

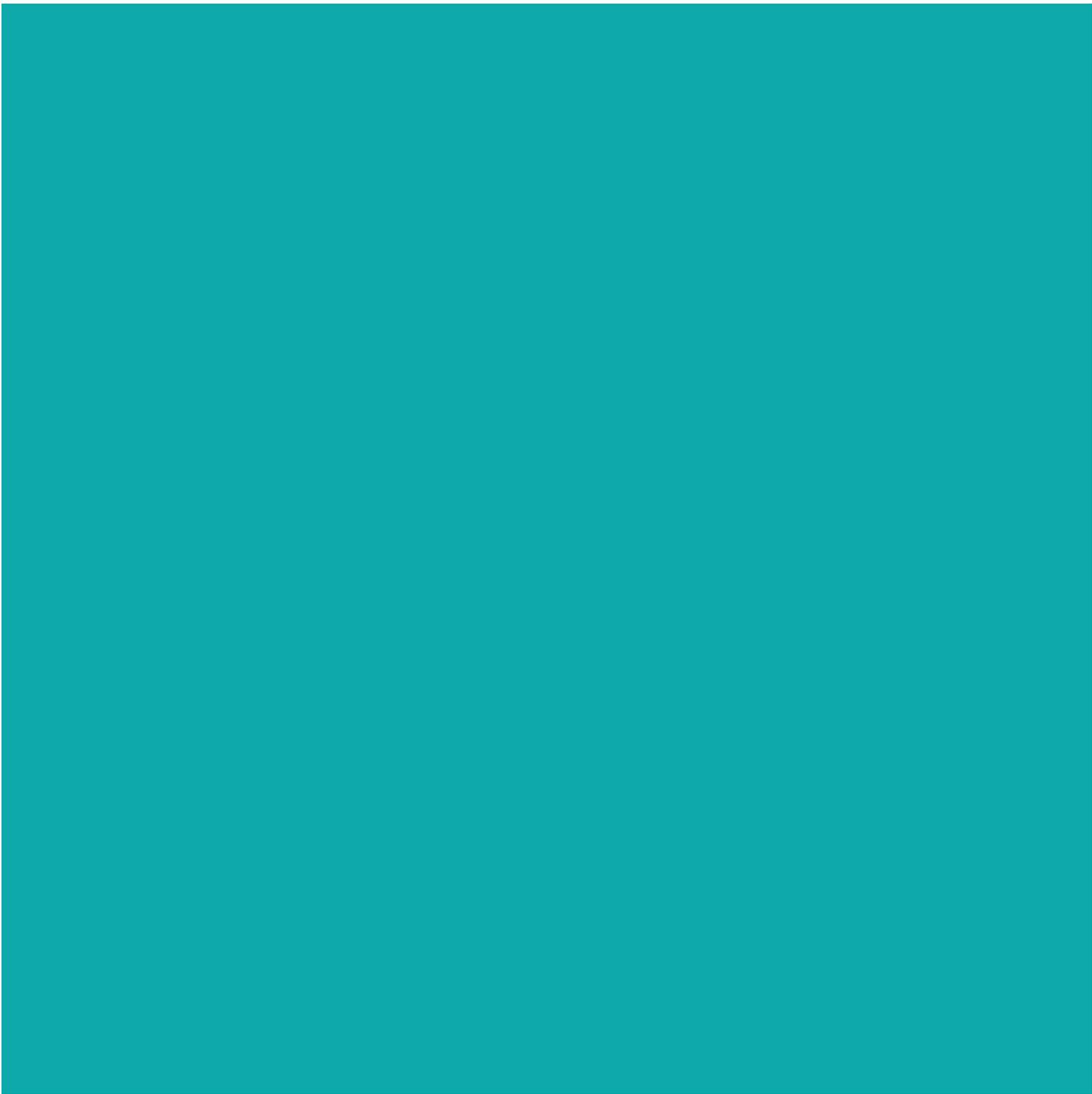


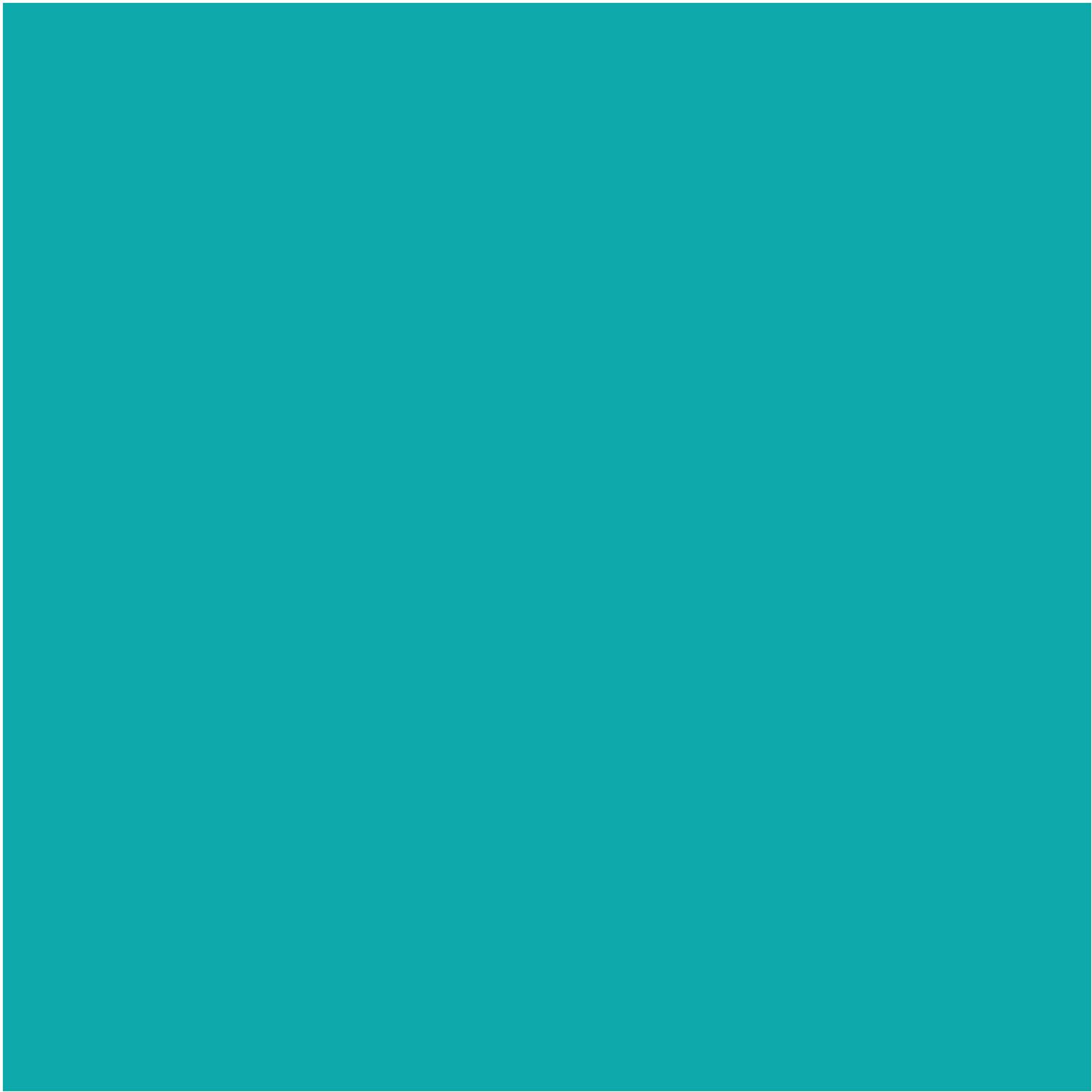
SCARCITY AMIDST PLENTY

Water In North East India



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Climate Change Adaptation -
North Eastern Region (CCA-NER) Project

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WATER – A Cross Cutting Concern

Water ecosystems in India's North East are taking on a visible shift due to the impact of climate change and human interventions – seasons and rainfall patterns change, rivers running dry, springs that were thought to be sacred no longer sustain communities whose livelihood depends on the existing water system to provide livestock needs, agriculture and household activities. Drilling deeper borewells has become a desperate last resort for communities with no other options. Communities are forced to abandon livelihoods that depend heavily on water.

The North East States, over the decade have witnessed 'water poverty'. Though most parts of the Region receive ample rainfall during the monsoon, water resources in the region are exposed to a number of challenges that continue to get aggravated: climate change leading to floods, droughts, soil erosion etc., increasing demand for water (arising due to population growth, unplanned urbanisation and economic development), deforestation or unsustainable land use in the upper reaches of the mountains which leads to excess surface water runoff, depletion of top soil; increasing competition for water use, lack of ownership and regard for the existing regulations, deficient operation and maintenance of the water infrastructure and absent cost recovery structures, have all contributed to the challenge.





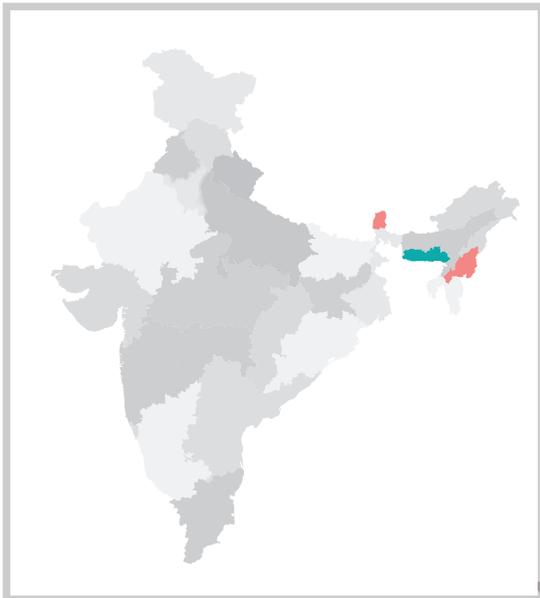
The Ranggeet Valley in West Bengal, near Sikkim

MAP OF CCA-NER INTERVENTION AREAS



Focal Areas

- *Hydro-geological assessments for targeted soil and water conservation through government flagship programmes*
- *Preparation of Village water security plans in Tendong Hills for efficient use of water resource*
- *Regeneration, conservation and management of oak forests*
- *Preservation of biodiversity and culture in Kabi Lungchok Sacred Preserves*



MEGHALAYA

Focal Areas

- *Drafting of Integrated State Water Policy*
- *Integrated land-use and water resource management in Upper Umiam*
- *Greening of Eri silk value chain*
- *Fish farming for livelihood enhancement*



NAGALAND

Focal Areas

- *Technical support for Drafting of Nagaland State Water Policy*
- *Greening of indigenous rice value chain*
- *Enhancement of irrigation for enhance production*



WATER/POLICY

Most states in North Eastern India strive to make water availability for varied uses equitable and sustainable. In the light of climate change, however, implementing enlightened legislations to re-govern water will require mind-sets to change, Policy makers to have the credibility and the ability to communicate and facilitate, bring stakeholders together and provide platforms for discourse to build bridges and drive change.

The overall strategy is to embrace an integrated water resources management approach, which seeks to:

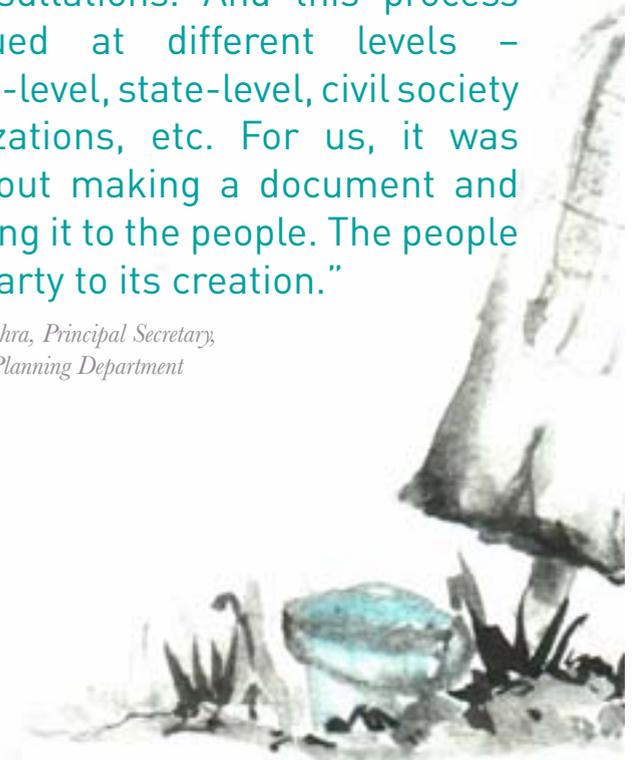
- *Encourage planning and management of natural water systems through a dynamic process.*
- *Balance competing uses of water through efficient allocation that addresses social values, cost effectiveness, and environmental benefits and costs.*
- *Require the participation of all units of government and stakeholders in decision-making through a process of coordination and conflict resolution.*
- *Promote water conservation, reuse, source protection, and supply.*
- *Foster public health, safety and community goodwill.*

Innovative, entrepreneurial and out-of-the-box solutions to these challenges are imperative to operationalise water and sanitation policies and enable the people of the North East to attain the future they long for. Finally, the use of technology will determine how we move towards more equity and sustainability in the water and sanitation sector. The challenge will be to determine the criteria to choose appropriate technologies and the ways to promote their use.

With all of these concerns in mind, CCA-NER has been instrumental in the drafting of an Integrated Water Policy for the state of Meghalaya and is currently in the process of formulating similar policies for Sikkim and Nagaland.

“Our endeavor was always to situate this policy as a living process. Therefore we had a series of consultations. And this process continued at different levels – district-level, state-level, civil society organizations, etc. For us, it was not about making a document and releasing it to the people. The people were party to its creation.”

- R. M. Mishra, Principal Secretary,
Meghalaya Planning Department





At a community spring in Gangtok

INTEGRATED WATER POLICY OF MEGHALAYA

Meghalaya receives copious rainfall and yet often faces shortages of water. This calamitous challenge is a product of multi-fold factors adding up over the past decade: a geological inheritance of impermeable rocks, seasonal rainfalls and uncontrolled surface water run-off, growing population, rising demand for water in agriculture and livelihoods, expanding industrialisation, transportation and mining, dwindling green cover and a rural population living in widely scattered habitats where traditional water management methods often don't work. Furthermore, the water sector, particularly in Meghalaya, is characterised by complex institutional setup with several Government Institutions at the national, state and community level. The challenge in the water sector relates thus not just to the availability of water, but also to governance. The need for an integrated, cross-sectorial change in water policy stems from these complex issues.

The Integrated Water Policy for Meghalaya, tackling aspects of Climate Change, has been drafted with the support of CCA-NER and is now adapted by the state government. Through a series of planning sessions with relevant stakeholders, CCA-NER has supported a policy that embraces both decentralisation and convergence between various sectors. The latter aims to ensure that economic development, social needs and environmental sustainability are balanced and all men

and women in the North East can enjoy water as their human right. It complements existing water policies in India by aiming at good water governance and actions at the community and state level. It emphasises social solutions over the technical and integrates water and sanitation. The new policy insists on decision making at the lowest appropriate level and builds on local capacity, traditional knowledge and institutions. More importantly, communities have are able to exercise their right to water resources, benefit from the management of water resources, play a role in planning and implementation, be compensated for damage suffered in relation to water management, obtain information

“In the North East, the focus of many government initiatives has been very technocratic. Water is a commodity or resource that has to be controlled. I've always felt that it is too complex of an issue to be handled only by the government. It needs a pool of experts, including those who are the users and those who have ideas other than on engineering. I was very pleased that in the 12th Five Year Plan, the water document highlighted this in particular.”

- Phrang Roy, Chairperson, North East Slow Food and Agrobiodiversity Society (NESFAS)



about and declare objections against water management plans, and file complaints and claims. It realizes that water and sanitation, given their systemic nature, cannot be managed by a multiplicity of organizations acting independently and argues for convergence that would enable not just coordination, but also collaborative efforts undertaken harmoniously.

Hence, the policy contains principles, objectives and specific policy measures and actions for various relevant sectors, such as:

- *Water resource management*
- *Operation and maintenance of water supply and sanitation*
- *Pricing and cost recovery*
- *Planning, implementation and financing*
- *Legal, regulatory and institutional frameworks*
- *Knowledge, information and data management*
- *Roles of non-state actors*



To each his own...

- *Other uses (fisheries, hydropower, industry, mining, tourism)*
- *Climate change, disaster management and risk reduction*
- *Policy objectives- emphases on regulating and monitoring ground water exploitation and gender sensitivity participation while planning*

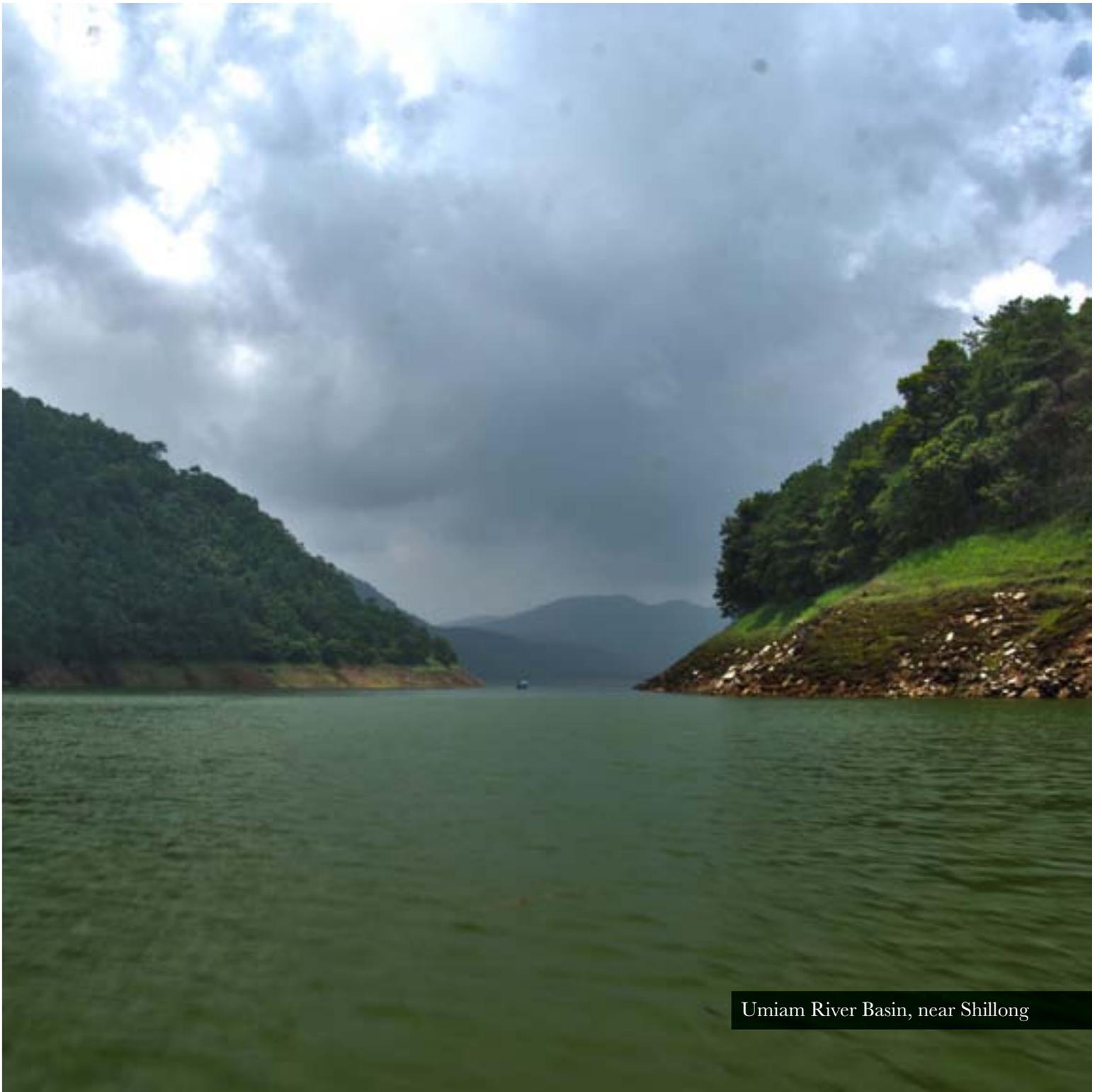
The current institutional and governance setup in Meghalaya needs to be geared towards implementation of an integrated water resource management. The Meghalaya Integrated Water Policy calls for institutional reforms to ensure sustainable use and preservation of water resources. It guides the formulation of apt institutional and regulatory frameworks, sector investment planning, professional operation and maintenance of urban drinking water systems, full cost recovery tariff and coordination between sectors. The policy also advocates decentralisation and clear roles of non-state actors, e.g.: private organisations, traditional and

community based institutions, civilians and academia.

The changed paradigm and adoption of new concepts will require government staff and sector stakeholders to be equipped with new skills and knowledge in order to assume their mandates and carry out their roles. Therefore, the Meghalaya Integrated Water Policy also comprises institutional strengthening and capacity building for stakeholders. Access to information is imperative to address new challenges in the water sector, especially in the wake of climate change and informed decision making. Right information made accessible at the right time can empower men and women and facilitate broad ownership. Thus, the Meghalaya Integrated Water Policy aims to ensure the availability of up-to-date information and access to state-of-the-art technologies for stakeholders at all levels.



Shillong city is becoming more and more populated, adding a huge pressure to manage the water in the region more effectively



Umiam River Basin, near Shillong



WATER/MANAGEMENT

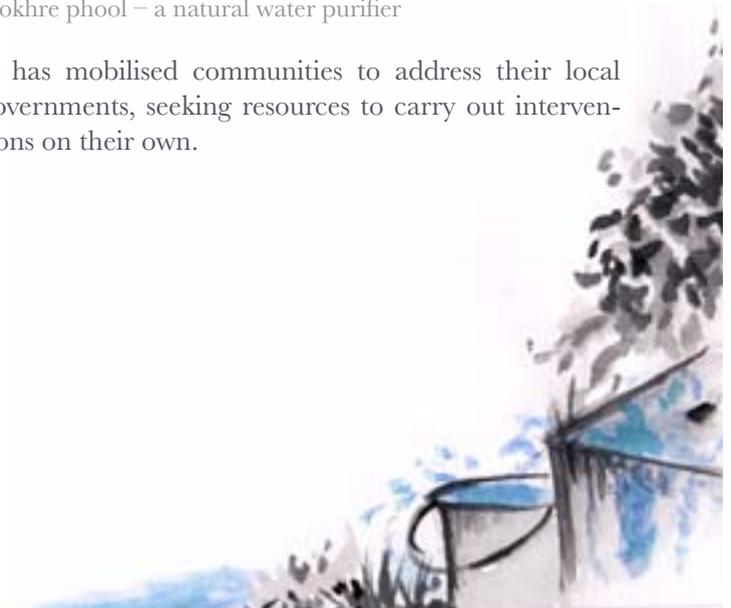
Water in the North East, like in many other parts of the world, is often sacred. In Sikkim, water sources are worshipped and guarded by the communities that use them. It is estimated that 20% of Sikkim's natural springs are religious sites of worship. The interpretation that water as a divine gift affects community outlook in two major ways: it implies that water is beyond human ownership and therefore, resists privatisation of water, but it also encourages the belief that people have little power or influence over the amount of water available to them. At the same time, issues like the land tenure system in Meghalaya allow for a reckless exploitation of natural resources without consideration for future generations. Empowerment of people's perception of rights, duties and roles in this regard is instrumental in bringing about a new spirit to integrated water management.

In the past, government efforts to manage and revitalise water has had little to do with context-specific scientific methodology and has been driven by the implementation of 'safe' technocratic measures. CCA-NER, through partnerships with several institutions and technical experts, brings an innovative scientific approach to the identification and resolution of water management issues. It also links these new methodologies with government schemes such as MGNREGA and the National Rural Drinking Water Programme for kicking off a structured implementation of water sector reforms. These endeavours have opened up people's perceptions of power over their local natural resources.



Dokhre phool – a natural water purifier

It has mobilised communities to address their local governments, seeking resources to carry out interventions on their own.





Each village has its own lifeline
- the local spring



Oak forests planted in the upper reaches of mountains in Sikkim to prevent surface runoff



Ponds at hilltops recharge the springs originating in the catchment areas

SPRINGSHED DEVELOPMENT IN TENDONG HILLS

The Tendong Hill Region is one of the most prominent attractions of South Sikkim. It is subject of many myths passed on through generations of the indigenous Lepchas. The name translates as ‘the upraised horn’, given by the Lepchas at the time when their land was submerged in flood waters. Since then, a monk traditionally visits the hill during the monsoons and stays there throughout the season, continuously praying that the calamity does not repeat itself.

In recent times, water has again become a matter of concern in the region though this time due to water scarcity. Most of the areas in South Sikkim are drought prone as they fall under the rain shadow area where annual rainfall constitutes around half of the average annual rainfall in the state. While the Tendong Hills are home to multiple springs and streams, most of the water sources dry out completely or have drastically reduced flows during the long, dry winter season. The communities then face an acute shortage of water.

Dhara Vikas is a program run by the Rural Management and Development Department of Sikkim (RMDD) to revitalise natural springs across the state. CCA-NER has contributed to the Dhara Vikas initiative in the Tendong Hills by introducing hydrogeological

assessments for identifying spring recharge zones. The program has prepared an in-depth hydrogeological survey of the region, mapping 22 springs and their respective recharge zones. On the basis of the results of this assessment, the national flagship program MGNREGA now implements springshed development in the targeted recharge area of 72 acres instead of treating the entire area of 1,100 ha thus ensuring optimal usage of funds available to the programme. Soil and water conservation measures at the right points have led to a drastic improvement in spring water recharge even in the lean period. Local government officials have received training on scientific methods and technical skills for hydrogeological surveying and monitoring of key springs in the area. 23 springs of the area are regularly monitored in order to quantify the results of the targeted interventions.

“Springs were considered to be a blessing of God and there was never a feeling that they could actually dry up one day. But slowly, over the last decade, the springs that were perennial have become seasonal. Now, the locals are realising that they can no longer just depend on God. They must do something proactively to sustain what God already gave them.”

– Sandeep Tambe, *Special Secretary, Sikkim Rural Management and Development Department*



Hydrogeological surveying help to pinpoint recharge zones

Photo: GIZ / Ghanshyam Kharel



Dhara Vikas handbook – a practical, easy to understand teaching aid



RMDD officials survey the rock structures to ascertain the direction of water flow

To consolidate the experiences gained in springshed development, CCA-NER has also facilitated the development of a handbook on springshed development - the Dhara Vikas Handbook. The cadre of trained RMDD officials are currently using the manual as a practical teaching aid to replicate springshed development within and outside Sikkim.



Recharge of springs is done with the help of trenches dug at strategic points on the hill

Photo: GIZ / Ghanshyam Kharel

OPTIMIZATION OF WATER USE THROUGH DEVELOPMENT OF VILLAGE WATER SECURITY PLANS IN SIKKIM

The Village Water Security Plans (VWSP) is another initiative of Sikkim's Rural Management and Development Department, facilitated by the CCA-NER program. The VWSP's mission is to ensure water availability in the drought prone areas of Sikkim. Conservation of spring sources, management and equal distribution of water resources to the entire village community are the key focus areas of the initiative. CCA-NER has supported development of 5 VWSPs in the Tendong Hill region in South Sikkim, identified as the most vulnerable villages by a block level vulnerability assessment done by the State.

The VWSPs are based on comprehensive hydro-geological potential analyses of the springsheds in the region and base flows of perennial streams that provide water to the villages.

Alongside this scientific baseline, participatory planning incorporating community insights have helped to develop a comprehensive water budget – a thorough picture of household consumption and vulnerabilities within the village. There also emerged a picture of how the villagers shared water in social occasions and how health and hygiene was managed.

The surveys have sparked positive actions that are already helping the village communities to get hold of more water: tanks dug in the higher reaches of the Tendong Hills slowly recharge the aquifers in the region and night time collection of water from springs ensures conserving the surplus during the day. Moreover, a pipeline connecting the village to a perennial water source 12 km away through funds of the National Rural Drinking Water Programme is under construction and a traditional irrigation channel is also being revived – already nourishing hopes of the villagers to revive agriculture in the area.

“Earlier, people used to feel that whatever water available should be used by the people who could tap it. There was no co-operation about water. When RMDD and GIZ came in, we realized how our consumption levels were, and how we were consuming water. Some people were wasting water, some were saying ‘the water comes from my tap, how does it matter for how long I let it run?’ However, after the intervention, people here realised how much water we can conserve.”

– Roshan Kaushik, member of Kütam Village Water and Sanitation Committee



Mapping...

Photo: GIZ / Ghanshyam Kharel



...and monitoring

Photo: Roshan Kaushik

UMIAM BASIN WATER RESOURCE MANAGEMENT AND LAND USE MODELING

Meghalaya in the past years has experienced a continuous economic growth which was not backed by proper institutional governance of its state water resources. A serene alcove in the shadow of thick pine forests and gentle slopes, the Umiyam Lake in Ri Bhoi district is one such essential water resource for the area.

The Umiyam River Basin is under pressure due to several factors such as:

- *Climate change, affecting the general water cycle and rainfall patterns.*
- *Increasing and competing demands for water due to population growth.*
- *Pollution from small-scale unorganized industries, agriculture and households.*
- *Anthropogenic activities resulting in deforestation leading to severe soil erosion (and subsequent siltation in the basin), increased surface water runoff.*

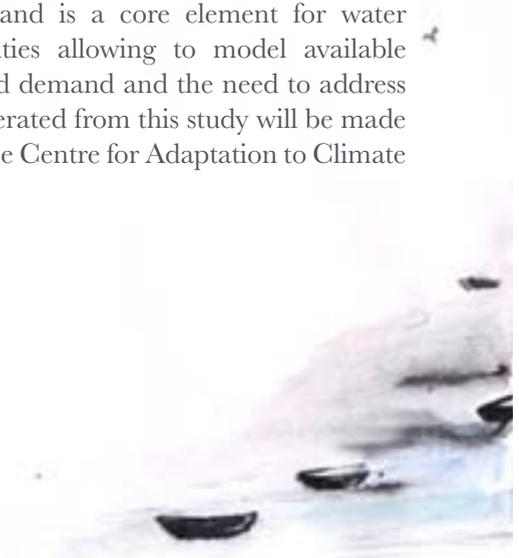
To tackle such challenges, an integrated approach is imperative. With the support of CCA-NER, the Government of Meghalaya with the Meghalaya Basin Development Authority, line Departments and the North Eastern Hill University (NEHU) of Shillong started a partnership with the Friedrich Schiller University of

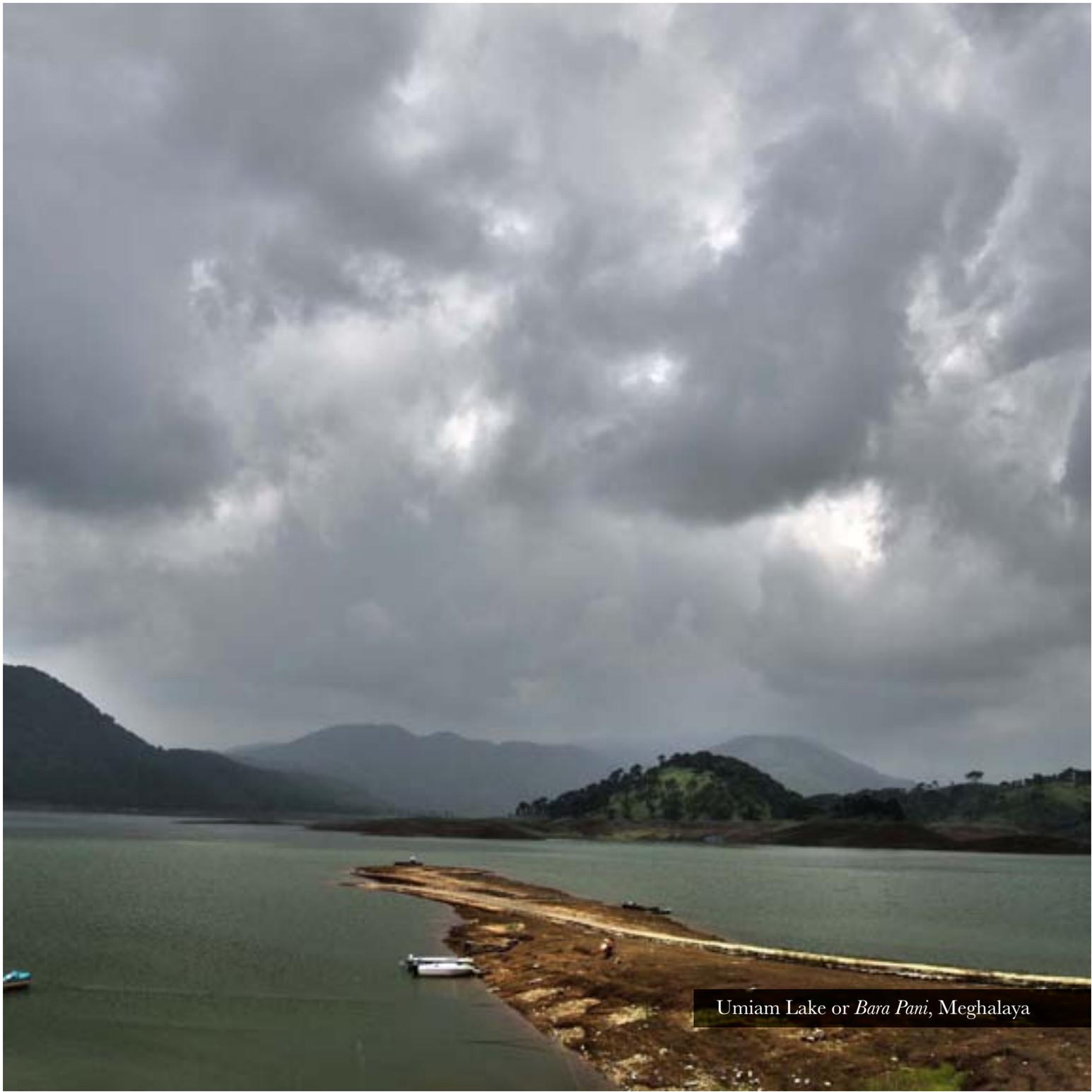
Jena and other organisations from Germany. Through this initiative, the program has developed and implemented a knowledge database and an integrated land and water resource management system for the Umiyam River Basin and its tributaries.

CCA-NER has jointly implemented the following measures to promote integrated land and water resources management in Umiyam:

- *Series of stakeholder workshops organised, data requirements identified in consultation with stakeholder departments.*
- *Data collection facilitated to feed into a Decision Support System (DSS).*

The Umiyam River Basin intervention is a unique model for integrated water management in Meghalaya. The project contributes to the State Action Plan on Climate Change (SAPCC) and is a core element for water management activities allowing to model available water quantities and demand and the need to address gaps. The data generated from this study will be made available through the Centre for Adaptation to Climate Change in Shillong.





Umiam Lake or *Bara Pani*, Meghalaya

WATER / LIVELIHOODS

Revitalising livelihoods in areas affected by climate change has been one of the key focal areas of CCA-NER. Most communities in the North Eastern Region base their livelihoods on agriculture, livestock, fisheries and other income generating activities which are derived from water resources. Given the need for water for multiple purposes, the competition for water is likely to increase. As a result, water will become even scarcer forcing the communities to shift to other livelihood activities. Therefore, beginning with an appreciation for local traditions and knowledge passed on faithfully from generation to generation, the program works towards developing simple, context-specific technical solutions to help communities to be more resilient to relentless climate change impacts. CCA-NER dovetails its interventions into existing government schemes and missions. Hence, the individual interventions undertaken serve as showcases, ready for up-scaling in the

respective states, the region or even beyond. Many of the CCA-NER showcases have inspired farmers and communities to undertake additional initiatives through their own initiatives which CCA-NER has then encouraged and supported.

“ Villagers are the sentinels of the forest. They are the sentinels of the rivers, the flora and the fauna. And if they are aware of the importance of climate change, then, I am sure, their awareness will create more impact than talking to someone living in a concrete building.”

- Limar Temjen, Assistant Professor, Kohima Science College



Greenhouses for ambitious cultivation projects in Perbing, Sikkim



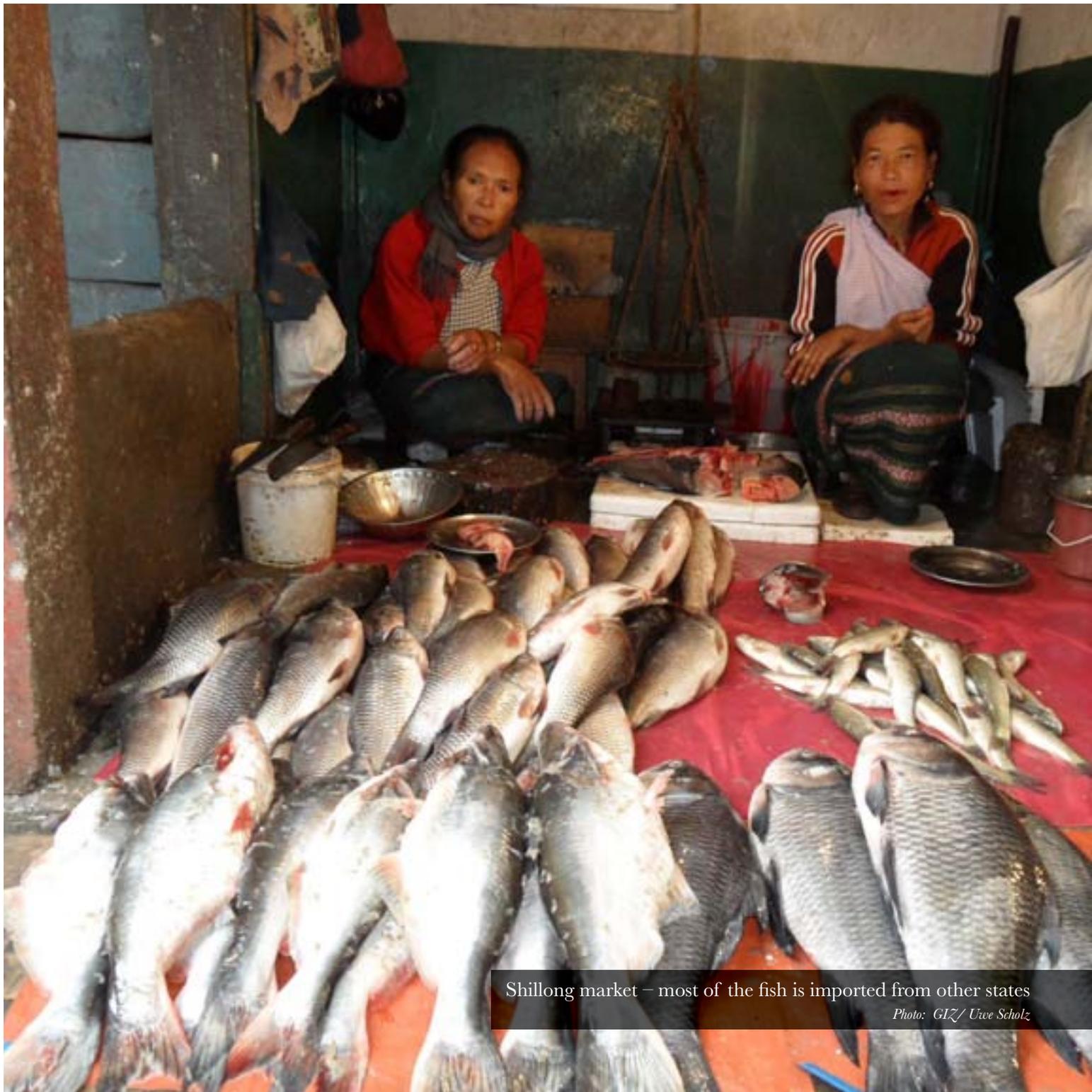
Farmer tills his land in Tsiese Basa, Nagaland

FISH FARMING IN MEGHALAYA

It is estimated that in the state of Meghalaya, about 30% of the total land area of 22,429 sq.km are utilised for fisheries. Despite being endowed with natural rivers and lakes plus man made reservoirs, the uneven terrain, lack of infrastructure and intense dry seasons (which will be worsened by Climate Change) have so far hampered the state's fishery development plans. Heavy, unprecedented rainfalls and flash floods during the monsoon season render fishery activities risky, unsustainable and unproductive. The state produces about 4,500t of fish every year, a yield that is far too low for the meal plan of around 3 million people, leaving an estimated production gap of 14,500 t annually (source: MSAM, see below). As a consequence, most of the fish that lands on dinner plates in Meghalaya are based on imports from Andhra Pradesh. Hence, aquaculture is seen to have a great potential and the Government of Meghalaya has identified fisheries as a key sector for development, in 2012 commenced the "Meghalaya State Aquaculture Mission (MSAM)" which is considered as a flagship programme. According to Mr. K.N. Kumar, Principal Secretary Fisheries, Government of Meghalaya, the support in recent years increased the number of fishponds to 20,000 in 2014.

aquaculture development through either construction of new or utilisation of existing reservoirs and fish ponds (rain fed or with own water supply). In the dry season, pond water can also be used for irrigation or supply of livestock. There is already a remarkable experience with aquaculture in India, being a part of the Asia-Pacific region which accounts for 89% of the worldwide production. India is also the second largest producer in the world and has developed very successful integrated systems, e.g. carp poly-culture, using indigenous Catla, Rohu and Migral plus Common Carp, Silver Carp and Grass Carp species, which may be also applied to a larger extend in Meghalaya in Intergrated Agriculture/ Aquaculture Systems.

Water management goes hand in hand with



Shillong market – most of the fish is imported from other states

Photo: GIZ/ Uwe Scholz



Carp culture: Rural Resource and Training Centre, Umran, Meghalaya

Photo: GIZ/Uwe Scholz



When the rivers in Meghalaya run dry in the lean season, the reservoirs and ponds help to produce fish.

Photo: GIZ/Uwe Scholz

WATER RESOURCE MANAGEMENT FOR OPTIMIZATION OF RICE PRODUCTION IN TSEISE BASA, NAGALAND

The village of Tsiese Basa in Kohima district is one of the many farming communities in the state of Nagaland that depend entirely on rainfed agriculture – a livelihood dramatically stricken by climate change impacts. With the increasingly erratic rainfall patterns, agricultural practices have suffered. CCA-NER, along with the nodal agency NEPED, has been successful in introducing field irrigation structures for rice cultivation.

- *A weir (small dam allowing a regulated flow of water) has been constructed across the stream with sluice gates to divert water along the roads to the community rice fields.*
- *36 rainwater harvesting ponds have been dug to store runoff water.*
- *Water from the source is being channelled through pipes directly to the rice fields.*
- *The community has formed a village water committee (8 members, of which 2 are women) for operation and maintenance of assets.*
- *The community has created an operation and maintenance fund, with each house contributing a small amount.*

The success of the irrigation measures in Tsiese Basa is envisaged to re-stabilize the rice production

in the village. Farmers have now taken up their own initiatives in developing three fish ponds as a mean to supplement their livelihoods. CCA-NER and Nagaland's Department of Fisheries recognizes this pro-activeness. Technical support has been provided in the form of providing technical advice during the construction of the ponds and sourcing fingerlings and fish feed. The vision is to support the growth of inland fish farming as an additional means of livelihood to complement rice cultivation.

“We have a very rich social capital in the state and we have a lot to learn from our people. When you empower them and you see the wonders that they can do on their own, it's tremendous!”

- Menukul John, Chairperson NEPED



Rice seed exchange couple with enhanced irrigation management in Tsiese Basa has increased the resilience of paddy crops

Photo: GIZ/ CCA-NER, Nagaland



Boy in the field

Photo: GIZ / L. Bachmann



WATER / KNOWLEDGE

HUMAN CAPACITY DEVELOPMENT

CCA-NER has amongst other mandates identified awareness raising and capacity building as an important pre-requisite for implementation of various missions highlighted in each State Action Plan on Climate Change (SAPCC). Capacity building for master trainers in climate change related awareness creation, knowledge management and need based skill development can contribute significantly to generating valuable human resources for transferring knowledge and skills of communities to effectively adapt to climate change.

The project has jointly implemented the following measures to enhance capacities and knowledge on topics related to water, climate change and adaptation in all three partner states Meghalaya, Nagaland, Sikkim:

- *Prepared tailor made training manuals, technical guidelines, among others for the 'flagship water interventions' village water security, springshed development, trout farming and rice field irrigation.*
- *Conducted training workshops and exposure visits for government officials.*
- *Carried out a cascade of trainings on climate change, adaptation and related issues for a selected group of master trainers (government officials) from state to district level and community level.*
- *Prepared participatory didactical material for community*

focal points on topics of climate change, adaptation and related issues.

- *This effort has helped mainstream awareness on climate change and appropriate measures by setting up focal points at community level.*



Local perspectives and technical expertise meet



Bhutan, Nagaland and Meghalaya officials gaining from the rich experience of their counterparts in Sikkim in springshed development, Tendong Hills, Sikkim

CENTRE FOR ADAPTATION TO CLIMATE CHANGE

So far, limited knowledge exists about the kind and intensity of climate change impacts in the North Eastern States and the region has limited practical experience in adapting to climate change. Further, the State Action Plan on Climate Change (SAPCC) highlights the problem of the limited and/or fragmented knowledge related to climate change that is available at the State level as an important and cross cutting issue. Following long and intensive discussions on how to improve data and knowledge management on climate change and adaptation related issues in a coordinated and professional manner, Government of Meghalaya and CCA-NER have set up a regional Centre for Adaptation to Climate Change (CACC) in Shillong. The Chief Minister and Chief Secretary of Meghalaya together with Dr Thomas Helfen, Head of South Asia Division, German Federal Ministry for Economic Cooperation and Development (BMZ) have inaugurated the Centre in July 2013. Setting up of the Knowledge Centre is an important step to improve data collection, management and dissemination for informed decision making. The creation of a database for baseline studies, modelling and monitoring is envisaged to aid in sharing relevant information with target groups such as villagers, district councils, planning authorities, governmental institutions and others.

Having knowledge management in its focus, the CACC plays a central, crosscutting role in the natural resource management envisaged to closely converge with the Meghalaya Institute of Natural Resource, an institution of the “Integrated Basin Development & Livelihood Promotion Programme (IBDLP)”. CACC has a co-ordinating structure to serve as a convergence platform where data from other primary sources is compiled into one place, namely from the other centres. In the inception phase of the CACC the Centre also provides support to the other centres in order to strengthen and make them functional. The Centre will encourage broader ownership of natural resources, empowerment and informed decision-making as well as serve as a discussion platform and training facility. It will facilitate learning from each other and working towards a cross-pollination of ideas and resources. All three state governments have expressed their willingness to share information, good practices and field experiences and to contribute further in developing knowledge products in the priority areas water, forest and livelihood/agriculture.



The Centre for Adaptation to Climate Change in Shillong

ACKNOWLEDGEMENTS

Through the program Climate Change Adaptation in the North Eastern Region (CCA-NER), GIZ acknowledge with thanks the support and assistance of the partner states, government bodies and local communities of Sikkim, Meghalaya and Nagaland who have to design and implement strategies that address proactively the challenges posed by climate change, to create opportunities for knowledge management and to increase the adaptive capacities of men and women in the face of climate change.

CLIMATE CHANGE ADAPTATION - NORTH EASTERN REGION (CCA-NER)

Climate Change Adaptation - North Eastern Region (CCA-NER) is a bilateral program between the Government of India and the Federal Government of Germany. The program is implemented in three North Eastern states: Meghalaya, Nagaland and Sikkim. The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH was mandated in 2011 by the German Federal Ministry of Economic Cooperation and Development (BMZ) to implement this Technical Cooperation program in partnership with the Ministry of Development of North Eastern Region (MoDoNER), the lead executing agency for the North Eastern Region of India at the national level.

CCA-NER aims to strengthen the adaptive capacities of people and various organisations and institutions, so as to enable them to cope with the consequences of climate change. The program area covers different geographical and bio-climatic zones of this Eastern Himalayan biodiversity hotspot. CCA-NER works closely with government departments, research institutions, community workers and men and women in rural areas.

The nodal implementation partners in the states are:

- *Department for Planning (Government of Meghalaya)*
- *Nagaland Empowerment of People through Economic Development (Government of Nagaland)*

- *Department of Science, Technology, and Climate Change (Government of Sikkim)*

CCA-NER program's work with water creates impact in various related sectors including agriculture, livelihood, policy, rural development, human capacity development, sanitation, infrastructure and tourism. The activities range from policy level inputs to revitalising water resources through simple, but scientific interventions. CCA-NER also facilitates the growth of a new generation of community workers who are equipped to tackle challenges that climate change poses in specific ecological contexts. In all activities, CCA-NER



Revival of mountain spring support vegetable cultivation

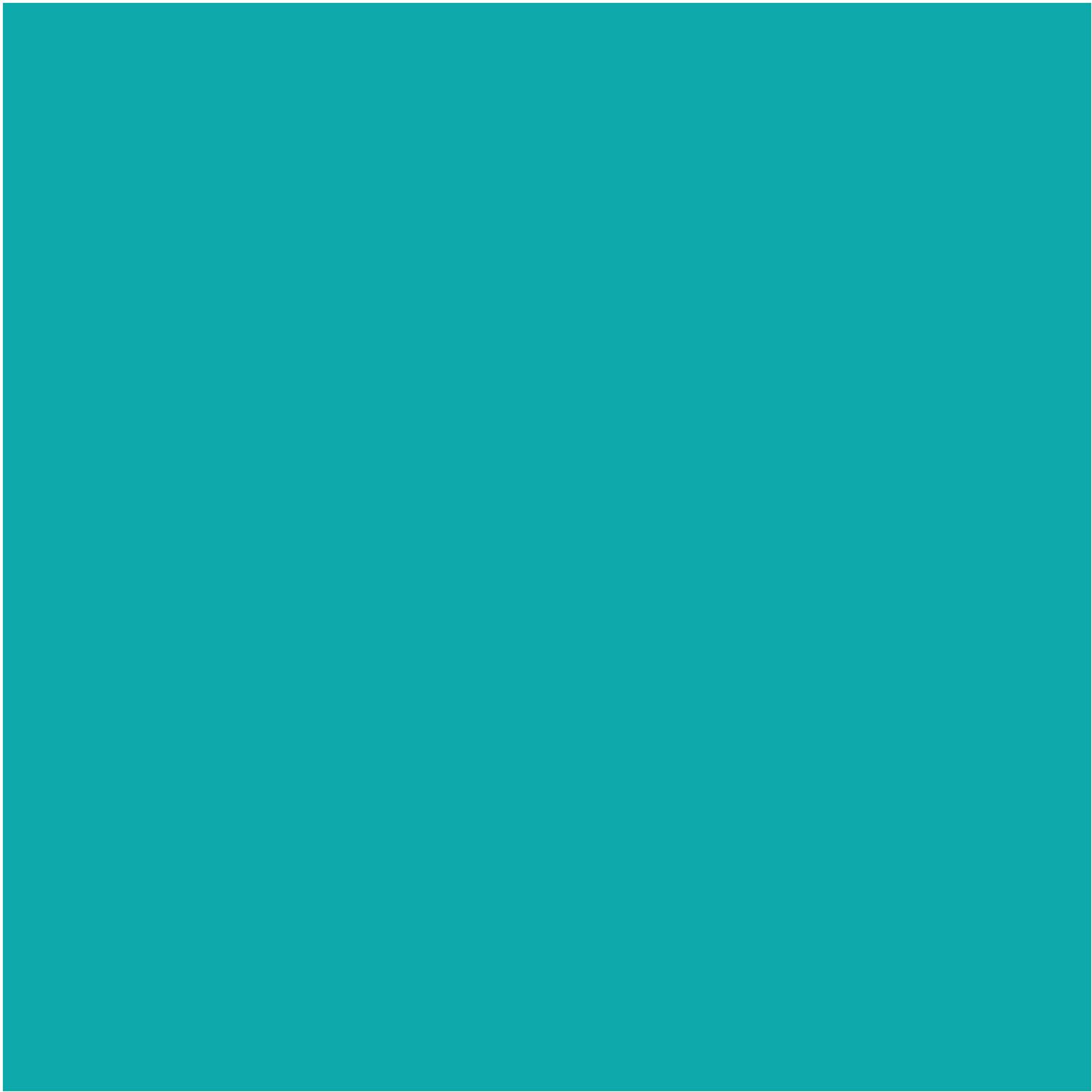
facilitates collaborations between government bodies, national funding agencies, technical experts and local communities to yield powerful results.

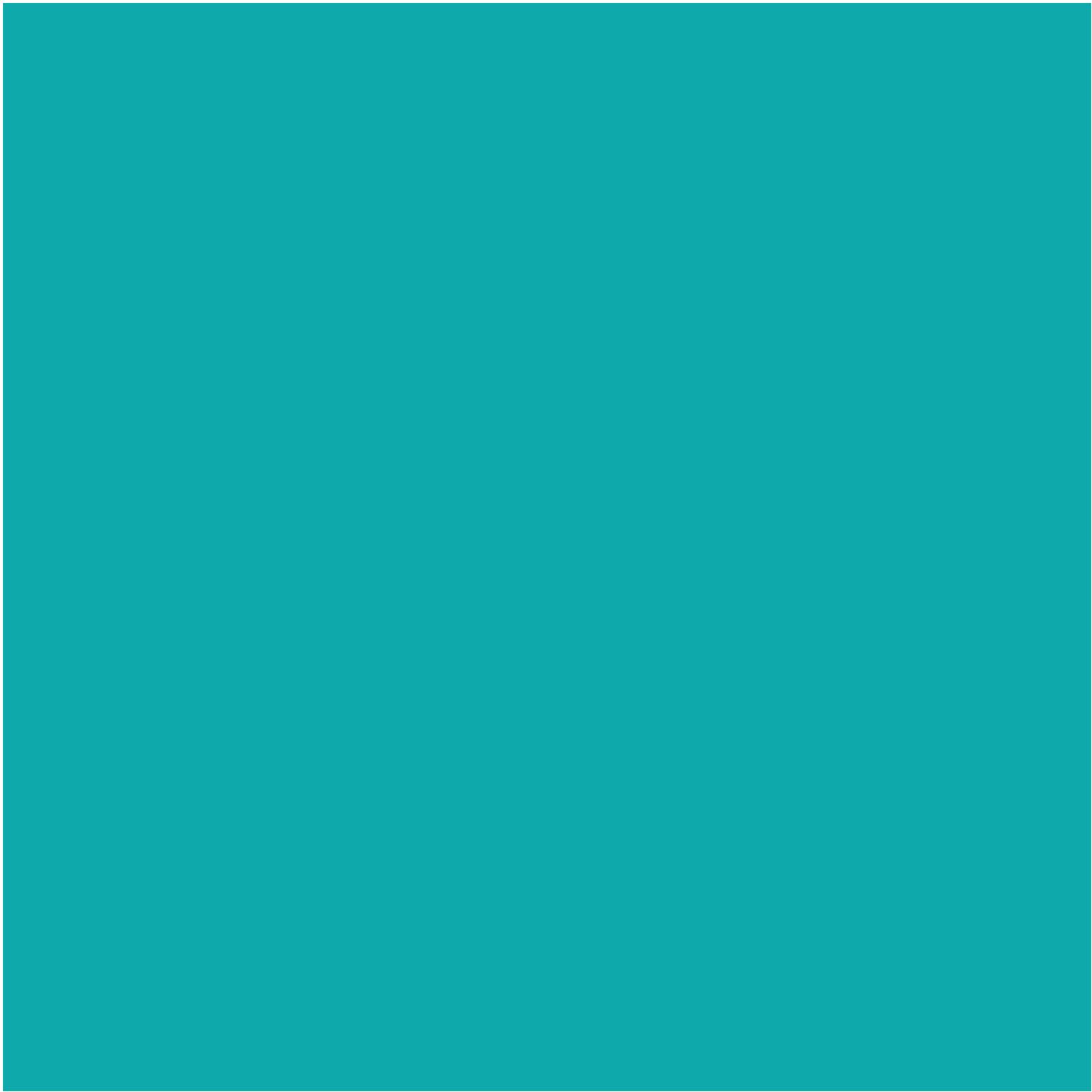
Some of the key results achieved so far:

- *Scarce water resources are harvested sustainably and efficiently, with operation and maintenance by communities in Tendong Hills, Sikkim.*
- *Cost-effective integrated irrigation system put in place in the village of Tsiese Basa, Nagaland, with strong ownership of the community.*
- *Showcasing effective planning through integrated resource management and land use modelling, to be scaled up to other water catchments.*
- *Mapping and monitoring of oak forests through satellite remote sensing techniques have enhanced capacities of forest department officials in Sikkim and an oak forest management handbook will assist government and communities in optimal oak regeneration and management.*
- *Soil moisture conservation works (targeted MGNREGA interventions) and village water security plans to be scaled up in 8 blocks of Sikkim, greatly facilitated by the Dhara Vikas handbooks*
- *Publication of a handbook on Village Water Security Plans*



Tendong Hills, South Sikkim







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