities has led to warming of the atmosphere, ocean and land since around 1750. Since 1850, each of the last four decades has been successively warmer than any decade that preceded it.

ii. Globally averaged precipitation over land has likely increased, with a faster rate of increase since the 1980s.

iii. The global retreat of glaciers since the 1990s and the decrease in Arctic sea ice area between 1979–1988 and 2010–2019 has been attributed to human influence. In 2011–2020, the annual average Arctic sea ice area reached its lowest level since at least 1850.

iv. Human-induced climate change is already affecting many weather and climate extremes in every region across the globe.

v. The heating of the climate system has led to global mean sea level rise through ice loss on land and thermal expansion from ocean warming.

vi. Human-induced climate change has contributed to increases in agricultural and ecological droughts in some regions due to increased land evapotranspiration and is also partly responsible for the decreases in global land monsoon precipitation from the 1950s to the 1980s.

vii. Human influence has likely increased the chance of extreme events like increases in the frequency of concurrent heatwaves and droughts on the global scale, fire weather in some regions of all inhabited continents, and compound flooding in some locations.

viii. It is predicted that global surface temperature will continue to increase until at least mid-century considering all emissions scenarios. A warming of 1.5°C and 2°C will be exceeded during the 21st century unless there is a sharp reduction in concentration of CO_2 and other greenhouse gas emissions in the coming decades. Continued global warming is projected to further intensify the global water cycle, global monsoon precipitation and the severity of wet and dry events.

ix. From a physical science perspective, limiting cumulative CO_2 emissions, reaching at least net zero CO_2 emissions, along with strong reductions in other greenhouse gas emissions is required to limit human-induced global warming to a specific level requires. It is projected that a strong, rapid and sustained reduction in CH_4 emissions would also limit the warming effect resulting from declining aerosol pollution further improving air quality.

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