STRATEGIES FOR MANAGING
COMPLEX DISASTERS
IN THE FACE OF

CLIMATE CHANGE

CAPACITY BUILDING

sponsored by

NMHS, MoEF&CC

IIPA

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- Mr. T.T. Bhutia, Secretary to the Government of Sikkim, Department of Tourism
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- Mr. Glyabo Lepcha, Sarpanch, Poklok Denchung, South Sikkim
- Mr. Chungchung Lepcha, Chungthang, North Sikkim
- Mrs. Chandra Kumari Tamang, Soreng, West Sikkim
- Sikkim State Disaster Management Authority, Land Revenue & Disaster Management Department, Government of Sikkim
- Mr. Imran Khan, Field Photographer

For supporting us in coordinating and implementing the project in the state.

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FOREWORD

At a critical time during the application of the National Action Plan on Climate Change, as country shapes it's development agenda, it stands clear that there are significant challenges to be addressed. The project "Capacity Building strategies for managing Complex Disasters in the face of Climate Change" has been envisaged by IIPA and sponsored by National Mission for Himalayan Studies, Ministry of Environment, Forest and Climate Change to address some of these challenges. This three year project studies state of Sikkim, which is one of the smallest states in the country that lies in the North eastern Himalayas. The state has a long history of meteorological and hydrological disasters and witnesses high rainfall, extreme weather events, natural calamity and winter droughts to name a few. The project aims to design safe and sustainable capacity building strategies in ecologically fragile Himalayas in the face of climate change. It capacitates the different stakeholders to develop strategies reflecting potential plans for Complex Disaster management. The book provides a look into the working of the project and how the team has been able to pitch sustainable development strategies to the people of Sikkim.

VINOD K. SHARMA
PROJECT INVESTIGATOR

SHYAMLI SINGH
PROJECT INVESTIGATOR

MESSAGE FROM THE CHIEF MINISTER

Sikkim being a small, vastly mountainous state in the Indian Himalayas has a diverse ecological condition from the subtropical to Alpine. Although the state is endowed with great biological diversity, many sharply defined and extremely steep regions in the state are severely vulnerable to many natural calamities. The State is subjected to torrential monsoon rains, which contribute to rapid runoff on the slopes, resulting in landslides and flooding in river bottoms.

Disasters not only disrupt progress but also destroy the hard-earned fruits of painstaking developmental efforts, often pushing sates, in quest for progress, back by several decades. Therefore, efficient management of disasters, rather than mere response to their occurrence, has in recent times, become the focus of Sikkim. This is as much a result of the recognition of the increasing frequency and intensity of disasters, as it is an acknowledgement that good governance in a caring and civilised society, needs to deal effectively with the devastating impact of disasters.

I am happy to know that the project "Capacity Building Strategies on Managing Complex Disasters in the face of Climate Change" sponsored by National Mission on Himalayan Studies, Ministry of Environment, Forest and Climate Change is being executed by Indian Institute of Public Administration, New Delhi in the state and has successfully converged various stakeholders onto a single uniform platform when it comes to Disaster Risk Reduction. I sincerely hope that the project paves a way towards an approach for development of the state as envisaged for the future, one that provides a safe and prosperous place for the community at large, while also safeguarding our fragile ecosystems.

(Prem Singh Tamang)

MESSAGE FROM THE MINISTER, DEPARTMENT OF LAND REVENUE & DISASTER MANAGEMENT

I am delighted to know that IIPA has been involved in a project that focuses on the preparedness of the local population of the state and am glad to note that the project is in line with the state's own Disaster Management policy. This project having incorporated the principles of sustainable development keeping in mind the risks and vulnerability of the state will greatly help in ensuring that the path taken will lead to Sustainability, Disaster Risk Reduction and increase Adaptive Capacity of the state in the long run in the face of Climate Change.

As we are all aware that Sikkim over the last two decades, has evolved as an upcoming tourist destination and highly developed state which has been attributed mainly to its picturesque landscape ranging from green fields and forests, pristine rivers and lakes to lofty snow clad mountains and its diverse and rich cultures. Since state offers a wide variety of destinations and circuits to attract tourists, over the last two decades has led to unprecedented growth in urban areas of the state. As the floating population grows it increases the level of exposure to many natural calamities. The state has also made concerted efforts to promote awareness campaigns and projects which are centred in the disaster risk reduction sector.

In order to maximise the risk reduction in case of any calamity and at the same time not hinder the development of the state, the project has done an exemplary job in setting guidelines and strategies for all the stakeholders, implementing agencies as well as the local community who are of utmost importance.

I hope that this coffee table book highlights the working and execution the project successfully and brings out positive changes that are required.

Kunga Nima Lepcha
MINISTER
HRDD, Law, Legal, Legislative and Parliamentary Affairs
Government of Sikkim

(Kunga Nima Lepcha)

FROM THE DIRECTORS DESK

In recent times, rising incidences of impacts of Climate Change have increased significantly. Number of natural calamities and their untimed occurrences have posed a major challenge to governance and administrations. Climate science provides us with evidence that Extreme events are on the rise in both frequency and intensity with increasing impacts on livelihoods and well-being. During such instances, it is essential to communicate risks effectively with populations, communities, families and individuals for everyone to be well equipped to fight against the disaster and crisis . This is a daunting task, to channelize masses to understand risks, and their important role in protecting themselves and being more resilient thus reducing their vulnerability and their livelihood.

Every organization and government engaged in public welfare sector must communicate Climate induced disaster risk reduction awareness. That IIPA has been implementing the project sponsored by Ministry of Environment, Forest and Climate Change and National Mission on Himalayan Studies which focuses on Capacity Building Strategies on complex disasters in the face of Climate Change of the local communities of Sikkim is a remarkable achievement. I am pleased to inform that the project has successfully addressed not only all the four districts of Sikkim but also both rural and urban communities of the state. The focus on adaptation and mitigation strategies as a consequence, increases people's confidence in acting to tread towards safer pastures.

My best wishes to the project Investigators and the team for deftly executing the task. I hope that this coffee table book would act as a window to the outer world and to the communities back home in Sikkim to be more strengthened and empowered in building strategies against disasters in the face of Climate Change.

S.N TRIPATHI, IAS

THE PROJECT

Sikkim is a small state that lies in the North eastern Himalayas. The state has a long history of disasters which has affected the state. Indian Institute of Public Administration (IIPA) in collaboration with SEEDS Technical Services is implementing a project on “Capacity Building Strategies for managing Complex Disasters in the face of Climate Change” sponsored by NMHS, MoEF&CC. The goal is to design safe and sustainable capacity building strategies in ecologically fragile Himalayas in the face of Climate Change. It also aims to capacitate the different stakeholders ranging from schools, local Panchayats and the various line departments in the state to develop strategies reflecting potential plans for Complex Disaster management, implementation of Disaster Risk Reduction and Climate Change Adaptation.

MEMBERS OF

THE PROJECT ADVISORY COMMITTEE

Shri S.N.Tripathi, IAS (Chairman)	Director, Indian Institute of Public Administration
Prof. C. K. Varshney, (Member)	Former Dean, Jawaharlal Nehru University
Shri. Nirankar Saxena (Member)	Deputy Secretary General, FICCI
Dr. Akhilesh Gupta (Member)	Head / Scientist – G, Department of Science & Technology
Shri Kamal Kishore, NDMA (Member)	Member, National Disaster Management Authority
Dr. Manu Gupta (Member)	Director, SEEDS
Dr. Jaya Kumar, IAS (Member)	Principal Secretary, S&T, Sikkim
Dr. Savita, IFS (Member)	Former Director, Forest Research Institute

PROJECT TEAM

TEAM IIPA
(Implementing Agency)

Prof. V.K. Sharma
Project Investigator

DR. SHYAMLI SINGH
Project Investigator

POOJA UPADHYAY
Research Officer

TEAM SEEDS
(Project Partner)

DR. ANSHU SHARMA
Executive Director

OBJECTIVES

Understanding **hazards and capacities to cope** with complex disasters

Developmental strategies with stakeholders to cope with complex disasters

Key **policy interventions** for redesigning development for a sustainable future

Disseminating and main streaming sustainable development practices

OVERVIEW

PROJECT LAUNCH	BREAKING THE HIERARCHIES	SCHOOL SAFETY	WORKSHOPS AND SEMINARS	CLIMATIC IMPACTS ON BIODIVERSITY	RESEARCH & GROUND TRUTHING	RECOGNITION AND AWARDS
	FGDs with local communities	Establishing Climate School	Training local communities			
	Community Risk Registers	School Risk Registers	State level workshops			
	Community Fair - ***Maghey Mela***	School safety exercises	National level workshops			

NURTURE NATURE FOR A FAIR FUTURE!!!

As a small plant needs to be nurtured with warmth , care besides sunlight water and minerals to blossom into a tree similar attention, care and strength has been ushered upon the faculty by Director, IIPA Shri. S.N TRIPATHI Ji, IAS (retd.) who joined IIPA in April 2019, since then he has been a pillar of strength, motivation and encouragement ensuring no stone unturned to ensure that the "SHOW MUST GO ON"....

PLANNING FOR A PERFECT EXECUTION...

Shri. S.N Tripathi Ji, IAS (retd.), Director IIPA, Prof. C.K Varshney , Prof. Emeritus, JNU, Dr. Shyamli Singh, faculty IIPA, Prof Vinod K. Sharma,Vice Chairman SSDMA & Sr. Prof. IIPA and Shri Sanjay Doshi Director (Finance and Admin),Member Secretary, GIDM in the frame

PROUD MOMENT!!!

Release of the COFFEE TABLE BOOK, First edition by Vice President of India and President IIPA, Honourable Shri M. Venkaiah Naidu ji ; Ex-Chairman IIPA Late Shri T.N Chaturvedi ji;Former Governor of Chhattisgarh ,Shri Shekhar Dutt Ji ;Director , IIPA ,Shri Surendra Nath Tripathi Ji... ensure that the "SHOW MUST GO ON"....

SIKKIM

The project focuses on the Sikkim state which lies in the eastern Himalayan belt. The state of Sikkim is one of the smallest states in India. The rapid growth of development has made the state more vulnerable to disasters !

LANDSLIDES

One of the most recurring form of natural disaster that the state suffers is Landslide. During the monsoon season from June - August, Sikkim experiences intensified heavy rains, as a result, landslides in the form of mudslides and debris are proactive

ERRATIC RAINFALL

Erratic rainfall and untimely monsoon hinders the smooth working of day to day life. Rapid urbanization increases the vulnerability of the masses.

As Climate has an influence on disasters, analysis of its parameters and establishing their linkages with disasters is essential. Various parameters, trends which reflect the potential risks in the future and is required to equip the local communities to manage disaster risks.

Thus a need arises to educate and sensitise the people about new technologies and best practices that help them recognise gaps. Therefore it is required to redesign development for a sustainable future. The project **"Capacity Building strategies for managing Complex Disasters in the face of Climate Change"** was envisaged to address the current situation.

NMHS- MoEF&CC

The project “Capacity Building strategies for managing Complex Disasters in the face of Climate Change” is sponsored by NMHS-MoEF&CC. The project addresses the issues of the disasters in the face of Climate Change of Sikkim on its communities.

The project has entered into it’s third year since its inception. The project has an yearly evaluation of the status quo. The project Investigator Dr. Shyamli Singh delivering the updates of the project to the panel.

PROJECT LAUNCH

Shri Tsegyal Tashi, Ex-State relief commissioner-cum-secretary, Land Revenue, and Disaster Management Department, Prof. Vinod K. Sharma, Sr. Professor, IIPA, Vice Chairman SSDMA, Dr. Shyamli Singh, Faculty and Project Investigator, Prof. C.K. Varshney, former Dean, JNU, Dr. Rinzing Bhutia, Special Secretary, Land Revenue & Disaster Management Department addressing the participants in the Training cum Policy Workshop at Gangtok, Sikkim

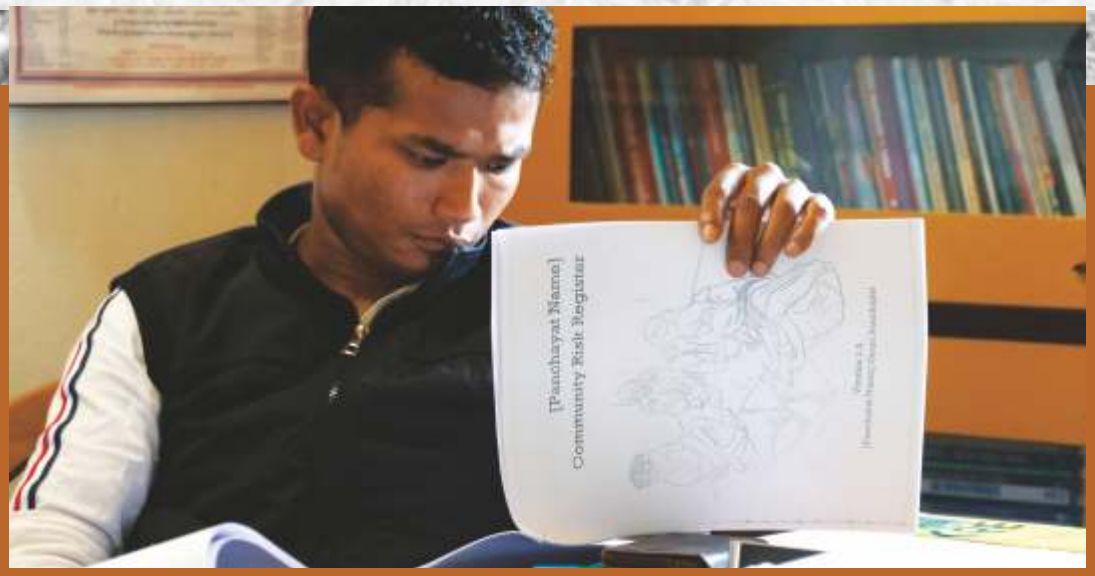
BREAKING THE HIERARCHIES

HEALTHY BUREAUCRACY

Realising the dream of **healthy bureaucracy**, Shri Tsegyal Tashi, Ex-State relief Commissioner-cum-secretary, Land Revenue and Disaster Management Department, Government of Sikkim, explaining the locals the effect of earthquake inside the house in local language thus breaking the hierarchy and making the procedures people friendly.

FOCUSED GROUP DISCUSSIONS

Local community, the most vulnerable stakeholder, which faces the impacts caused due to Climate Change, in agriculture and other related fields. The team holds **Focused Group Discussions (FGDs)** with the local Panchayat Raj Institution members as means of capacity building exercise to hone the local skills in acclimatizing to the unknown terrains!!



COMMUNITY RISK REGISTER

The Community Risk Register **(CRR)** a public document, which provides an overview of the potential risks in the community which can lead to a disaster.

A localite cruising through the details of the CRR so as to visualize the wholistic picture which will be useful for him and others!!

HAND HOLDING

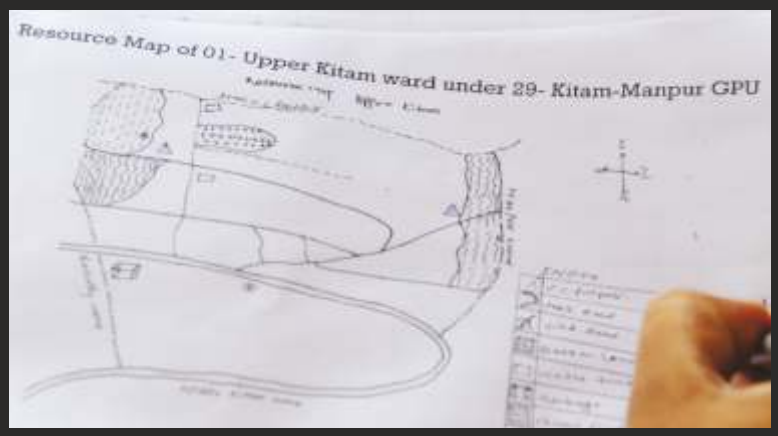
IIPA team **hand holding** the Panchayat Raj Institution member in comprehending the CRR so as to inform people about the associated risks, so they can think about what they can do to be better prepared in their homes, communities and businesses.

KNOWLEDGE TRANSFER

Panchayat Raj Institution member sharing his knowledge on filling up CRR with the locals to better facilitate in TOUGH times ahead.

EFFECTIVE PLANNING FOR BETTER RESULTS

Community absorbing a complete picture of integrated risk assessment with recognition of emergency services in their vicinity. Together .....WE CAN !!!



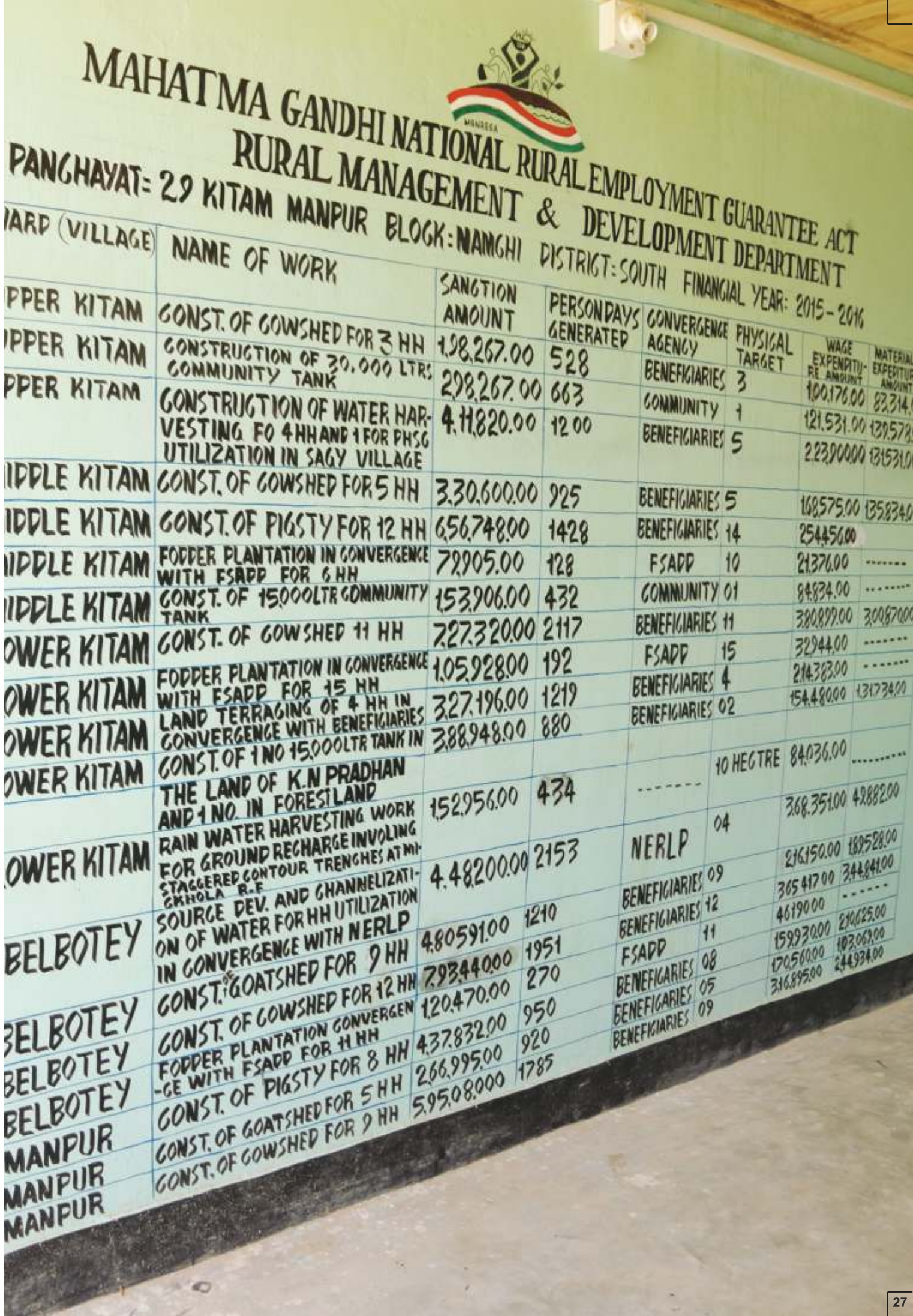
PANACEA !!

A well filled and updated CRR is a **panacea** for most of the climate related issues. CRR aims to help agencies make informed decisions on emergency planning work, and will help them develop better relationships whilst considering their resources and capacities.

Gram Panchayat President, Shri Gyalpo Lepcha filling the CRR of his Panchayat unit, Poklok Denchung, South Sikkim

TRANSPARENCY ALL the WAY!!

Mahatma Gandhi NAREGA scheme board displaying the activities done to bring accurate understanding of the risk and sound foundation for future planning.

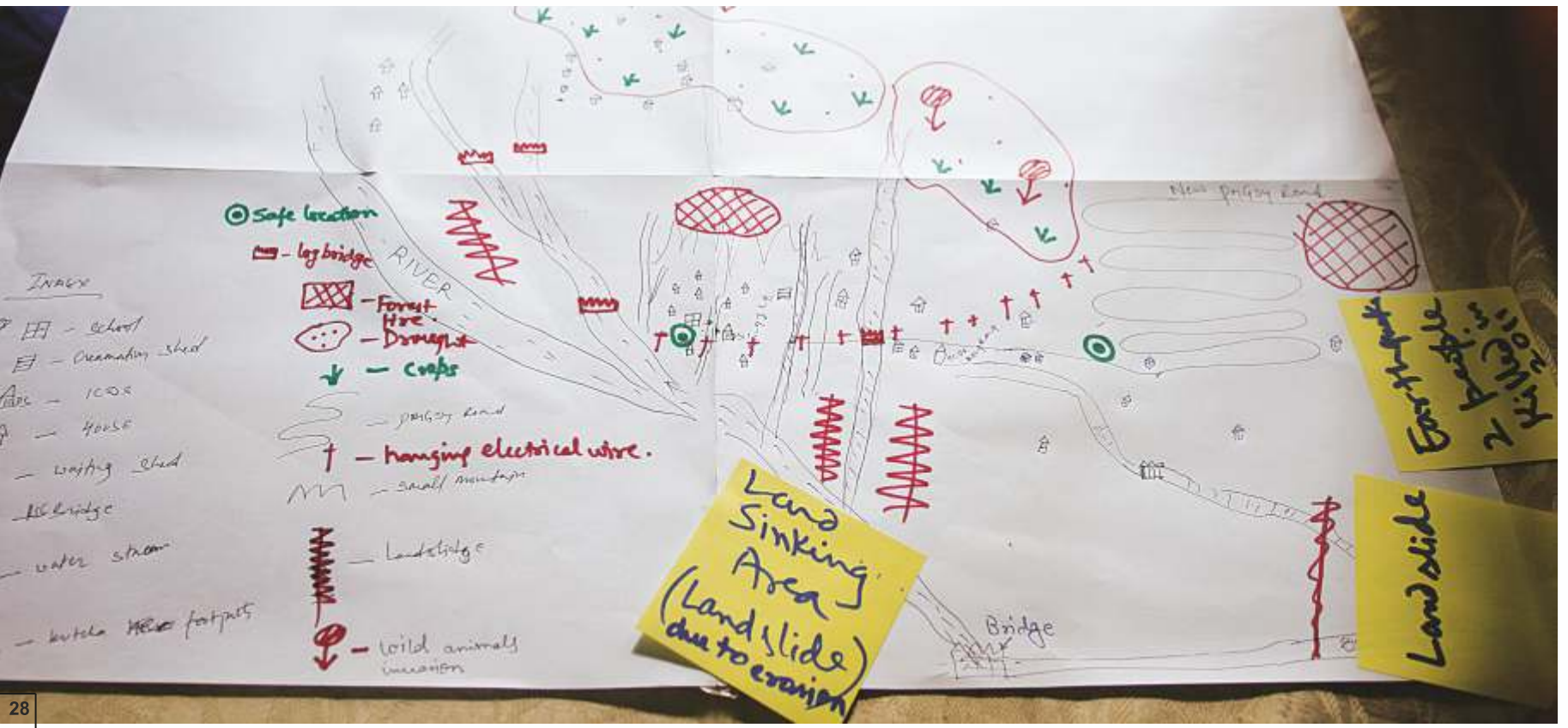


PRIORITISING

Locals engrossed in **prioritising** of objectives, work programmes and allocation of resources which would enable them to assess the adequacy of their plans and identify gaps, if any.

PLANNING ALL the WAY!!

CRR facilitates joint planning, based on consistent planning assumptions and provide an accessible overview of emergency planning for the public and officials.



FESTIVITY ALL AROUND

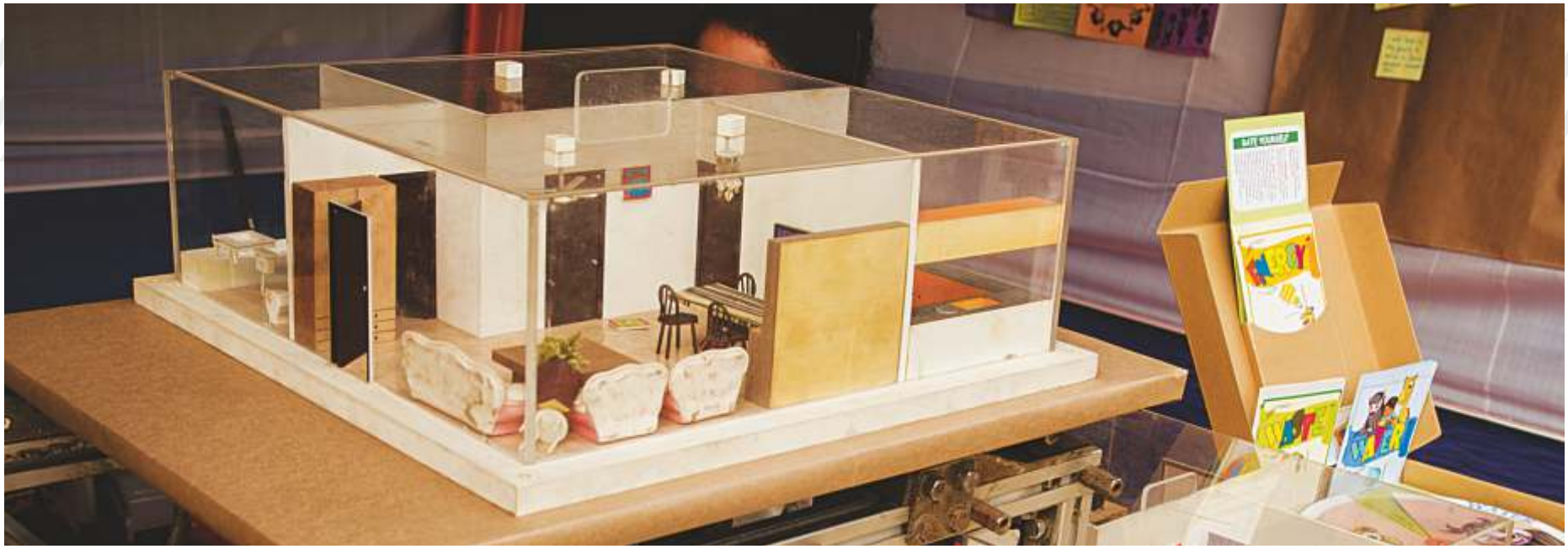
Maghey Mela, the biggest community fair in Sikkim where people from all walks of life from the entire state and also from the adjoining state of West Bengal congregate. It takes place every year during *Makar Sankranti,* the start of the harvesting season.

IIPA's STALL AT MAGHEY MELA

The project participates in this fair every year by putting up a stall for the people visiting the fair. This is a very effective informal platform to connect directly with the community and disseminate the acquired knowledge from the project.

MELA!! GO BAG! EMERGENCY KIT

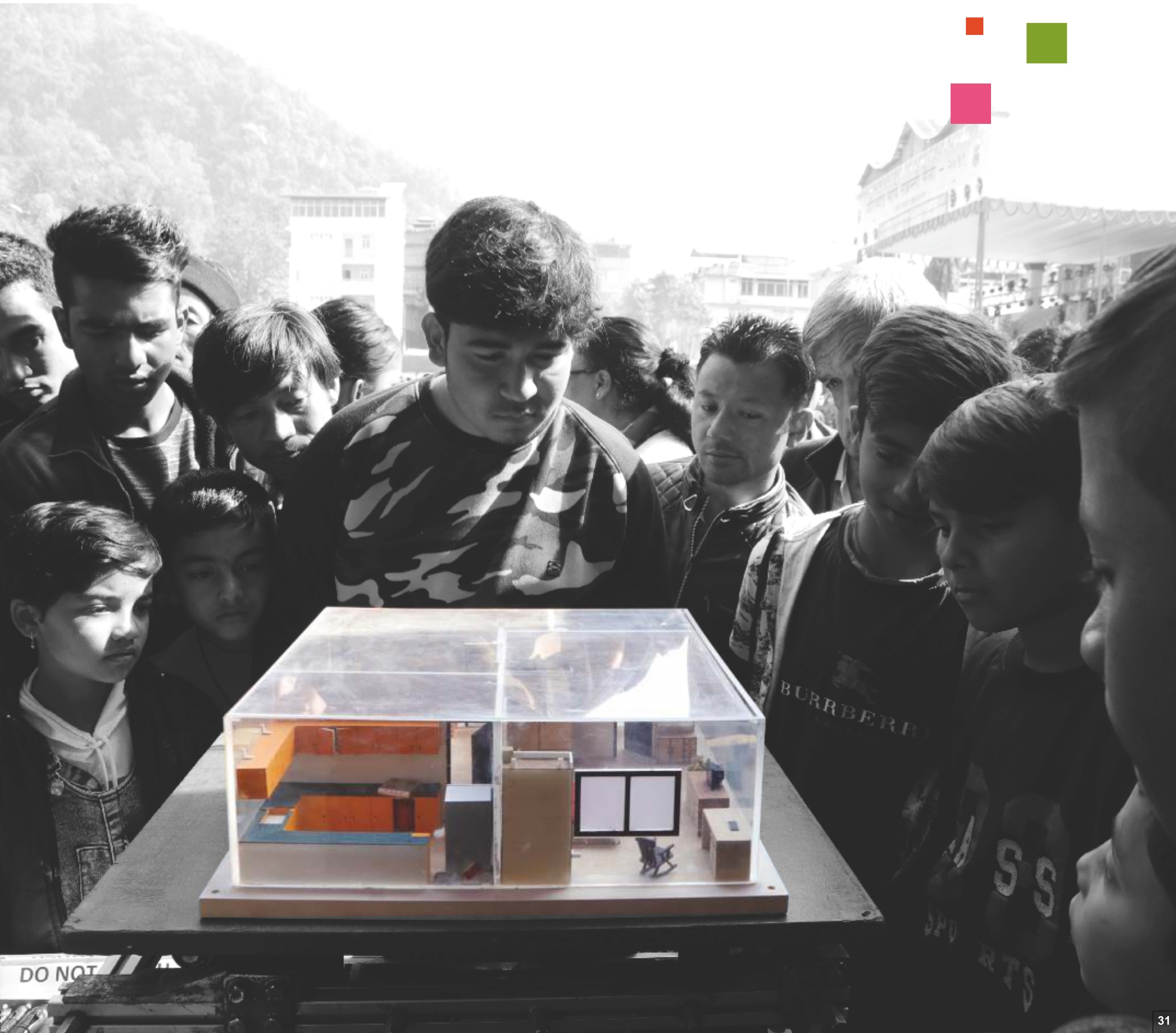
As a part of the display, “Go bag” is designed as an emergency kit in case of any evacuation event. The kit holds supply for one to two days in case a person is stranded and cannot be rescued immediately.



SHAKE TABLE AT THE MELA

The model represents of a typical house with interiors and furniture. The entire structure is mounted on a table known as “Shake Table”. The shake table can be operated by pulley system and earthquake of various magnitudes on Richter scale can be simulated.

The locals observing the shake table during one of the demonstrations. The observer can witness damage caused by varying amount of earthquake shocks. The model encourages the observer to use non-structural mitigation measures for safekeeping their house.



FLOOD WARNING SYSTEM

The model represents a settlement near the banks of the river Teesta with full fledged working of a town. It is divided into two separate parts. The first part depicts a lake at higher altitude whereas the lower part is modelled as the town. During torrential rains there can be an overflow in the lake causing it to outburst thus flooding the villages downstream.

An early warning system signals the downstream settlements of the oncoming floods. Thus, the locals are made aware of the causes and dangers of Glacial lake Outburst Flooding, to which Sikkim is extremely vulnerable. The early warning system helps in reducing losses and make the community better prepared for an upcoming flood.

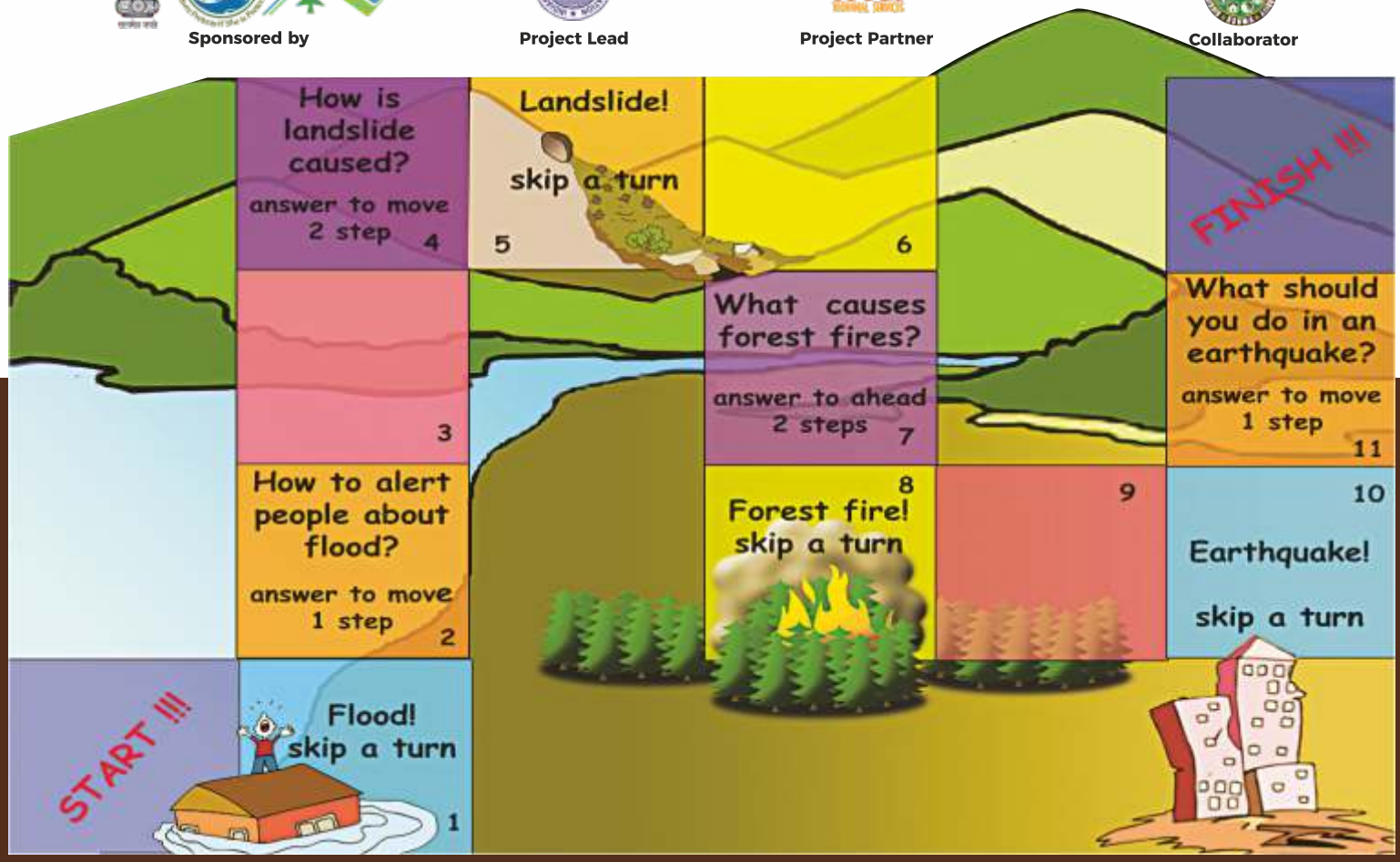
AVID READER

Curious little reader engrossed in going through IEC materials distributed to the locals. The project adopts this strategy for disbursal of information. IEC materials on safety tips during a disaster, leaflets, booklets are distributed to the general masses which includes school children besides all age groups of people.

CAPACITY BUILDING STRATEGIES

FOR MANAGING COMPLEX DISASTERS IN THE FACE OF CLIMATE CHANGE

Sponsored by | Project Lead | Project Partner | Collaborator



PLAYTIME

Playtime is Fun time! Board game laying emphasis on probable disasters and complex disasters in the face of Climate Change.

PROJECT TEAM HAVING FUN BASED LEARNING WITH THE KIDS, THE FUTURE CITIZENS!!

The disaster management awareness game is designed especially for kids. The two player game is played with a dice and has several steps between “Start and Finish” which are designed to have questions regarding Climate Change and Disaster Management

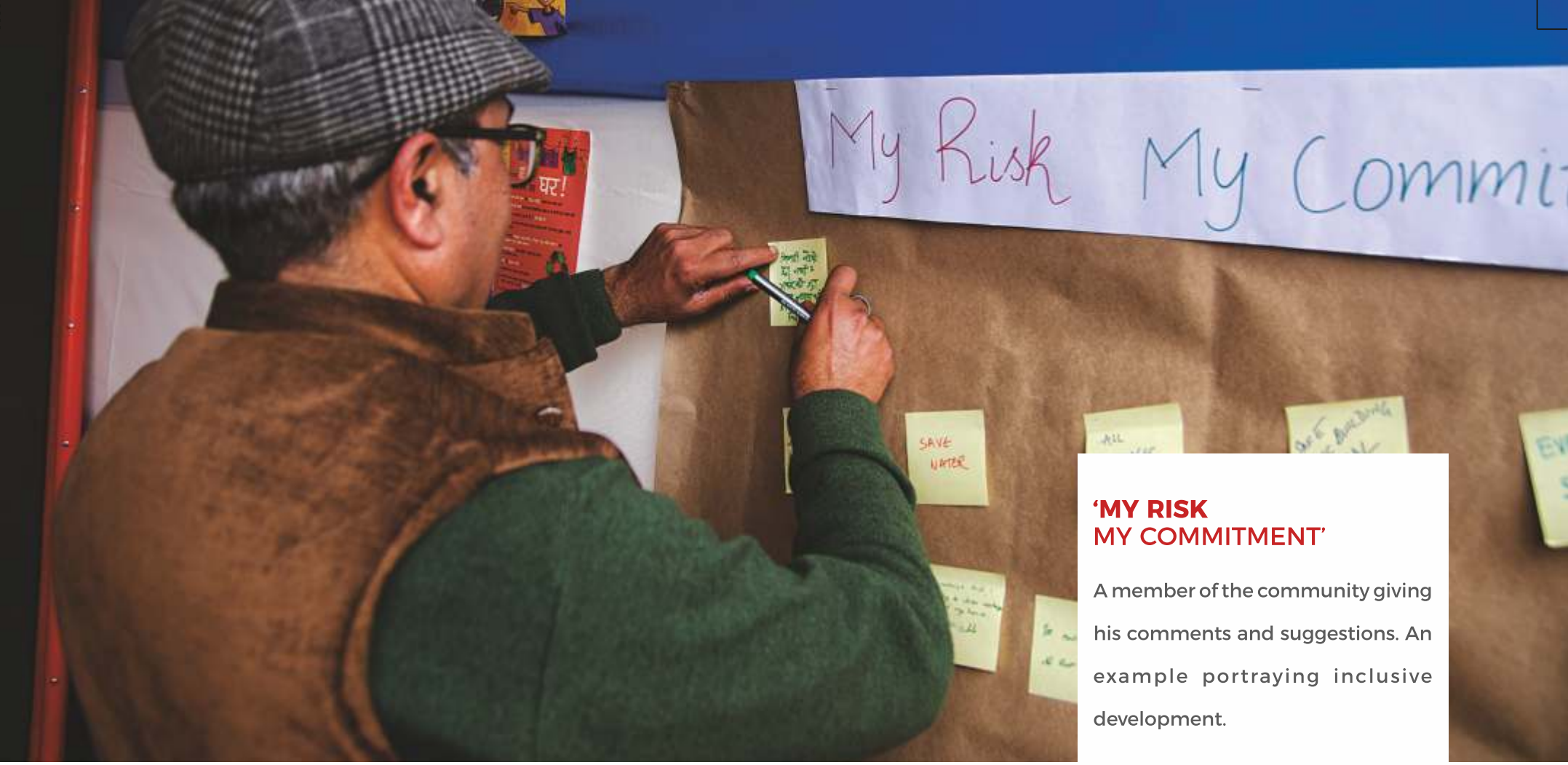
I am **RISK Ready.** Are You?

The risk ready kit is designed for school students that includes a board game . The kit includes flash cards for Road Safety, Water Sanitation and Hygiene (WaSH), Non structural mitigation, Earthquake Safety, Floods, and Fire safety.

SUCCESS STORIES:

Posters narrating the story of Sikkim basking in its eco- friendly glory Posters put up in the stall depict the projects objectives,

Sikkim state's journey towards becoming the nations first organic state and it's inclination towards being CLIMATE smart.



‘MY RISK MY COMMITMENT’

A member of the community giving his comments and suggestions. An example portraying inclusive development.

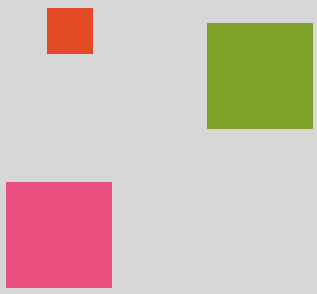
HAPPY CURIOUS FACES

Green Ambassadors learning DO IT YOURSELF!! They made wind vanes from waste.....Mission accomplished!

School Safety

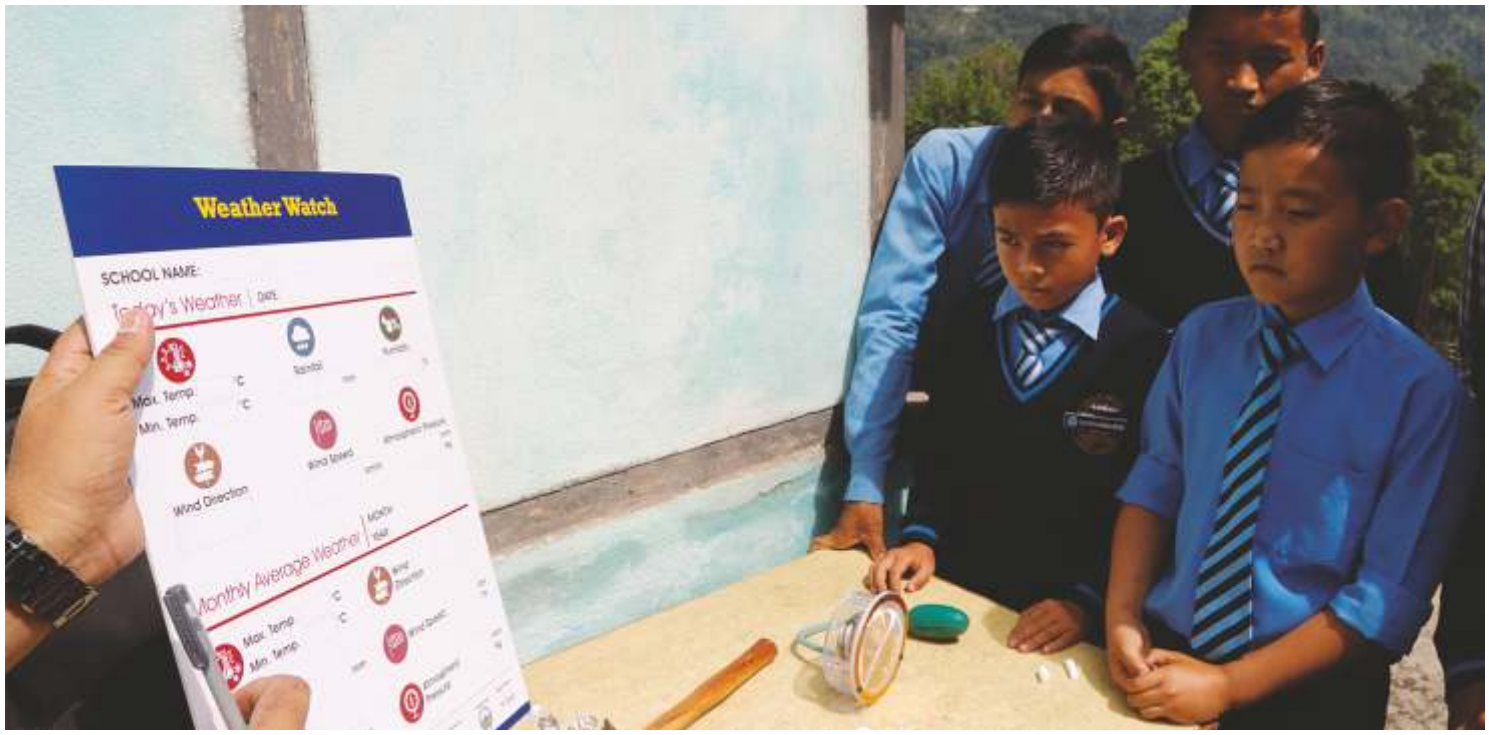
Climate
school

A Capacity Building Initiative



Children listen to the concept of Climate School.

A ‘Climate School’, as a pilot project was established in Govt. Junior High School, Upper Syari, Deorali, Gangtok.



The concept of the project is to sensitize the school children towards Climate Change under practical conditions. The students as weather watchers are key stakeholders in this initiative.

Its a Windy day!!

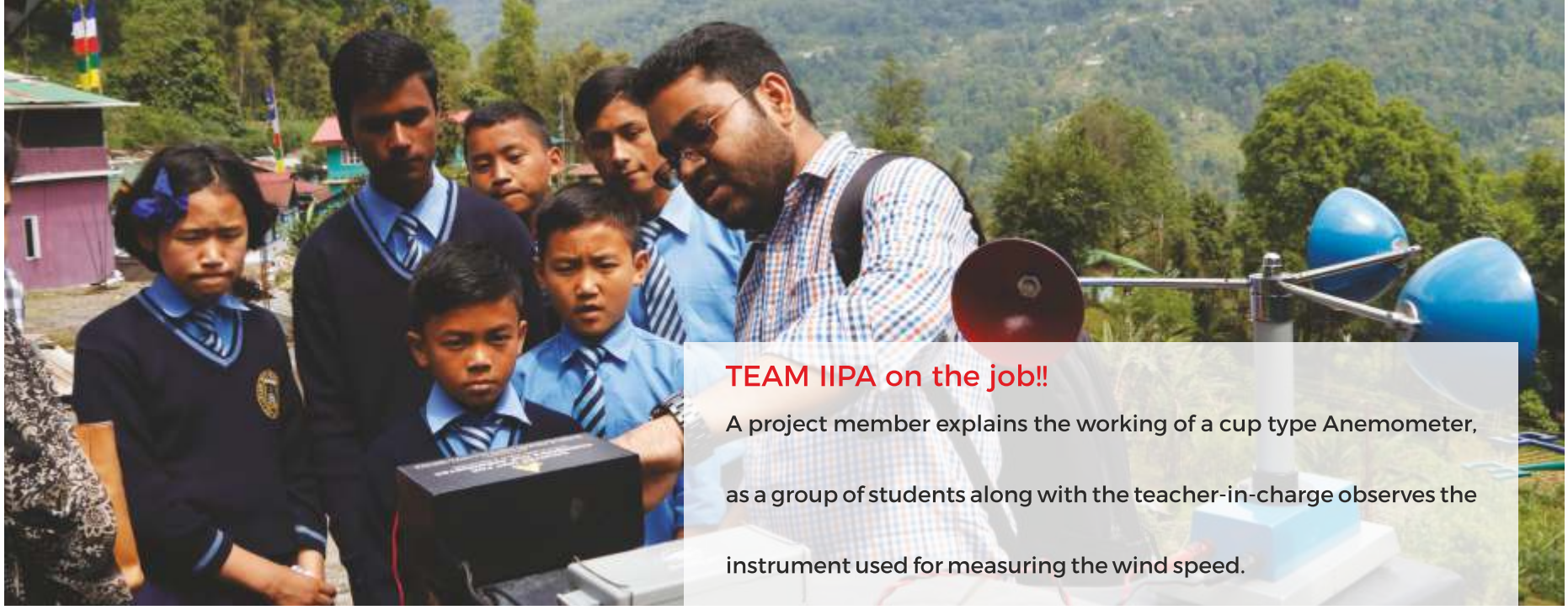
An anemometer is one of the instruments in the Climate School kit. It is a device used for measuring the speed of wind, and is also a common weather station instrument

EINSTEINS OF TOMMROW!!

Students observe the working of an aneroid barometer while taking the reading from the instrument. This instrument is used to measure atmospheric pressure, as a method that does not involve liquid.

WEATHER .....You are being Watched!!

The Climate School aims to record daily weather data through the students for six parameters. A weather board is placed in the school premises, where the students note down daily weather readings.



TEAM IIPA on the job!!

A project member explains the working of a cup type Anemometer, as a group of students along with the teacher-in-charge observes the instrument used for measuring the wind speed.

FUTURE TECHNOCRATS

The exercise of the taking the readings on daily basis and recording them is done by a group of four students, two new and two old on the Weather Watch Board.

HAND HOLDING

The old students train the new students in demonstrating the working of the instruments which is done on rotation. The entire exercise is monitored by a teacher-in-charge.

PROUD MENTORS

School Principal with the Climate School team. The science teacher has stated that the “The daily recording of

the temperature has helped in sensitizing the students about climate and weather studies”.

SAFETY FIRST!!

The Nandu Gaon Secondary School, Poklok Denchung, South Sikkim was visited, and an exercise on the subject of school safety was conducted in the school.

DANGER!

High powered Electronic transmission lurking as a danger, due to no railing along the school boundary.

PREACHING

IIPA team interacting with the school students and giving them tips on school safety.

Exercises for School Safety being conducted in the school. A small discussion on the prevalent risks in and around the school premises being carried out with the school students in the format of a game.

TEACHING IMBIBED

Students marching in a synchronized manner: Each step is a step towards A CLIMATE AND DISASTER RESILIENT SOCIETY.

LESSON LEARNT

Cheerful faces! School becomes a haven.

Workshops and Trainings

As per the project mandate, the team conducts Capacity Building Workshop conducted for the local stakeholders capacitating them for Disaster Risk Reduction in face of Climate Change. The workshops are conducted in all four districts of the state.

Luing Perbing, a small Gram Panchayat Unit (GPU), is located in the East district of Sikkim. The nearest town from the GPU is Gangtok. The map of Luing Perbing depicts vulnerable areas and settlements.

TOGETHER WE CAN

A capacity building workshop was conducted in the GPU. The workshop focused on all local stakeholders such as

Panchayati Raj Institute members, local farmers, school students, teachers and the like.

Project Investigator, Dr. Shyamli Singh, informing the participants about the vulnerabilities in their area and briefed the assembly about the concept of "Complex Disasters"

PLAY and LEARN!

A school Risk Ready Kit was displayed for the benefit of the high school children of the Senior Secondary School Luing. The kit contains games and flash cards detecting various disasters and their escape strategies

EMPOWERING THE MASSES!!

The workshop in Luing Perbing was attended by over 75 participants which included members of the PRI, local community,

high school students and the school teachers.

A team member explaining the working of the School Risk Ready kit

and displaying a sample of the flash card showing "To-Do's" in an

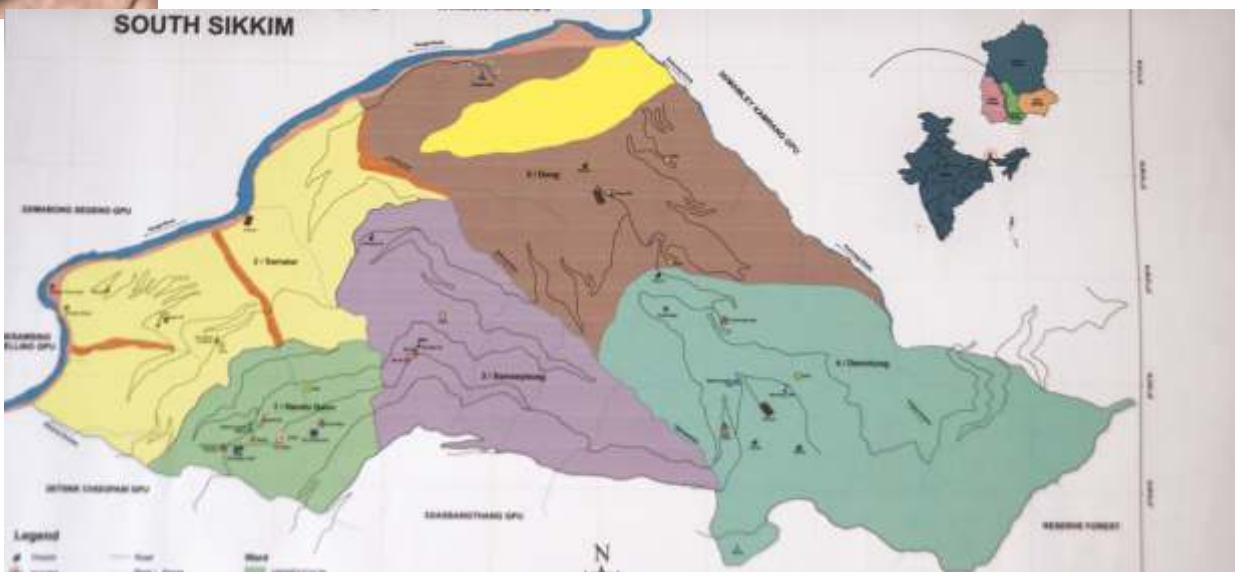
earthquake emergency.

Capacity Building Programme held in

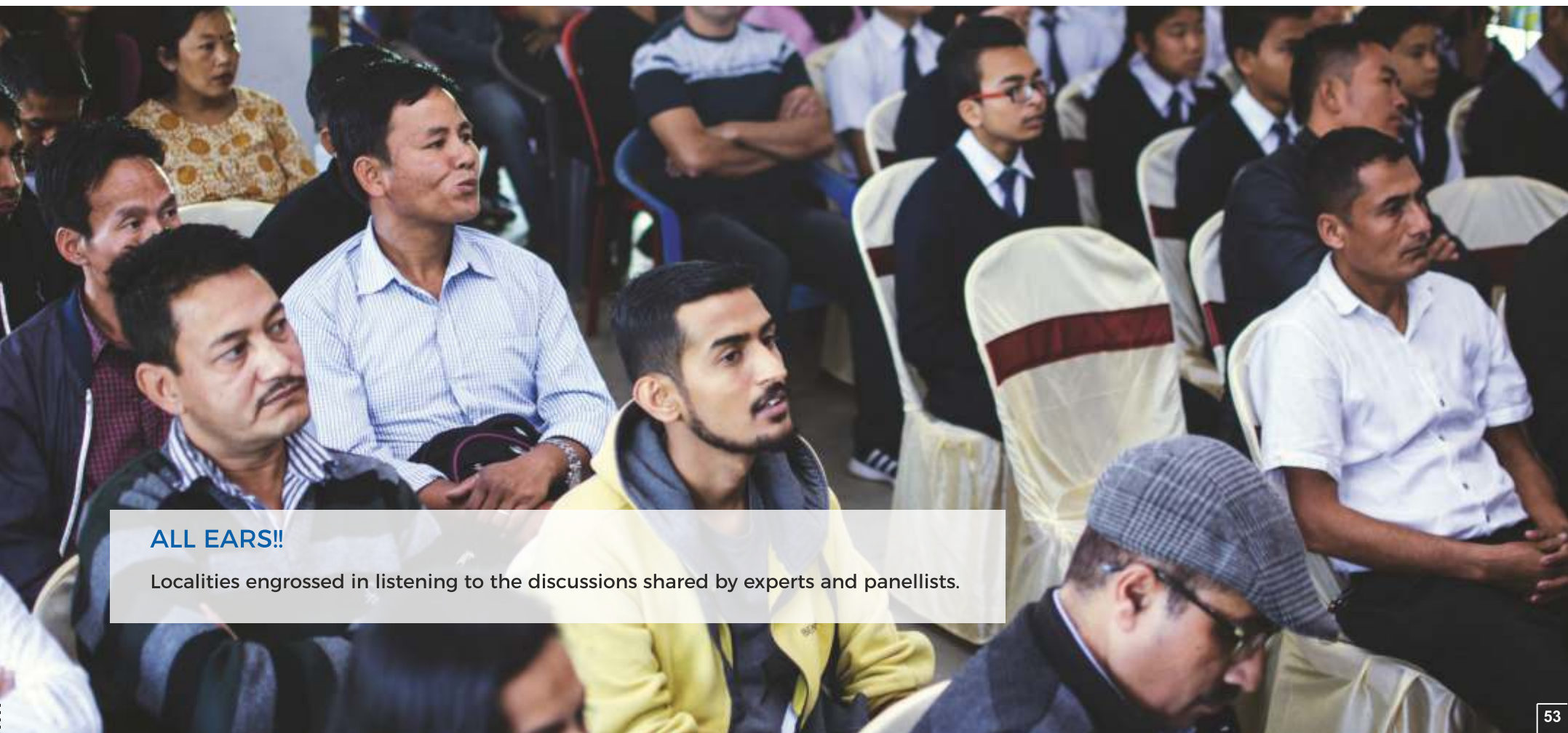
Poklok Denchung, South Sikkim. The

map depicts the vulnerability sites for

better preparedness in the GPU.



Project Investigator Dr. Shyamli Singh, Shri Abhishek Kharel DPO, DDMA, Shri Anil Rai, GPU President, Barfung and Shri Gyalbo Lepcha GPU, President, Poklok-Denchung presiding over the workshop.



ALL EARS!!

Localities engrossed in listening to the discussions shared by experts and panellists.

GIRL POWER

A girl student highlighting the disasters on the cards.

The IIPA and SEEDS team with the PRI members of Chungthang. The GPU is located in the North district of Sikkim and is one of the most vulnerable locations of Sikkim.

Mentoring the GEN NEXT!!

The Project Investigator, Dr. Shyamli Singh, taking a session on Complex Disasters. The participants include all school children and local stakeholders.

A demonstration of an earthquake simulation model was shown where, the importance of tie beam and lintel beam during construction was reinforced.

An exercise conducted in the Capacity Building Workshop, encourages the participants to list down Disaster Risks in their areas.

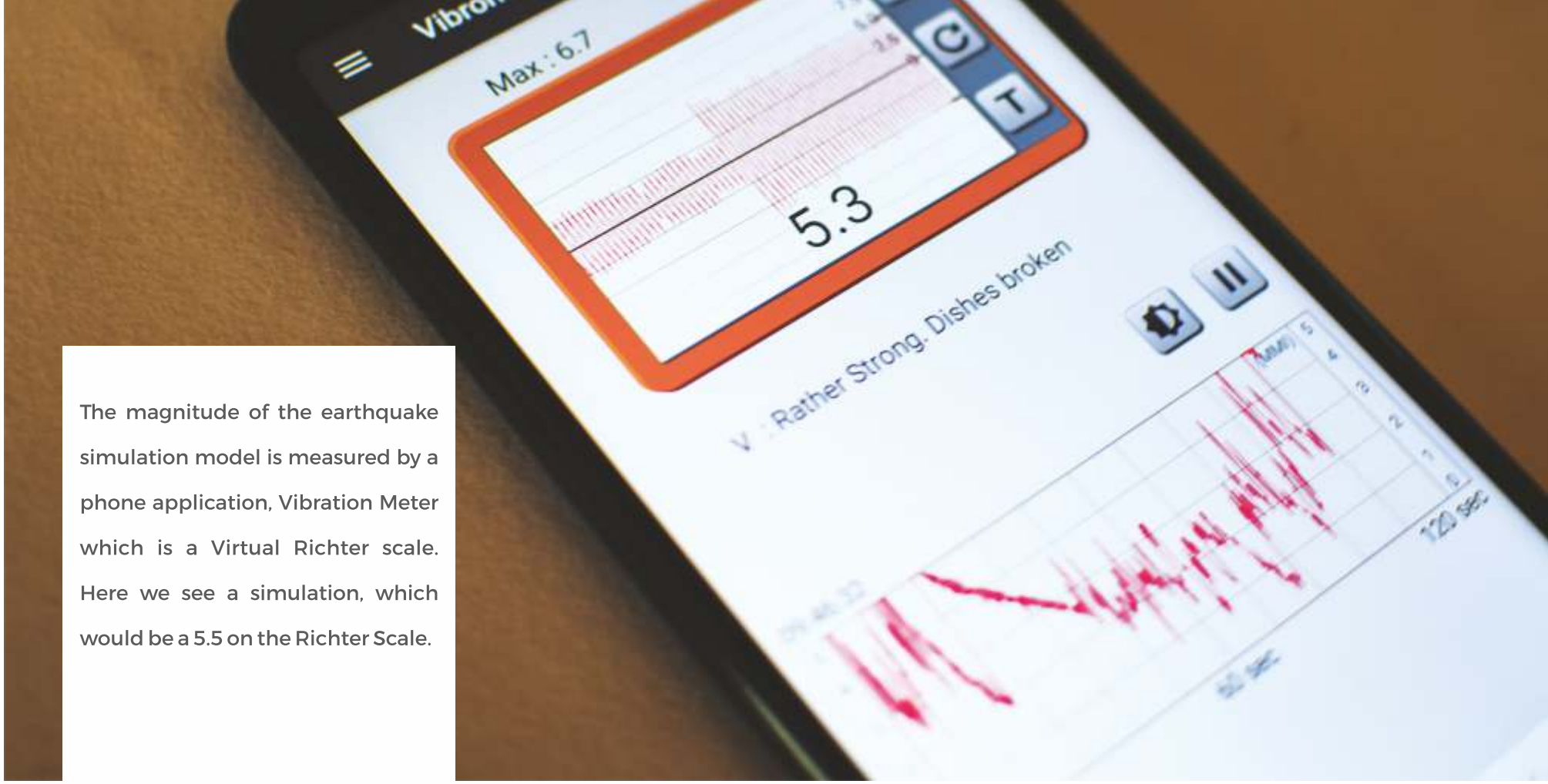
CATEGORISATION

After Risks and vulnerabilities being categorised as long, medium and short term issue.

The project team held sessions on Disaster Risk Reduction and complex Disasters for the participants.

All local stakeholders including PRI members, school students and local cultivators attended the training workshop. A local paddy farmer listens to the team during a workshop session.

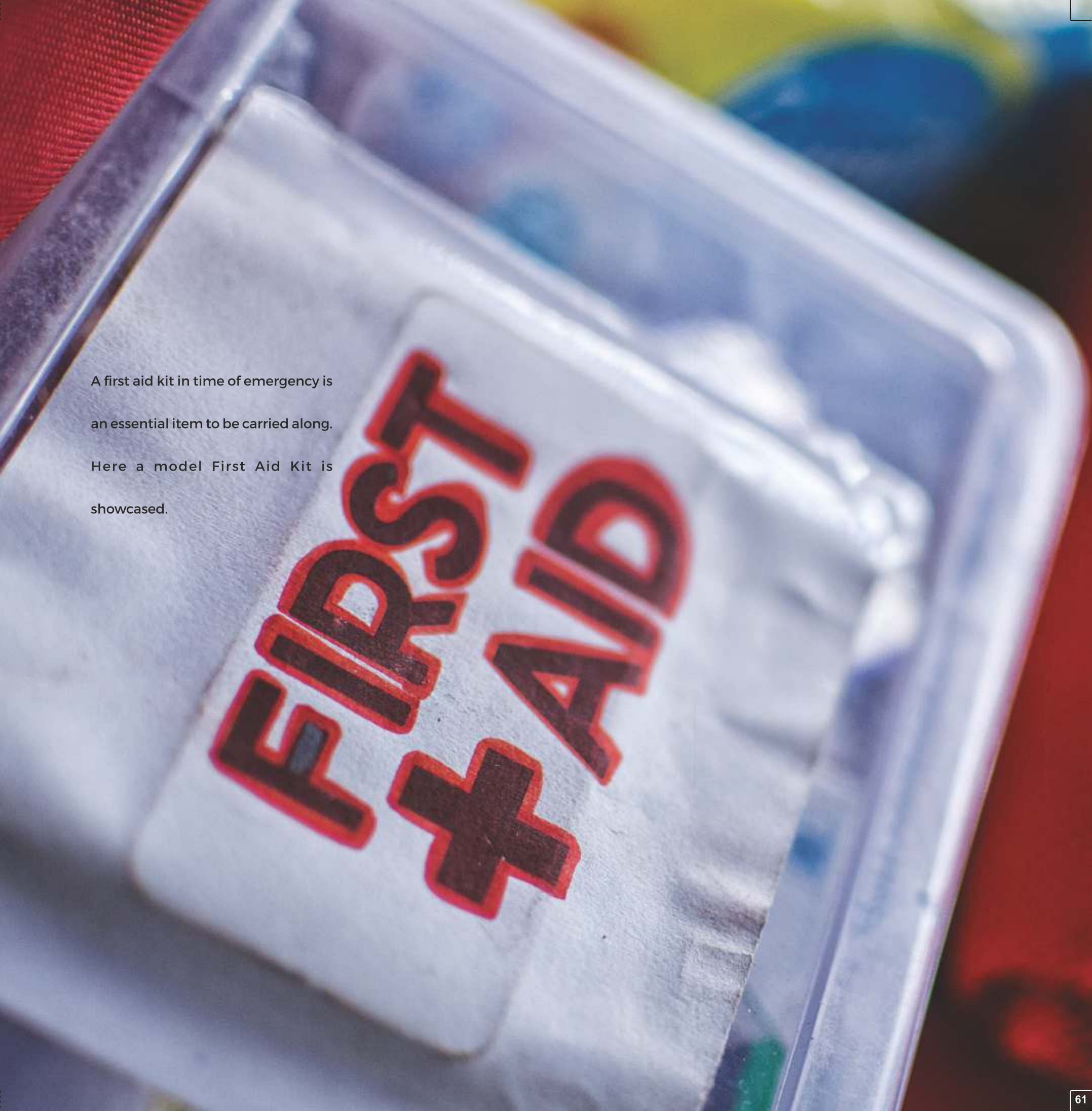
The earthquake simulation exercise being demonstrated to the participants of the Soreng GPU.



The magnitude of the earthquake simulation model is measured by a phone application, Vibration Meter which is a Virtual Richter scale. Here we see a simulation, which would be a 5.5 on the Richter Scale.

FASTEN UP!!

A number of non-structural mitigation devices and techniques are displayed for the exercise on earthquake mitigation. Rivets, bolts and brackets fasten the furniture to the wall surface which holds it during even strong earthquake thus reducing damage.



A first aid kit in time of emergency is an essential item to be carried along. Here a model First Aid Kit is showcased.

PRACTICE MAKES YOU PERFECT

Posters displaying “To-Do’s” during the time of the earthquake

POSTERS!!

Posters of safety during Disasters were displayed in the training workshop. Flood safety, Earthquake safety, Fire safety, Road safety, Non-structural mitigation etc were some of the displayed posters.

FELICITATION

Soreng is a GPU located in the West of Sikkim. Dr. Shyamli Singh facilitating the GPU President, Mrs. Chandra Kumari Tamang.

PRIORITISING

A National level Workshop 'Complex Disasters and Climate Change in Eastern Himalayas' was conduced at IIPA, New Delhi.

The keynote address delivered by Dr. T. Chatterjee, Former Director, IIPA , who emphasised on the need to take up research on complex disasters in time of Climate Change.

The participants were from various fields such as, academics, research organizations, scholars and non-governmental organizations, who work in the field of Climate Change.

Panellist- Dr. Shyamli Singh, Prof V.K. Sharma, Dr. Thiruppugazh at national level workshop on

'Mainstreaming Climate Change in Disaster Risk with reference to GLOFs and Forests Fires in Sikkim Himalayas'.

The workshop addressed the senior and middle level officers of all line departments dealing with Climate Change, Disaster risk and related issues.

The panel heading the workshop, discussed the threats of GLOFs and Forest Fires in the state and action plan for way forward.

BRINGING IT TO THE GROUND!!!

Project Team , Headed by Dr. Shyamli Singh along with Ms. Chandra Kumari Tamang, Gram Panchayat Head of Soreng , West Sikkim

Starting the workshop with the community

TRIBUTE TO SUNNY!!

Handing over the “Sunny Weather Lab” as a part of the “Climate School Initiative”, a school based weather station was launched. The Government Senior Secondary School, Soreng was equipped with six instruments to measure daily the minimum and maximum temperature, rainfall, humidity, atmospheric pressure, wind speed and wind direction. The Weather Lab is expected to sensitise the students towards the climate change and ignite their curiosity to study the phenomena further.

Photograph © SEEDS/ Siddharth Behl

PASSING THE BATON!!

Spreading the knowledge and making it widespread. The teacher in-charge Ms. Aparna Chetri of Junior High School Deorali handing over the “Climate school initiative” to the Principal, Senior Secondary School, Soreng.

STALWARTS IN A FRAME!!!

Mr. Kunga Nima Lepcha, Minister of Education, Land, Revenue & Disaster Management, Law, Legislative and Parliamentary Affairs, Youth and Sports Affairs, the Chief guest of the event. Aditya Golay, MLA from Soreng-Chakung , the Guest of Honour, Himmat Rai, Sub-Divisional Magistrate (Soreng) , Prof. Vinod K.Sharma Vice Chairman, SSDMA,Dr. Shyamli Singh, Faculty, IIPA and other dignitaries....

DISCUSSION AND DISSEMINATION!!

Dr. Shyamli Singh, delivering on Two days event, 'Climate School Initiative: Making Schools Climate Smart' at Soreng, West Sikkim under the project, 'Capacity Building Strategies for Managing Complex Disasters in the face of Climate Change' sponsored by the National Mission on Himalayan Studies and Ministry of Environment, Forest and Climate Change

Enthusiastic Green Ambassadors!!

Future “Green”, Disaster managers handing over the baton from Deorali Junior High School, Gangtok, East Sikkim to Government Senior Secondary School, Soreng, West Sikkim.

Busy Minds and Hands!!!

Shaping and Making Earth a more Colourful Planet to live

A painting competition for students from ten senior secondary schools from the Soreng, Chumbung, Tharpu, Pakkigaon, Sombaria, Sribadam, Timburbung, Gelling, Chakung and Daramdin was organised on, 5th March, 2020. The theme of the painting competition was ‘Sikkim: Treading towards Climate Smart and Disaster Resilient State’. Fifty students from these ten schools participated in the competition

GLIMPSES OF MASTER PIECES

by Picasso's of tomorrow !!!

Colours on paper....in anticipation of a greener...cleaner planet!!

climatic impacts on

BIODIVERSITY

The high range Himalayan eco-system in India is of critical importance for the bio-diversity and eco-systems of Global significance as it harbours and forms an important life – support system for a large number of remote and agro-pastoral communities that depends on it. The Tso-Lhamu region of North Sikkim houses one of the highest lakes in the world Gurudongmar Lake.

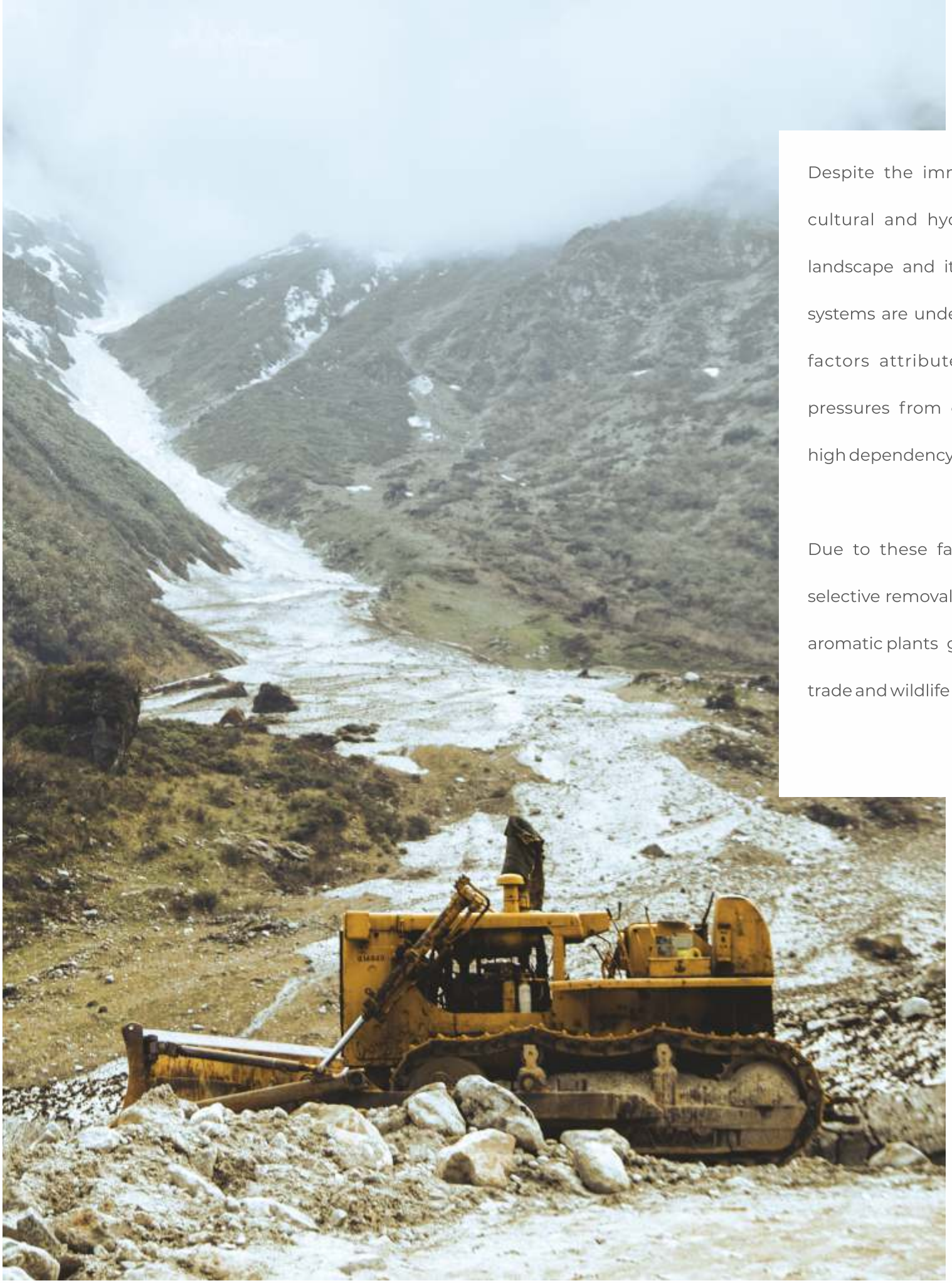
SPIRITUAL

Gurudongmar Lake is situated at an altitude of above 18,000 ft. It is not only a global bio-diversity

hotspot but also considered scared by Buddhists, Sikhs and Hindus.

PROTECT

The Khangchendzonga – Upper Teesta Landscape spans over an area of 3600sq.km. It includes Khangchendzonga National Park and Shingba Rhododendron Sanctuary as Protected areas and the Tso-Lhamu Plateau as proposed conservation area.



Despite the immense biological, socio-cultural and hydrological values of the landscape and it's bio-diversity, the eco-systems are under severe threat from the factors attributed to Climate Change, pressures from economic development, high dependency of natural resources etc.

Due to these factors, activities such as selective removal of certain medicinal and aromatic plants gives rise to illegal wildlife trade and wildlife crime.

An accelerated pace of construction activities, earth-cutting especially with regards to road development at various locations, exposes the inner rock structure, that is further weakened by rains causing landslides and mudslides.

DISASTROUS

Hundreds of cars stuck in jam on the way to ‘Zero Point’. One of the main reasons for unplanned and extensive development in the state is the boom in tourism sector. A jam packed narrow road in a landslide vulnerable area is a recipe for a disaster!

Climate Change affects not only the flora and fauna of the state but also causes risks to the animal and livestock of the area. The North district landscape is a natural habitat for the Yaks.

MERCY

In the year 2019, more than 300 yaks starved to death in North district of Sikkim after an unusual bout of Winter in the month of May (when it should have been summer like situation in the valley)

BEAUTY at its glory

Primose or ***Primula Farinose*** is a small perenial plant in the family of Primulaceae, found in higher altitudes. It thrives on grazed meadows. The primose flower blooms in the meadows of the Yumthang Valley.

HEAVEN ON EARTH

The site of the project's third Capacity Building workshop is the Chungthang Valley. The GPU is situated at the confluence of Lachen and Lachung and is surrounded by extremely rich biodiverse hills

EVERGREEN

One of the main species of evergreen conifers are the Sikkim spruce or the ***Picea spinulosa.***

It has a conical crown with horizontal branches and needle like leaves.

As the altitude increases the vegetation coverage decreases. The higher parts of the landscape are covered by dwarf shrubs, sedges and grasses, mosses and lichens.

Khangchendzonga National Park shares it’s boundary with West Sikkim and is also home to the Shingba Landscape.

The Shingba Rhododendron Sanctuary is located in the Yumthang Valley of flowers. It is home to around forty different species of the Rhododendron.

Board depicting different types of Rhododendrons found in the sanctuary.

The most common Rhododendron flower is the ***Rhododendron arboreum***, also known as the Gurans in local Nepalese language. The striking feature of the plant is it's bright red flower !

Another variant of the red Rhododendron is the violet Rhododendron flower also commonly known as ‘Blue Peter’. The plant flower from early spring to early monsoon.

The Shingba sanctuary is also home to several birds both non-endangered and endangered species.

The locals rely on the forest produce for various activities from cooking fuel to construction material. Unchecked use of the forest produce has an impact on the bio-diversity and ecosystem of the area.

An important cash crop of the state of Sikkim is the Sikkim Mandarin also known as Sikkim Orange.

RESEARCH and GROUND TRUTHING

Theme: Water resources management and glacier retreat

Water Resource management in Hill settlements: Case study of Soreng, Sikkim

Dr. Shyamli Singh (Faculty), shyamli.env@gmail.com
Rini Reejonia (Research Officer),
Vinod K. Sharma (Sr. Professor),
(Indian Institute of Public Administration, New Delhi)

Abstract

The 57.8 million people residing in the Himalayan region depend on the Himalayan landscapes, glaciers and springs for water resources for irrigation, food, industry and for the functioning of many important ecosystem services (Apollo, 2017). The region being rich in glaciers and abundant in perennial snow cover is a source of many big rivers like the Indus, Ganges, and Brahmaputra, and have abundant seasonal and annual water supply. The mountain people depend largely on this region for their sustenance, in form of springs and rivers. The mountain springs, locally known as *Dharas*, are the natural discharges of groundwater from unconfined aquifers. In Sikkim, 80% of the rural households depend on spring water for their water security (Tambe, 2012). Traditionally, the state has always received good rainfall and has generally been a water surplus state. But recent years have witnessed unprecedented and erratic rainfall trends and longer and warmer summers. This has lead to rise in average temperature and shifting winter precipitation from snow to rain, leading to a change in the timing of the peaks of stream-flow which may be attributed to Climate Change. Glacial retreat causes an increase in the flow but only for short term and decreases as the glacier melts therefore changing the timing and quantity of the stream flow creating a huge impact on the settlements downstream. A prime example of this is the South Lhonak Glacier in the North district of Sikkim which has receded 2km in the past decade (Govindharaj, 2013). The situation is exacerbated due to the drying up of natural springs or turning of perennial springs into seasonal. This has added to the water shortage issue which is fast becoming a regular occurrence in the state which is not used to dealing with water scarcity. Throughout the mountain region, springs are reported to be drying, and mountain agriculture has suffered from drought. The paper reflects this occurrence and the plight of the community through the case study of a Gram Panchayat Unit (GPU) in the West district of Sikkim, Soreng, which receives its water from the local spring, namely Chalidhara Chakmaki. In the recent years the water level of the spring has significantly reduced. This has created a lot of problem for the GPU residents who rely heavily on the spring for daily use

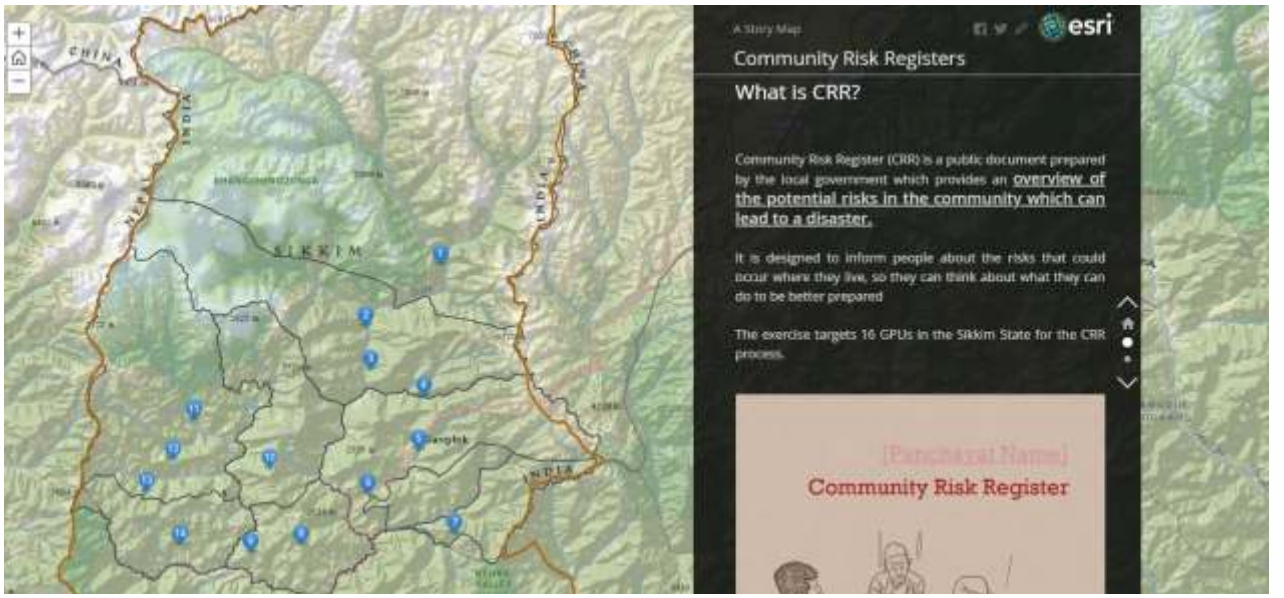
CLIMATE COMMUNITY RESILIENCE IN THE FACE OF CLIMATE CHANGE: A CASE STUDY OF EASTERN HIMALAYAN REGION, SIKKIM, INDIA

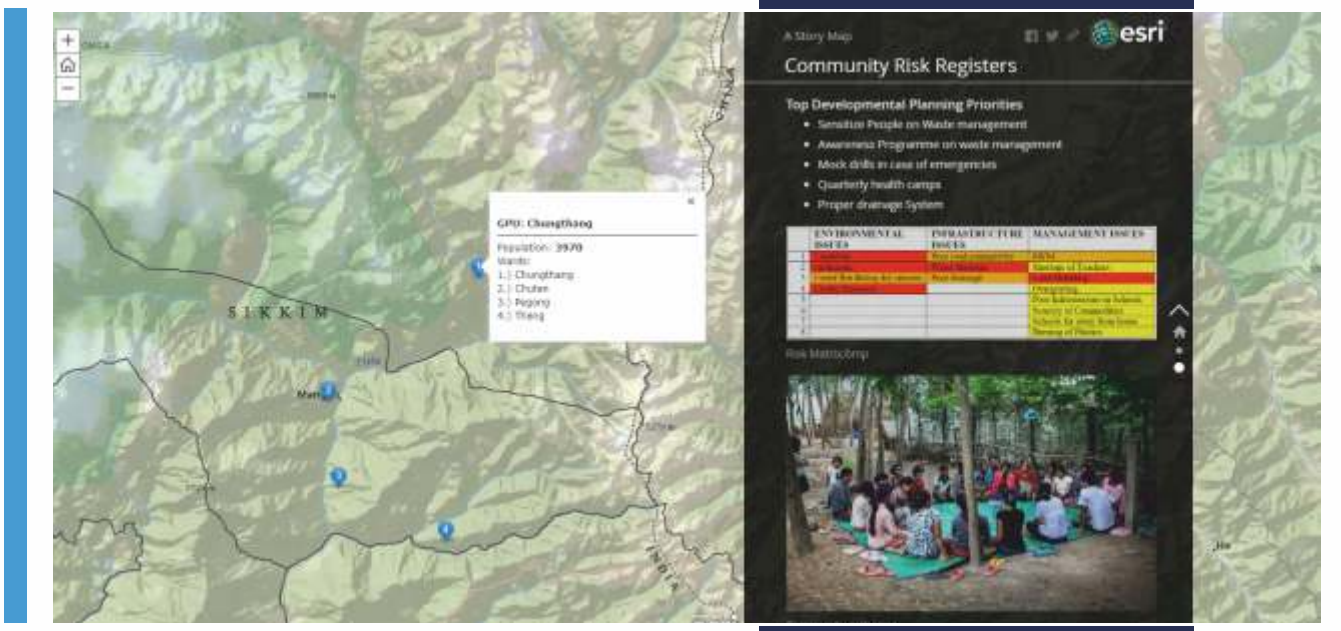
Shyamli Singh, Mutup Tashi, Prof. Vinod K. Sharma
Indian Institute of Public Administration
shyamli.env@gmail.com, mutup.tashi08@gmail.com

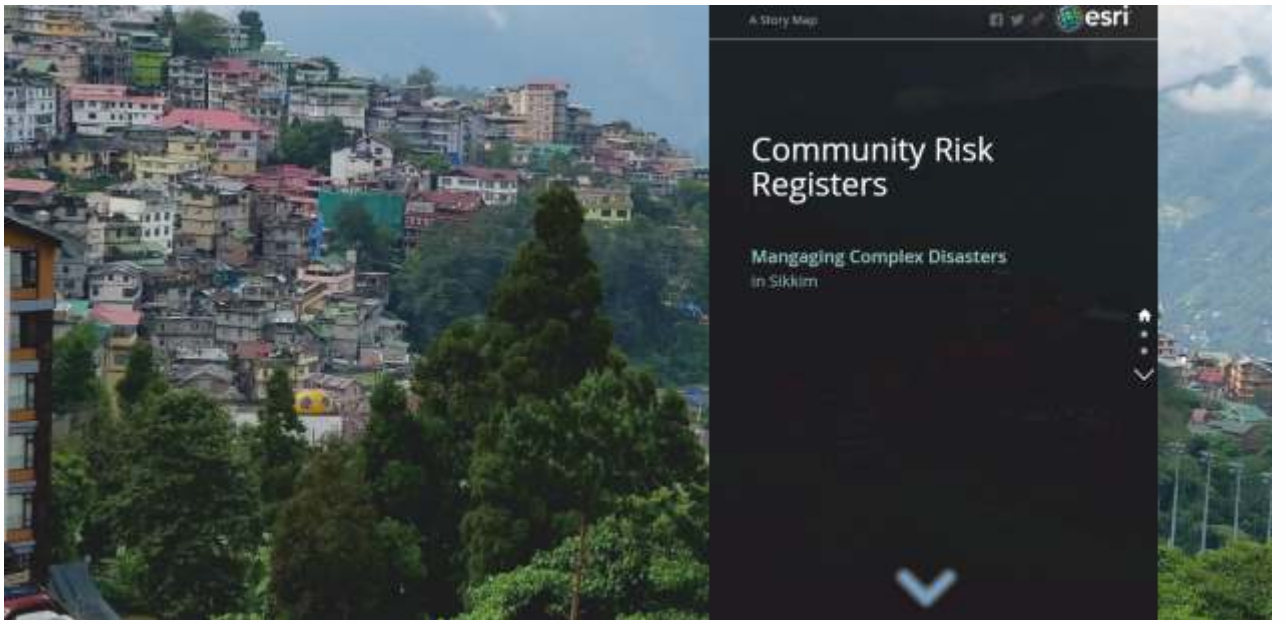
Communities have been experiencing the Climate Change and weather variability. Communities have its own traditional knowledge to cope with the changing patterns, shifts in temperature, erratic rainfall, extreme weather phenomena like floods, landslide, hailstorms etc. The communities have considerable awareness of Climate Change, its cascading impacts on crops, shifts in agriculture, untimely snowfall etc. According to Human Development Report, Sikkim (2014),75% population lives in ruralareas which solely depend on agriculture and forest produce. 64 % of population depends on agriculture for their livelihood. Communities are the first responders of the impacts of Climate Change in the form of disasters like Landslides, forest fire, hailstorms etc. increased frequency of disasters such as landslides and Glacial lake outburst Floods (GLOFs) and incidences of forest fires has been witnessed in the state. Sikkim housed a number of natural resources with 47.80 % Forest cover. The available evidence strongly indicates that, Climate in Sikkim is changing rapidly and more changes are ahead. Land use, haphazard developments in the hilly terrain, construction, and urbanizations are other changes which hampers the ecology and the ecosystem services. This study reflects the risk of the two wards in the East District in Sikkim. Focussed Group Discussion and household survey was carried outand documented in the form of Community Risk Register. The study was carried out in two wards (*Thewo Dara* in Luing Perbing Gram Panchayat Unit (GPU) and *Upper Sumin Ward* of Sumin Lingzey GPU). It was found that both the wards are at a very high risk of Landslide, Medium risk of hailstorms, forest fire, followed by soil erosion, water scarcity, winter droughts etc. Other identified risks are no proper network in the area which makes connectivity a big problem agricultural production has gone down due to uncertain whether condition, infertile soil and soil erosion, The risk rating was calculated based on the likelihood and impact. The modern farming techniques, supply of new improved varieties of seeds with high production potential to be given to the communities. Rain water harvesting to be encouraged to solve the water Scarcity in the Upper Sumin Lingzey. Forest is not dense in Upper Sumin ward due to forest fire and diseases.

Introduction

Sikkim (27°05' to 28°07'N and 87°59' to 88°56'E), wedged between Nepal and Bhutan, is a small state of India well known for its scenic beauty, immensely rich biological diversity, very rich diverse Eco climatic conditions, and wide altitudinal variation (300-8598 m). Mount Khangchendzonga (8598 m), the third highest peak in the world, strongly governs the relief features of the state, also regarded as Guardian deity of the State which has a total geographical area of 7096 km. It is not only the highest but also the steepest landscape in the country, as the width of the Himalaya across its entire length is narrowest here (Schaller


CHINA
INDIA
NEPAL
SIKKIM
A Story Map
esri
Community Risk Registers
What is CRR?
Community Risk Register (CRR) is a public document prepared by the local government which provides an overview of the potential risks in the community which can lead to a disaster.
It is designed to inform people about the risks that could occur where they live, so they can think about what they can do to be better prepared
The exercise targets 16 GPUs in the Sikkim State for the CRR process.
[Panchayat Name]
Community Risk Register


SIKKIM
GPU: Chungthang
Population- 3970
Wards:
1.) Chungthang
2.) Chuten
3.) Pegong
4.) Theng
A Story Map
esri
Community Risk Registers
Top Developmental Planning Priorities
Sensitize People on Waste management
Awareness Programme on waste management
Mock drills in case of emergencies
Quarterly health camps
Proper drainage System
ENVIRONMENTAL ISSUES
INFRASTRUCTURE ISSUES
MANAGEMENT ISSUES
Risk Matrix.bmp


A Story Map
esri
Community Risk Registers
Mangaging Complex Disasters
in Sikkim

RECOGNITION AND AWARDS

Sikkim Express 21-09-17

Project to study, counter climate change impacts launched

SE Report

GANGTOK, September 20: A new project to understand the impact of climate change and disasters and counter them was launched by chief secretary A.K. Shrivastava here today.

The project on capacity building strategies for managing complex disasters in the face of climate change has been supported by the Union Environment & Forests ministry and being implemented by the Indian Institute of Public Administration (IIPA) and the technical organization SEEDS with support from the Sikkim State Disaster Management Authority (SSDMA), an IPR release informs.

The workshop deliberated on various issues to crystalize the project and ensure that the local nuances are studied and the way forward decided based on the specific local context.

Speaking on the occasion, Vinod Sharma of IIPA, who is also vice chairman of SSDMA, highlighted that the design of safe and sustainable development in the ecologically fragile setting of Sikkim is no easy task. The various social, economic and environmental factors that contribute to this fragility are intricately intertwined. No global or theoretical solutions can be copied and pastehere, and we need to clearly define what our own unique path to sustainability needs to be, he added.

Chief secretary Shrivastava stated that the capacity building initiative is targeting different institutions including schools, panchayats and concerned departments. "This approach gives us confidence that we are embarking on a practical approach that will lead to real impact on the ground and for the long run," he said adding that the project would hopefully work towards formulating citizen oriented planning which would be suitable to local needs and aspiration.

State relief commissioner Tsegyal Tashi urged the agencies to create an archives of case studies done on Sikkim so that those could be useful in research that will be carried out in future.

The workshop discussions stressed on the need for addressing complex disasters in a comprehensive manner. It was stated that disaster events are becoming more and more difficult to anticipate, reduce and respond to because of changes in the climate, built form of the settlements, people's economy and behaviour. Many of our traditional systems are being forgoten, or are failing in the emerging realities, the IPR release adds.

मौसम परिवर्तन र विकासको प्रभावमाथि कार्यशाला

गान्तोक, २० सेप्टेम्बर (निस)। मौसम परिवर्तन र निरन्तर विकासका कारण प्राकृतिक संकटका बाह्यक्षीय प्रभाव र यसका मूल कारण जटील रहन्छ। पानीको दबाउ अनि पर्यावरणीय [illegible] अभ्यासलाई राम्रो सुझ्न अनि यसको प्रतिरोधका विभिन्न पक्षी रणनीति ल्याउने उद्देश्यले राज्य प्रशासनका मुख्य सचिव आलोक कुमार श्रीवास्तवले स्थानीय एक होटलमा व्यवस्थित स्ट्राटेजिज फर म्यानेजिङ कम्पेल्क्स डिजास्टर्स इन द फेस अफ क्लाइमेट चेन्ज नामक प्रकल्पको औपचारिक थालनी गरेका छन्। कार्यक्रममा बोल्दै [illegible] जातुक पर्यावरणीय पृष्ठभूमिको सुरक्षित तथा दिगो विकासकको रणनीतिक ढाँचाको विकास गहन कार्य नरहेको बताएका छन्। सिक्किमको पर्यावरणीय जटीलता राज्यका सामाजिक,आर्थिक अनि पर्यावरणीय पक्षहरू सिक्किमी पर्यावरणका अन्तरबन्धित रहेको उल्लेख गरेका छन्। सिक्किमको मामिलामा कुनै वैश्विक वा सैद्धान्तिक समाधानको मानदण्डको कपीपेस्ट नगरेर सिक्किमे पर्यावरणको दिगोपनको लागि रूपले परिभाषित गरिनु आवश्यक रहेको बताएका छन्। कार्यशालामा प्रकल्पका विविध मुद्दाहरूमाथि छलफल गरियो। मुख्य सचिव श्रीवास्तवले सिक्किम [illegible] प्रकल्पलाई व्यवहारिक रूपले सकल तुल्याउन आवश्यक सहयोग पुर्‍याउ प्रशासन विभागमा बनेको पानी आयोग गरेका छन्। भू-राजस्व तथा आपदा प्रबन्धन विभागका राज्य राहत आयुक्त नग्या शेरिङ लिप्चेल टासील सिक्किमको पर्यावरणमाथि भएका अध्ययनका तथ्याङ्कहरूको अभिलेखागार गठन गरिनुपर्नेमा जोड दिएका छन्। भारत सरकारको [illegible] मन्त्रालयको सहयोगमा थालिएको यस प्रकल्पको कियान्वयन इण्डीयन इन्स्टिट्यूट अफ पब्लिक एडमिनिस्ट्रेसन अनि राज्य [illegible]

Project launch by Shri Alok Kumar Shrivastava on 18th September 2017. To commemorate the earthquake of 2011 the day is observed as **'Disaster Risk Reduction Day'.**

IIPA secured first position in Maghey Mela 2018 as the best Department in the category of Department Staff of Maghey Mela 2018, South Sikkim.

The project had a stall in the community fair in collaboration with the Land Revenue and Disaster Management Department.

ON AIR!!

The series on understanding Climate Change is broadcasted for global audience for 134 countries.

SCIENCE WATCH PROGRAMME ON AIR

The project is set to be featured in the Science Watch Programme aired on All India Radio in Air World Service an External Service Division of AIR.

DEVELOPMENT

- FOCUS ON DRR IN LOCAL AREA PLANS
- PLANNING FOR URBAN DEVELOPMENT
- CONVERGENCE OF ISSUES

TECHNOLOGY

- STORY MAPS
- SPATIAL MAPS ON GIS
- AWARENESS ON EARLY WARNING SYSTEMS

IMPACT

FOCUS ON FUTURE

- AWARENESS GENERATION OF DISASTERS
- CLIMATE CHANGE AWARENESS
- SCHOOL SAFETY

PROACTIVE GOVERNANCE

- INNOVATIVE TECHNIQUES
- PROACTIVE MITIGATION STRATEGIES
- TAPPING FULL POTENTIAL OF PEOPLE

RAYS OF HOPE!!

IIPA looks forward to aspire to a healthy, happy, clean green and sustainable FUTURE!!

LIVE and LET LIVE!!

A flourishing SIKKIM with amplified livelihood which is Disaster and Climate Resilient


LIST AREAS OF CONCERN FOR THE FUTURE :→
1. Agriculture & Food Security
* Irrigation
* Eutrophication
* Use of Fertilizers/Pesticides
* Agriculture waste disposal
* Desertification
* Soil Salinity /Alkalinity
* Soil Erosion
* Groundwater Contamination
* Bioaccumulation & Biomagnification.
2. Forestry & Biodiversity
* Deforestation
* Forest fire
* Forest degradation
* RET Species
* Species Shift
3. Environmental Protection
* Vehicular Emission (PM10, PM2.5, PM1)
* Industrial Emission
* Industrial Effluents
* Mining – Sand, Coal etc.
4. Human Health
* Communicable diseases.
* Genetoxic
* Cancinogenic


ACTIVITY - 2
DISASTER RESPONSE
TYPES OF DISASTER


जोरथाङ दक्षिण सिक्किम

CAPACITY BUILDING

STRATEGIES FOR MANAGING
COMPLEX DISASTERS
IN THE FACE OF
CLIMATE CHANGE

CAPACITY BUILDING

STRATEGIES FOR MANAGING
COMPLEX DISASTERS
IN THE FACE OF
CLIMATE CHANGE

STRATEGIES FOR MANAGING
COMPLEX DISASTERS
IN THE FACE OF

CLIMATE CHANGE CAPACITY BUILDING

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