



# Sustainable Mountain Development Summit X

November 18 - 20, 2021







# Sustainable Mountain Development Summit X

Towards One Health: Making our mountains resilient

November 18 - 20, 2021

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Photo: Roshan Rai



# Sustainable Mountain Development Summit X Towards One Health: Making our mountains resilient

November 18 – 20, 2021

## Tiny Report

### BACKGROUND of SMDSX

The Integrated Mountain Initiative's Sustainable Mountain Development Summit (SMDS) X was organized in the Darjeeling - Kalimpong Himalaya from 18th-20th November 2021 in a hybrid mode. It was hosted by the Darjeeling Himalaya Initiative (DHI) and Integrated Mountain Initiative (IMI) with the theme "Towards One Health: Making our mountains resilient". SMDS X brought together a diverse group of stakeholders to deliberate on the summit theme. SMDS outcomes and recommendations are pursued for actionable outputs that include the Meet of the Mountain States with policy makers by Integrated Mountain Initiative (IMI).

IMI is a civil society-led forum working across the Indian Himalayan Region (IHR) with a vision of "Making India proud of our Mountains". Darjeeling Himalaya Initiative (DHI), was formed as the state chapter of IMI in 2013 representing Kalimpong and Darjeeling districts of West Bengal.

### CONTEXT, OBJECTIVES of SMDSX

#### **Towards One Health: Making our mountains resilient**

The COVID 19 pandemic made apparent the inter-linkages between biodiversity, ecosystem, and human health. It also showed that such outbreaks are not just a health risk, but regress human

civilization through its disruptions and rob people of basic dignity and wellbeing. The pandemic also highlighted the existing social inequities and further deepened this. Mountain communities are highly dependent on natural resources and services and are particularly vulnerable to climate change. The far-flung mountain populations are underserved with low access to health and social facilities, and thus more vulnerable to the impacts of pandemics.

With this backdrop, the concept of One Health, that binds together the health of humans, animals, and the environment has gained greater relevance particularly with the ongoing COVID19 pandemic. One Health is an integrated, inter and multidisciplinary approach that recognizes the interconnectedness of the components, interactions and relationships, both tangible and intangible, within landscapes for optimal health and environmental outcomes. One Health is a framework for addressing, promoting and implementing collaboration, with health as an important indicator of community resilience. One Health aims to improve the health of humans, animals, and the environment.

SMDSX sought to discuss and deliberate the framework of One Health contextualising it to the IHR. The SMDS X was taken forward under 4 broad thematic discussions that are outlined below along with the key outcomes of the discussions under each thematic.

# THEMES, OUTCOMES and RECOMMENDATIONS of SMDSX

## 3.1 One Health Response to Zoonosis

Zoonosis refers to an infectious disease that is shared between animals and humans that involves an interface between animals, both domestic and wild, humans and their shared environment.

The rapid transformation of the shared environment in the form of biodiversity and habitat loss and climate change hugely influence disease emergence. One Health recognizes this interconnectedness between people, animals, and their shared ecosystem to prescribe an effective way to address health issues at the human animal-environment interface.

IHR with fragility, marginality, rich biodiversity, is vulnerable to environmental changes and accompanying alterations and has been hit by the COVID19 pandemic and many other zoonoses.

Hence, it is important to understand the adequacies, infrastructural capacities and preparedness of the mountains to contain the vagaries of zoonoses, prevent and control them.





3.2 Biodiversity and Ecosystems for Human Health

Biodiversity underpins ecosystem functioning and the provision of goods and services that are essential to human health and well-being.

Biodiversity is a key environmental determinant of human health; the conservation and the sustainable use of biodiversity can benefit human health by maintaining ecosystem services and options for the future. COVID 19 pandemic has shown the vulnerabilities of public health across the world due to unsustainable biodiversity management and the IHR is highly vulnerable to it.

The IHR is exceedingly rich in biodiversity and generate a diverse set of ecosystem services for human wellbeing. But the IHR is also experiencing extreme anthropogenic pressures that threaten biodiversity and ecosystem services.

The ongoing loss of biodiversity and ecosystems have the potential of leading to emerging disease risks further increasing vulnerabilities.



3.3 Sustainable Food Systems

70% of IHR population is agrarian with a rich diversity of food cultures.that has provided nutritional security and livelihoods to mountain people.

However, mountain food cultures are fast eroding with the onslaught of the globalised food industry. This has impacted agrobiodiversity, traditional food knowledge, dietary diversity and nutritional security. Communities' food systems are changing to more commercial or cash crop farming too.

Agriculture in the mountains faces many challenges including access to markets and infrastructure, crop depredation by wildlife, out migration and changing youth aspirations. These are further exacerbated by climate change impacts.

Dietary shifts not only result in poor health with increasing consumption of nutrition deficient packaged food with excess sugar and salt, but also the problematic plastic packaging leading to a waste crisis in the mountains.

To build back better with COVID19, a food system approach in the IHR is essential for food and nutritional security of mountain people. Urgent steps are required for conserving the rich food cultural landscapes of the IHR for Himalayan resilience.





3.4 Governance that promotes One Health

The process of institutionalising and mainstreaming One Health is what will manifest as an extremely relevant lens to reality and in the everyday lives of people and communities.

While we do have clearly defined and strong institutional mechanisms, this in itself is a challenge to synergistic and multi-disciplinary approaches.

The Indian Himalayan Region has a rich institutional tradition of governance that play an important role in the development pathways of the communities.

These empowered local self-government institutions offer great opportunities for the actualisation of One Health at a local level. Convergence the "buzz" word makes it possible to go beyond sectoral silos which is the key to the One Health approach.



#### 4. THE 4TH INDIAN HIMALAYAN YOUTH SUMMIT

The youth representatives of the IHR were an integral part of the SMDSX discussions. A series of youth-led pre-summit events were organized across the IHR for contextual and deeper reflection on the subthemes before the SMDSX.

These outcomes of reflections and actions were integrated within the thematic discussions at the SMDSX. A special concluding session was facilitated to collate the voices of the youth that were integrated into the valedictory session. The special concluding session opened with discussion on youth and mental health.

#### Youth, Mental Health and SMDSX

As per United Nations (UN) population prospects, the youth population (15-29 years) globally stands at 1.8 billion out of which every fifth (20%) resides in India (366 million), reflecting the importance of youth in the country.

Nearly 10-30 per cent of young people suffer from health impacting behaviours and conditions that need urgent attention of policy makers and public health professionals.

WHO states that the mental health workforce in India is not upto the mark and there is a huge shortage of psychiatrists and psychologists. Life in the mountains is challenged with geography, access to social infrastructure, support and opportunities and further exacerbated by environmental stress and climate change impacts.

The COVID-19 lockdown has added a series of challenges and vulnerabilities to the existing situation in the IHR.

All these issues and challenges of the mountains have bearing on the mental health of the people of the mountains, but do not feature prominently in the development discourse of the mountains with extremely limited care and support services.







## 5. MOUNTAIN LEGISLATORS' MEET 2021

"Pathways for Plastic Waste Management in the Indian Himalayan Region". The Mountain Legislators' Meet brought together elected representatives of the IHR states to discuss One Health with a key focus around plastic pollution and its impacts, for policy recommendation on plastic waste specifically for the mountains.

### Plastic Waste Crisis in the IHR

Plastic pollution in the IHR is not just a threat to life in the IHR but the Himalayan rivers carry through plastics and further contaminate downstream landscape. The Indian Council of Agricultural Research's Central Inland Fisheries Research Institute study in 2019 showed as much as 100-400 microplastic particles per kg of river sediment present in the downstream and estuarine areas of Ganga. The findings of the CounterMEASURE Project of the UNEP showed that Haridwar has been generating around 11 tonnes of untreated plastic waste everyday which nearly doubles during festivals.

With rapidly changing production and consumption systems, urbanisation and fast growing tourism in the IHR, the problem of plastic pollution is becoming more grave.

Systemic changes in the long run and not just the end of the pipeline solutions are much required. Designing out plastic pollution and companies taking responsibility for their waste is the narrative shift essential to redress the waste crisis.

There is a need to contextualise waste management rules that are sensitive and acknowledge the specific issues and challenges of the mountains.

Appropriate resource allocation and support that is considerate of and reflective of the rich biodiversity, ecological sensitivity and fragility of the Indian Himalayan Region besides specific geographical challenges of mountain waste management is needed.



Declaration at the Mountain Legislators' Meet 2021

We, the representatives and former representatives of various elected bodies of the Himalayan States, Union Territories and districts of India, having heard, discussed and deliberated on several important issues of the Indian Himalayan Region, especially on the pathways for plastic waste management in the region, collectively do hereby:

- **Acknowledge** that there is an urgent need for bringing about stringent policies and legislation against Single Use Plastics due to the fragile Himalayan ecosystem and resolve to commit to the vision of a Zero Waste Himalaya.
- **Support** the Central government's call to eliminate Single Use Plastics and take measures for eradicating SUPs in the Indian Himalayan Region by urging our state governments, Union Territory administrations, district councils, traditional institutions and other civic bodies for sustained cooperation and collaboration in a serious fight against plastic pollution.
- **Advocate** for Extended Producer Responsibility (EPR) to be made feasible to the mountain states by addressing the specificities of mountain economy and bringing in commitment from the industry.
- **Facilitate** and support the contextualisation of all waste management rules to be sensitive and acknowledge the regional specific issues and challenges of mountain/hill states.
- **Engage** relevant stakeholders to take proactive steps to explore solutions for a sustainable tourism in the Indian Himalayan Region which is possible only with arrest of the existing waste crisis and reducing plastic pollution in the region.

Placed on record at the Mountain Legislators' Meet 2021 held in Darjeeling on 20th November 2021.

6. SMDS X: IN CONCLUSION

The urgency and importance of taking forward One Health in the Indian Himalayan Region with a rich diversity of peoples; biodiversity and ecological importance that provides life to the mountain people as well as downstream has to be acknowledged. This complex and rich socio-ecological systems of the IHR are made increasingly vulnerable by issues that are intersectional and transboundary. One Health offers a framework that is inter and multidisciplinary that is based on interdependence and inclusive of human, animal and planetary health which is critical for mountain resilience.

In taking the theme of SMDSX "Towards One Health: Making our mountains resilient" there are a few key actions required.

6.1 Enhance understanding of One Health in the Indian Himalayan Region

- Interfaces between human health and animals in IHR need to be studied.
- Joint ownership, responsibility and partnership approach critical for policy and action.
- For the IHR, transboundary perspectives (disease transmission) are important as most of the borders are transboundary, international and connected.

6.2 Strengthen Practices that promote One Health in the Indian Himalayan Region

- Collaboration beyond silos - Interdisciplinary approach although challenging is the only way to move forward.
- Restoration beyond reforestation of biodiversity and ecosystems in the mountains.
- Enhance disease surveillance at all levels
- Documentation and focus on grounded and contextual experiences.
- Promotion of traditional food systems that are nurturing for human health as well as the planet.

6.3 Mountain Sensitive Policies on One Health required

- Mountain One Health policy that fosters cooperation/collaboration (transboundary focus).
- Front of label packaging for food for promoting good health.
- Strengthened Policy on restricted use of antimicrobial drugs in agriculture.
- IHR single use plastic bans.
- Mountain sensitive waste management policies and extended producer responsibility.



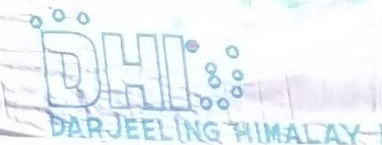
# Summit Proceedings

Photo: Roshan Rai

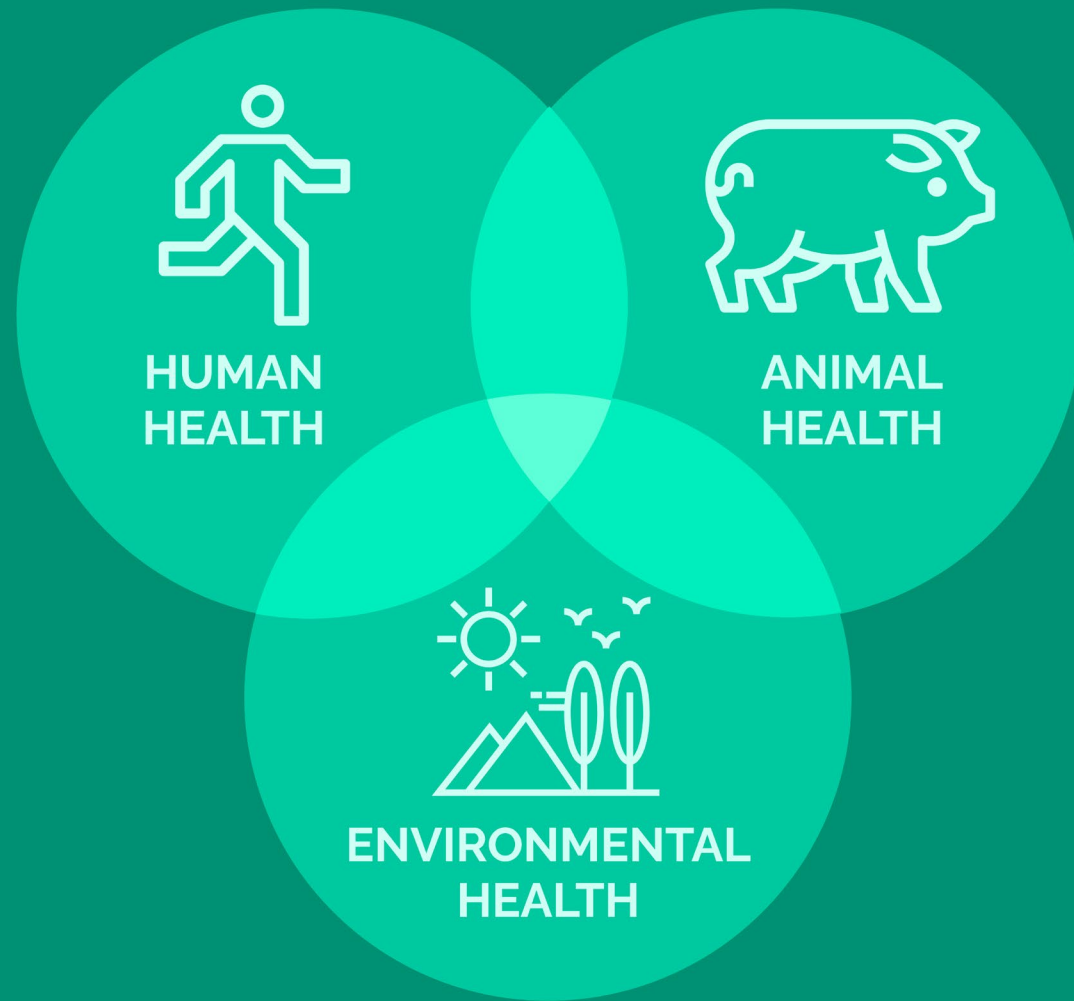
**Towards one Health:  
Making our mountains resilient**



**TENTH  
SUSTAINABLE  
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SUMMIT**  
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# Introduction to SMDSX



## 1.1 BACKGROUND

The Integrated Mountain Initiative's Sustainable Mountain Development Summit (SMDS) X was organized in the Darjeeling - Kalimpong Himalaya from 18th-20th November 2021 in a hybrid mode (online and in person) in line with the protocols for COVID 19 pandemic. It was hosted by the Darjeeling Himalaya Initiative (DHI) and Integrated Mountain Initiative (IMI). The theme of SMDSX was "Towards One Health: Making our mountains resilient". The summit brought together individuals, government agencies, academic and research institutions, policy think tanks, NGOs, entrepreneurs, elected representatives, bilateral agencies, donors and mountain enthusiasts from IHR and beyond to deliberate on different themes of the Summit.

Integrated Mountain Initiative (IMI) is a civil society-led forum working across the Indian Himalayan Region with a vision of "Making India proud of our Mountains". It brings mountain concerns to the centre stage in regional, national, and global agendas through sustained and informed dialogue among all stakeholders. IMI operates through an ecosystem of state and regional chapters who are aligned to IMI's Darjeeling Himalaya Initiative (DHI), was formed as the state chapter of IMI in 2013. It is a platform represented by various civil society organizations and individuals from Kalimpong and Darjeeling districts of West Bengal.

SMDS has been hosted in a different mountain state each year since 2011 when the first Summit was organised in Nainital, Uttarakhand. SMDS brings together a diverse group of stakeholders to discuss relevant themes warranting immediate attention of the mountains. Recommendations emerging from

these summits are pursued by IMI subsequently for actionable outputs that include the Meet of the Mountain States with key policy makers. The Mountain Legislators' Meet and the Indian Himalayan Youth Summit are two events which are integral components of SMDS.

## 1.2 CONTEXT, OBJECTIVES AND OUTCOMES

### Context

The wellbeing of mountain people is inextricably linked to biodiversity. Biodiversity is known to be the foundation of human health. With the COVID 19 pandemic, inter-linkages between biodiversity, ecosystem, and human health have become starkly apparent. COVID 19 showed that outbreaks and spread of diseases are not just a health risk, but regress human civilization by disrupting social life, economy, education, livelihoods, and rob people of basic dignity and wellbeing. The pandemic also highlighted the existing social inequities and further deepened this.

Mountain communities are particularly vulnerable to climate change, which impacts vulnerable populations dependent on natural resources and services like water, energy, food and associated livelihoods. The far-flung mountain populations are underserved with low access to health and social facilities, and thus more vulnerable to the impacts of pandemics brought about by loss of biodiversity and ecosystem services and aggravated by climate change.

With this backdrop, the concept of One Health, that binds together the health of humans, animals, and the environment has gained greater relevance particularly

with the ongoing COVID19 pandemic. One Health is an integrated and multidisciplinary approach to recognize the interconnectedness of the components, interactions and relationships, both tangible and intangible, within landscapes for optimal health and environmental outcomes.

### The key objectives for SMDS X were:

- To advocate for resilient and sustainable policies and programmes in the IHR in averting future impacts of climate change, disasters and pandemics
- To share knowledge and inform policy and decision makers about the interconnectedness of the selected themes and the importance of One Health approaches in all aspects of development in the IHR

### Some of the outcomes and outputs that the summit set out to achieve are listed as follows:

- White/Strategy Papers developed targeted at policy makers, practitioners, donor agencies and key stakeholders engaged in the IHR
- Policy recommendations/inputs for policy makers in the IHR to include One Health approach in key development sectors
- Plan of actions identified and chalked out for the post summit phase based on the deliberations of the pre-summit and the summit outputs
- Pilot actions projects identified for implementation in collaboration with IMI chapters. Key knowledge gaps identified and studies commissioned or designed with key funding partners across the IHR

## 1.3 SMDS X THEMES

### One Health Response to Zoonosis

Zoonosis indicates an infectious disease that is shared between animals and humans. Zoonosis involve an interface between animals both domestic and wild, humans and their shared environment. The rapid transformation of the shared environment in the form of biodiversity and habitat loss, land-use change, exploitation of natural resources, unsustainable development, human behaviour and climate change hugely influence disease emergence.

One Health recognizes this interconnectedness between people, animals, and their shared ecosystem to prescribe an effective way to address health issues at the human animal-environment interface, through interdisciplinary and inter-sectoral collaborative approach. IHR with its specificities such as inaccessibility, fragility, marginality and rich biodiversity, is highly vulnerable to environmental changes and accompanying alterations.

The IHR was not spared by the COVID 19 pandemic, nor by many other zoonosis. Hence, it has become immensely important to understand the adequacies, infrastructural capacities and preparedness of the mountains to contain the vagaries of zoonosis, prevent and control them with a 'One Health' approach.

### Biodiversity and Ecosystems for human health

Biodiversity underpins ecosystem functioning and the provision of goods and services that are essential to human health and well-being. Ecosystems, including

the food production systems are dependent on biodiversity elements which are part of the food chain, ecosystem services and function. Ecosystem services include food, clean air, fibre, fodder, fuel, and both the quantity and quality of fresh water, medicines, spiritual and cultural values, climate regulation, pest and disease regulation, and disaster risk reduction.

The COVID 19 pandemic has shown the vulnerabilities of public health across the world due to unsustainable biodiversity management. According to the IPBES report at least five new diseases are emerging every year and any one of these can spread and become a pandemic like COVID 19. Large scale and intense exploitation of the environment leading to loss of biodiversity and degradation ecosystems are driven by land-use change, land degradation, agricultural expansion and intensification, urbanisation, wildlife trade and consumption. In addition, the IHR is a multi-hazard landscape with a history of catastrophic disasters with grave impacts on lives, livelihoods and assets. Development and defence infrastructure investments and land cover change and degradation play key roles in accentuating disasters that are further exacerbated by the climate.

The IHR is one of the vulnerable areas for climate change impact. In the IHR the ongoing loss of biodiversity and ecosystems due to landscape transformations have the potential of leading to emerging disease risks. The mountain communities in IHR are already challenged by various issues mentioned above resulting in loss of economic and livelihood opportunities and health impacts due to loss of biodiversity and ecosystem degradation, further increasing the vulnerabilities.

Sustainable Food Systems

IHR covers 17% of the total geographic area of India and supports 4% of the country's population. Of this about 70% of IHR population is rural and thus agrarian. The IHR has a rich diversity of food cultures from cultivated, foraged and pastoral agroecology which include culinary processes, preparation and preservation.

This diversity has provided nutritional security and livelihoods to mountain people. However, this has changed over the years to more commercial or cash crop farming to enhance the livelihoods of mountain communities. Agriculture in the mountains faces many challenges due to topography, top soil erosion, monsoon dependence, small land holding access to markets, lack of infrastructure (storage, transport), lack of mountain friendly mechanization tools, crop depredation by wildlife and larger issues of out migration, economic changes and youth aspirations. These are all exacerbated by the impacts of climate change leading to hydrometeorological incidents, long dry spells in winter, and natural disasters. The COVID 19 lockdown has added a series of challenges and vulnerabilities to the existing situation in the IHR. A food system approach in the IHR is essential to approach these issues because poverty, isolation, remoteness, limited access to markets, services, environment degradation, climate change impacts and more recently COVID 19 pandemic make food and nutritional security of mountain people of paramount importance. To ensure mountain people are in the forefront of building back better, it is imperative to have a sustainable food systems approach in the mountains. Further, delving into the importance of food security, safety and sovereignty is needed to identify the urgent steps for conserving the rich food cultural landscapes of the IHR for Himalayan resilience.

1.4. OTHER EVENTS

The 4th Indian Himalayan Youth Summit

The youth representatives of the IHR were an integral part of the SMDSX discussions. A series of youth-led pre-summit events were organized across the IHR for contextual and deeper reflection on the subthemes before the SMDSX. These outcomes of reflections and actions were integrated within the thematic discussions at the SMDSX. A special concluding session was facilitated to collate the voices of the youth that were integrated into the concluding valedictory.

Youth, Mental Health and SMDSX

As per United Nations (UN) population prospects, the youth population (15-29 years) globally stands at 1.8 billion. Out of the total youth in the world, every fifth resides (20%) in India (366 million), reflecting the importance of youth in the country. The youth are faced with many challenges, and one of the most serious issues is the growing number of youth who are not in employment, education and training (NEET). Nearly 10-30 per cent of young people suffer from health impacting behaviours and conditions that need urgent attention of policy makers and public health professionals. At least 20% of young people are likely to experience some form of mental illness - such as depression, mood disturbances, substance abuse, suicidal behaviours, eating disorders and others. There are a number of barriers to taking care of the mental health needs of the youth including lack of services, lack of awareness, myths, misconceptions and stigma and low priority to mental health. WHO states that the mental health workforce in India is not upto the

mark and there is a huge shortage of psychiatrists and psychologists in the country as compared to the number of people suffering from mental health issues. WHO also estimates that about 7.5% Indians suffer from some mental disorder and predicts that by the end of this year (2019), roughly 20% of India will suffer from mental illnesses. The Himalaya is celebrated for the beautiful mountains and landscapes, its cultural diversity, lush forests, expansive riverine systems and rich biodiversity. But this also masks the hard life in the mountains. Life in the mountains is challenged with geography and access to social infrastructure and support. Opportunities are limited in the mountains and return on investment for agriculture and services is not equitable and commensurate with the efforts. This results in large-scale out-migration of young people from the IHR. This brings challenges to not only the ones who migrate but also to the families who stay back. The challenges and lives of the mountains do not always figure in the Indian Policies. In most instances the policies are plains centric, adding further disadvantages to the mountains. These are all exacerbated by the impacts of climate change that affect life and livelihoods. The COVID19 lockdown has added a series of challenges and vulnerabilities to the existing situation in the IHR. All these issues and challenges of the mountains have bearing on the mental health of the people of the mountains. But, it does not feature prominently in the development discourse of the mountains.

In most instances, care and support for mental health whether it be clinical or community based is extremely limited in the mountains. There is still stigma related to mental health within communities and institutions and there is no everyday language that encompasses mental health issues in the mountains.



### Mountain Legislators' Meet 2021

A highlight of the Sustainable Mountain Summits was the Mountain Legislators' Meet that brought together elected representatives of the IHR states to discuss relevant issues. This SMDSX brought together legislators from the IHR states to discuss One Health with a key focus around plastic pollution and its impacts thereof to lead to a policy recommendation on plastic waste specifically for the mountains. The Mountain Legislators' Meet was titled "Pathways for Plastic Waste Management in the Indian Himalayan Region".

### The Indian Himalayan Photography Contest 2021

Food is central to our existence. It embodies our history, culture, values, lifestyle and beliefs. The food cultures of the IHR have evolved as a result of traditions, traditional knowledge, ethnicity, climatic conditions, access and availability of food crops, religion, food taboos and socio-economics of each region. There is an immense diversity of food cultures in the IHR that include productions and foraging systems, cuisines, preservation traditions, cooking practices and recipes. Food in the IHR is changing due to changing agriculture patterns, impacts of markets, policies and consumption patterns. The photography contest aimed to capture this diversity of food systems, the transitions that are taking place and ongoing efforts to transform/revive mountain food cultures that are nature friendly, diverse, regenerative and nutritious.

## Theme: Food cultures of the Indian Himalayan Region

Prizes :

1st Prize: **Rs 25,000/-**

2nd Prize: **Rs.15,000/-**

3rd Prize: **Rs.10,000/-**

Deadline for entries:

**15th October 2021.**

The winners of the contest will be announced during the **SMDSX-18th-20th November 2021.**

Submissions must be sent to: [progcoordinator@inmi.in](mailto:progcoordinator@inmi.in) by **15th October 2021.**

For details: [www.mountaininitiative.in](http://www.mountaininitiative.in)

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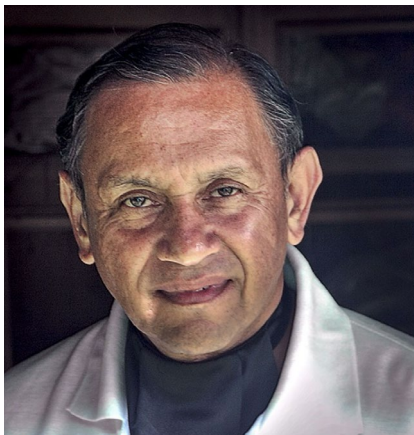


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# Inaugural Session





## 2.1 WELCOME ADDRESS

**Mr. Praful Rao,  
President,  
Darjeeling Himalaya Initiative  
Save The Hills**

The formal welcome was given by Wing Commander Praful Rao, who welcomed all participants joining in person and online. Mr. Rao mentioned that it was a privilege for the Darjeeling Himalaya Initiative to be hosting the 10th edition of SMDS.

He also highlighted that hosting the SMDSX in Darjeeling - Kalimpong was not without its challenges, as unlike other states that had support of state machinery for organising the summits in the past, Darjeeling Himalaya Initiative being at the district level had limited support to organise a meet of such magnitude.

The theme of One Health, though highly relevant, occupied a space that was largely conceptual, and Mr. Rao expressed that the sessions had been carefully crafted so as to make it pertinent to the general audience as well as experts in the field.



## 2.2 ADDRESS BY SESSION CHAIR

**Mr. PD Rai,  
President,  
Integrated Mountain Initiative(IMI)  
& Former MP (Lok Sabha), Sikkim**

***“The young voices matter as they will inherit the planet with all its triumphs and tribulations, so we in our time must not let them down”***

Welcoming all participants, President, IMI, Mr PD Rai highlighted the significance of the SMDSX coming right after COP 26, which had brought more clarity to India's commitments to move towards a greener pathway. SMDSX would have undertones of climate action embedded right through the discussions, Mr. Rai mentioned, stressing that the magnitude of change in the mountains would be much higher than the rest of the world. He made a mention of IMI's vision, and its values that were inclusive, which was the main reason why participants from all walks of life were connecting for the mountain summits every year, as it provided a platform for Governments, academia, civil societies, youth and communities to provide inputs into policy building exercises. Here he also highlighted the importance of youth integration and participation.

In conclusion, he referred to the theme of One Health as being highly pertinent as the world recovered from the pandemic. Governance that looked at planetary health and biodiversity health would reap rich benefits of building good human health. Lastly, he mentioned that having the SMDS in the Darjeeling region, which was unthinkable some years back, showed how IMI as an organisation was growing and provided an answer to what the role of IMI was. Mr PD Rai thanked all the partners and supporters of SMDSX at the end of his speech.



### 2.3 ADDRESS BY SPECIAL GUEST

**Mr. Amar Singh Rai,**  
**Vice Chairperson Siliguri**  
**Jalpaiguri Development**  
**Authority; Ex MLA, Darjeeling,**  
**West Bengal; Ex Chairperson**  
**Darjeeling Municipality**

Mr. AS Rai congratulated IMI and DHI for bringing the SMDSX to the Darjeeling region. He expressed his gratitude to IMI for being the torch bearer for carrying forth the issues from the mountains to the national platform.

Speaking on the theme, he mentioned that there was a need to bring clarity and deeper understanding on the issue of One Health, and the summit would provide the direction that was needed.

He hoped that the proceedings from the summit would lead to the formulation of relevant policies through the cooperation and collaboration of all stakeholders.



### 2.4 SPECIAL ADDRESS

**Mrs. B.V. Umadevi,**  
**IFS, Addl Secy,**  
**Ministry of Environment, Forest**  
**and Climate Change (MoEFCC)**

Mrs. Umadevi began her address by highlighting the relevance of the theme of One Health as people were recovering from the impacts of COVID 19. It had been a reminder that humans are not above nature but a part of nature, and the need to balance conservation with development, she mentioned. She referred to studies that revealed zoonotic diseases spread most from biodiverse landscapes that had high anthropogenic interferences.

A holistic plan that was grounded on the concept of One Health integrating the health of animals, environment and human health through multi- sectoral partnerships was the need of the hour.

She provided insights on the Government of India's plans to initiate One Health Programmes, which was still at a nascent stage in the country, and mentioned an Inter-ministerial and lack of legal framework was highlighted as one of the key challenges. At the same time she highlighted that 14 states had already formed State Level Zoonotic Disease Management Committees under the National Center for Disease Control.

In the end she highlighted India's commitments to transition to renewable energy sources and achieving net zero, which would require clear cut plans, and some developed specifically for the mountain states.





## 2.5 KEYNOTE ADDRESS

**Dr. Soumya Swaminathan**  
**Chief Scientist, World Health**  
**Organisation (WHO), Geneva**

***“No country, no matter how rich, was prepared for the pandemic. Investments in primary health care, rapid surveillance systems that are transparent are important for preventing future outbreaks”***

Dr. Soumya Swaminathan began her address by expressing her love for the mountains and mentioning that mountains, and the harmonious way of life in the mountains were threatened by the larger changes that were happening such as globalisation and urbanisation. Referring to COP 26, she stated that it had brought home the point of oneness, and that it was one humanity and one species living on a fragile planet that had been exploited beyond recovery. She mentioned that global warming and climate change affects us all and each one of us has to contribute in dealing with the repercussions. Mountain communities had lived in harmony with nature and were well aware of the dangers that disruptions in nature would bring, Dr. Swaminathan said. Speaking on the linkages between the climate crisis and health, Dr. Swaminathan mentioned that there was more recognition and acknowledgement of health impacts caused due to climate change or pollution, with courts recognising deaths caused due to climate change.

Dr. Swaminathan's address focused on drawing parallels between COVID and the climate crisis, in which she stated that both have affected human beings across the Earth, and there were lessons to be learnt on how to tackle it. Just as the virus impacts every part of the body, she stated that climate change also affects all the organs/cells of a human body, from lungs, to heart, to endocrine systems and cognitive development. She then highlighted that the fight against the pandemic showed that the toughest challenges can be overcome, and some countries pulled all their resources, and through cooperation managed to defeat the crisis early on.

She further elucidated how the use of science and scientific tools such as vaccines that were developed to control the pandemic were used by everyone to beat the virus. However, inequitable distribution of vaccines and not sharing of scientific technologies led to a rise in the number of cases and deaths in certain nations. Similarly, the climate crisis also needed to be tackled through scientific knowledge that already existed, be it for renewable energy or other greener technologies that needed to have mechanisms for equitable sharing and distribution along with financial availability. This is where global leadership was required, as well as leadership at national and local levels.

Coming to One Health, she mentioned that there would be greater mixing of animals and humans that would drive the emergence of zoonotic disease spread in the future, so tracking the origin of zoonotic diseases was important to be able to take preventive action for which awareness at the local level in the communities is very essential. Dr. Swaminathan mentioned that the One Health approach has to be multidisciplinary, particularly stressing on the participatory nature of decision making to engage communities for transparent communication. She made a reference to the Sustainable Development Goals (SDGs) stating that it speaks about One Health as it visualizes healthy individuals on a perpetually habitable planet.

On the importance of data, she mentioned that the pandemic showed that real time data gathering was possible, and moving forward these mechanisms needed to be strengthened for surveillance of

zoonotic diseases, and have communities act on it. For this, capacities of communities needed to be developed for better understanding which could be done through existing programmes of the Government, which at the moment only focused on infrastructure. She stressed that the power of young people needed to be harnessed and mentored for taking this forward in developing interdisciplinary programmes.

She highlighted the need for interdisciplinary approaches citing the example of behavioral scientists and social scientists even in the medical field, and how biomedical science would not be able to solve certain issues on their own without the intervention of social or behavioral scientists. For instance, high consumption of processed food was resulting in the spread of non-communicable diseases, and for solutions, strong behavioral insights would be needed to make people move away from such unhealthy food.

In conclusion, she reflected on the lessons learnt during COVID-19 pandemic and what changes needed to come about, the first one being that no country, no matter how rich, was prepared for the pandemic. More investment in primary health care, rapid surveillance systems with knowledge of how to use these data, transparency and pre-negotiated platforms for bringing equity, multi-dimensional approach and solidarity is required. She mentioned.



## 2.6 ADDRESS BY CHIEF GUEST

**Dr. Pema Gyamtso,**  
**Director General, ICIMOD,**  
**Kathmandu Nepal**

Dr. Pema Gyamtso congratulated the organisers for organising the SMDSX with the theme of One Health and making mountains resilient. He started by narrating how the environment has gone through irreversible changes due to overexploitation and human activities.

Mentioning the significance of the Hindu Kush Himalaya, Dr. Gyamtso mentioned that biodiversity loss and habitat degradation would impact a large population of people not only in the mountains but also downstream. COVID19 pandemic is a reminder that we need healthy ecosystems.

Climate change is an added complexity to mountain landscapes that were also already experiencing impacts of pollution, infrastructure development, over exploitation of natural resources and so on, which would impact both environment and people.

He mentioned some of the work of ICIMOD during the COVID19 pandemic to design policy papers to counter future pandemics. ICIMOD had also been campaigning for greater attention and investments for the mountains at global platforms, he stated, and that there were many synergies with IMI and SMDS that could be strengthened.



## 2.7 VOTE OF THANKS

**Ms. Priyadarshinee Shrestha**  
**Secretary, Integrated Mountain**  
**Initiative (IMI)**  
**WWF-India**

Ms. Priyadarshinee Shrestha expressed her gratitude on behalf of IMI and DHI to all participants. She mentioned that for DHI

it was a moment of great pride to be hosting the SMDSX in the Darjeeling Himalaya, something the platform had been planning for a while.

Referring to Dr. Swaminathan's point on youth engagement, she thanked the youth group of DHI, who had been working behind the scenes for SMDSX.





03

# Setting the Context





### 3.1 ADDRESS BY THE CHAIR

**Dr. VB Mathur**  
Chairperson, National  
Biodiversity Authority

Dr. VB Mathur opened his address by stating the importance of planning and preparedness for preventative strategies as the pandemics will keep on happening. He mentioned that the issue had demonstrated the interconnectedness of the global community and that the pandemic affected everyone irrespective of economic status.

Delving into some for future focus areas he presented the following points -

- Scientific evidence of the pandemic- where and how did it emerge and spread?
- Drivers of the pandemic- factors that exacerbate or help in containing the spread under different conditions
- Policy and management actions that need to be taken to prepare for future

In conclusion, he reiterated the urgency of planning, adopting and implementing solutions that bring transformational changes.



### 3.2 ADDRESS BY THE PANEL One Health from the lens of Biodiversity and Environment Conservation

**Mr. Ravi Singh**  
CEO and Secretary General,  
WWF- India

Climate change has been impacting the ecosystem and humans. The effects of climate change are seen more in the Himalaya among the communities. The natural links of biodiversity are disrupted beyond capacity. Going beyond carrying capacity with extremely large ecological footprints and Earth Overshoot Day are the problems we are facing today.

Biodiversity and veterinary science come together to form One Health. Himalayan pastures are used by livestock and repercussions of wildlife and illegal trade are aspects of biodiversity disruption. In addition, invasive grasses, food requirements for wildlife are changing, leading to human and wildlife interaction and conflict. Risk of disease transmission between the animals is real and high in the Himalaya. Disease transmission from free ranging dogs to wild carnivores- Canine Distemper Virus (CDV) is an area that needs to be looked at immediately. Encountering zoonotic diseases in future can be easy if we are well prepared with tools and technologies.

To help the health of systems we need a better ecosystem. Good biodiversity and a healthy ecosystem will lead to a better food system and downstream accordingly. Each one of us has examples and solutions and we could move forward from it with actionable solutions. Adapting One Health system using traditional knowledge and adapting sustainable techniques is important. In summation, One Health perspective can be attained if multiple stakeholders work in tandem.





## One Health from the lens of Food Systems

**Dr. Vandana Shiva**  
**Founder, Navdanya,**  
**Uttarakhand**

Dr. Shiva started her address by pointing out that the lens of food is the lens of biodiversity and we are connected to the earth through biodiversity, but when biodiversity is destroyed we can be connected also through disease. Referring to the Green Revolution and the Bhopal Gas Tragedy, Dr. Shiva mentioned that we need to look at solutions that work for the earth, for everything we do to harm the earth we end up hurting ourselves. This interconnectedness is One Health, she mentioned, strongly drawing the link that diseases spread when forests are destroyed. Citing examples of the spread of globalised agri corporations in the Amazon and British Columbia that invade habitats of species will result in more pandemics in the future if we do not stop this invasion into forests.

"COVID19 is an anthropogenic disease similar to the climate crisis which is also anthropogenic."

Changing food consumption patterns that have changed drastically for the worse was the other part of Dr. Shiva's address, in which she pointed out the impacts this was having at various scales. At a global level, the industrial food production system accounts for 14% of greenhouse emission, while at the level of the individual, processed food was recognised to be the cause of chronic diseases such as diabetes. These comorbidities amplified the risk of death from infections such as COVID19. Talking about the importance of biodiversity as the fabric that weaves One Health together, Dr Shiva mentioned how these occur at various scales. The nourishment that soil biodiversity provides, which works to protect the biodiversity, is within us in the form of gut microbes. She cited the example of the Navdanya farm, which was

established to conserve seed diversity, and how it was in the same continuum as conserving biodiversity. She lamented that the food diversity has reduced from 10000 species that were eaten to 4 or 5 major species that are being mass produced and processed.

In the last part of her address, Dr. Shiva reiterated that destruction of soil health is the destruction of our health, mentioning research findings that show how food is losing its nutritional quality due to the erosion of biological functions of the soil brought about by chemical farming.

Sick soil produces nutritionally empty food or food that are low in micronutrients such as phosphorus, potassium, magnesium, calcium, iron, copper, etc. she mentioned, and the sicker the soil gets, there is expansionism to occupy more land. Dr Shiva provided examples of farms that were using chemical fertilisers versus organic manure and how invariably nutrients were higher in farms using organic manure.

In conclusion, Dr Shiva stated that the planet had its own capacity to regulate itself and that it is a living planet. One Health is about realising that and that we are on a biodiversity rich planet, and One Health is about protecting that biodiversity through the food we eat.

*"COVID19 is an anthropogenic disease similar to the climate crisis which is also anthropogenic."*



One Health - Veterinary Science and Practice in India

Dr. Sandeep Chaudhuri  
Asst Prof Veterinary College  
Nagpur, One Health Mission,  
Maharashtra

Dr. Chaudhari gave an overview of zoonotic diseases that were prevalent in the country.

He mentioned the protocols adopted by the Indian Council of Medical Research (ICMR) and also shared the details of the One Health GOI plan that includes a specialised university in Nagpur.

# Q&A

How do we expedite research and convert research into policy and policy into action?

One in One Health has two meanings. One meaning is about interconnectedness which is based around biodiversity. The other meaning of One Health is 'One agriculture' for the whole world that has cooperation between species, which needs to happen with involvement of communities. The organic Himalaya initiative is already initiated in Bhutan, and this needs to be taken forward wherever there are willing Governments or willing organisations.

What is the relationship of gut bacteria to human health and mental well being?

Research on gut bacteria has exploded in the past few years and it has been found that what is fed to the gut microbes is what decides the health of the individual. Gut biome is now called the second brain. To take care of the gut, we have to take care of the soil which provides us with the required nourishment.

How is the veterinary sector positioned in the discussion of One Health in relation to soil health, biodiversity and human well being?

Epidemiology has not been well studied and is an area where deeper research is required. New vectors are being discovered and there is a need to understand this more in terms of control of the pathogens that they carry. This is a big contribution that the Veterinary Sector can make to the One Health discussion.





04

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# One Health Response to Zoonoses

**Session Leads:** Mr. STS Lepcha, Dr. Sunita Pradhan, Ms. Shreya Gurung



## 4.1 INTRODUCTION

The COVID-19 pandemic has forced governments to think about Zoonosis in a proactive way and rethink public health governance mechanisms to accommodate themselves within the One Health approach. The IHR, with its multifaceted geographical and socio-cultural features, especially warrants a special focus on Zoonosis which has so far remained low on priority in the region. The discussions in this session were focussed on prevalence and extent of zoonoses in IHR, required preparedness and challenges, in infrastructure, capacity building, policies, and awareness in the IHR for combating zoonoses through one health implementation in IHR and the knowledge gaps on zoonoses outbreaks in IHR to prioritise action and required resources to fill these existing gaps.

## 4.2 PRESENTERS IN THE SESSION

- Objectives of the session and introduction to the session speakers:  
**Shri STS Lepcha (IFS) and Dr. Sunita Pradhan**
- Zoonotic diseases in the IHR: prevalence, trends & emerging public health threats  
**Dr. R. C. Dhiman (ICMR, Govt. of India)**
- Eco-epidemiology in Risk assessment: consideration & challenges  
**Dr. Lallianpuii Kawlani (Wildlife Institute of India)**
- One Health and Zoonoses in the Indian Himalaya Region: Lessons from Sikkim  
**Dr. Thinley Bhutia SARAH, Government of Sikkim**
- UNDP's perspective on One Health Approach and zoonosis in IHR  
**Mr. Rajarshi Chakraborty (State Project Officer, GoI-UNDP-GEF SECURE Himalaya project)**
- Media representation and narrative of Zoonosis  
**Ms. Shreya Gurung (Save the Hills) and Mr. Palden Sherpa (Research Scholar): Youth Representative DHI.**



Photo: WWF-India





### Zoonotic diseases in the IHR: prevalence, trends & emerging public health threats

**Dr. R. C. Dhiman**  
Indian Council of Medical Research (ICMR), Govt. of India

Dr. Dhiman started by mentioning that zoonotic diseases have been rising globally, and India with its high dependency on agriculture and animal husbandry was particularly vulnerable. There were national programmes to monitor common diseases, however there was limited focus on new and emerging diseases. He highlighted that mountain ecosystems provided the environment needed for emergence of these diseases, and mountain communities who have close association with forests due to their dependence for food, fodder and fuelwood have high risks of transmission of diseases like Scrub typhus (ST) and Cutaneous leishmaniasis (CL). However he mentioned that there was no surveillance, and prevalence and trends for these diseases were not known. Preliminary studies, however, have shown that mountain regions are the hotbeds for these diseases, with Mizoram having the highest number of cases, Dr. Dhiman presented.

Speaking about Cutaneous leishmaniasis, Dr. Dhiman presented that rodents play a primary role in the spread of disease and in Jammu due to increased surveillance the number of cases had gone up than previously recorded, and it had been recorded also at high altitudes. In fact, mountain states like Himachal Pradesh, Uttarakhand and UT of Jammu & Kashmir have witnessed the rise of both scrub typhus and leishmaniasis diseases recently.

He further elaborated the reasons for the resurgence of zoonotic diseases as deforestation, conversion of land into urban sprawl, animal farming, lack of surveillance and general awareness of diseases and protective measures to be taken at community level. In conclusion, some of the recommendations presented by Dr. Dhiman were - enhancing active surveillance, collaboration and cooperation between stakeholders, understanding ecology and climate determinants of the affected areas and investing in health education of local community members on disease prevention.



### Eco-epidemiology in Risk assessment: Consideration & Challenges

**Dr. Lallianpuii Kawlani**  
Wildlife Institute of India

Dr. Kawlani started her presentation by sharing that India ranked high when it came to the environmental burden of zoonotic diseases, and high movement of people, overcrowding, high overlap of spaces between humans and wildlife, limited health infrastructure, etc were presented as some of the factors that led to this.

Presenting the case study of North East, Dr. Kawlani mentioned that there was an annual outbreak of diseases in the region like African swine flu, foot and mouth disease, PPR, CSF, PRRS, goat pox, etc. She mentioned that there is a need to also focus on diseases that are not just threatening human health, highlighting the example of mass mortality of 116 serows in Mizoram and Arunachal Pradesh from goat pox and how disease spread from domestic to wild animals. In her presentation, she also mentioned the rise in antimicrobial resistance which is a major global concern and needed to be acknowledged.

Moving on to speak on the challenges of zoonotic diseases, Dr. Kawlani elaborated that the remoteness of the mountain regions was a major hindrance to early information, and lack of infrastructure to diagnose diseases. She mentioned that currently there are no programs in place for monitoring such diseases, and there was an urgent need to build capacities and long term surveillance programmes at field level, for which collaborative work is required. Citing a study finding that revealed higher preference of wild meat (for instance ungulates) over domestic meat, Dr. Kawlani reflected that this could lead to more interfaces with wildlife increasing the risk of disease spread.

She also added that jhum cultivation, change in landuse, increasing human wildlife conflict, and transboundary movement of animals are also some of the challenges.



### One Health and Zoonoses in the Indian Himalaya Region: Lessons from Sikkim

**Dr. Thinley Bhutia,  
Sikkim Anti Rabies and  
Animal Health (SARAH),  
Government of Sikkim**

Dr. Thinley started by providing a background on the Sikkim Anti Rabies and Animal Health Programme of the Animal Husbandry and that it was developed to control the widespread rabies disease, and was the only state in India with such a programme. He highlighted how prior to the initiation of the SARAH programme, there were annual deaths caused by rabies in the state, no system of reporting any zoonotic diseases existed, loss of livestock from dog bites, and rampant mass shooting of dogs had to be resorted to in case of an outbreak.

Highlighting the changes brought by the SARAH programme, Dr. Thinley mentioned that there was marked reduction in human and animal rabies and other incidental zoonotic diseases which led to huge economic savings, while promoting a compassionate and humane way of treating animals.

Dr. Thinley highlighted the key challenges for the spread of rabies, being the permeable border with other states and countries and habitat disruptions due to development projects leading to a surge in the number of cases. He cited the example of cases in South Sikkim and Pakyong which could have emerged from cross border and disruptions in habitat of jackals due to construction activities. In conclusion, Dr. Thinley highlighted that an overarching collaborative approach is lacking to have a holistic intervention on zoonotic diseases, mentioning that SARAH had initiated collaborative work with other departments. Active surveillance is the need of the hour, especially in areas that share borders with other states and countries, and transboundary cooperation would be a must, along with strong legislation.



### UNDP's perspective on One Health Approach and zoonosis in IHR

**Mr. Rajarshi Chakraborty  
State Project Officer,  
GoI-UNDP-GEF SECURE  
Himalaya project**

Mr. Chakraborty gave an overview of UNDP's One Health programme that looked at a green recovery pathway approach, building upon the ongoing project of SECURE Himalaya in the snow leopard Himalayan states, for which they had partnered with National Biodiversity Authority of India. The programme looked at the goal of - Mainstreaming the One Health approach through relevant sectors and policies, through capacity enhancement of stakeholders and demonstrating best practices on prevention of zoonotic diseases. He highlighted that the One Health programme focused on capacity building of frontline staff and community for better disease management, awareness raising at community level on zoonotic diseases surveillance and legal matters, and developing early warning systems through digital platforms.

Mr. Chakraborty further mentioned that the One Health programme would identify priority diseases and work on understanding the gaps in capacities of frontline workers to equip them further through customised training programmes on disease prevention measures. At the policy level, an interdisciplinary committee that is dedicated to One Health implementation is being formed at district level, and a policy on One Health would also be drafted to facilitate sharing of information. On the ground the programme is already working to strengthen Primary Health Centers in their areas of operation, he mentioned.

As a way forward, building convergence and synergies with key departments and strengthening interdisciplinary committees were highlighted as important by Mr. Chakraborty, along with mobilisation of resources and building capacities of communities.



### Media in strengthening surveillance



**Ms. Shreya Gurung,**  
**Darjeeling Himalaya Initiative,**  
**Save the Hills, Kalimpong**



**Mr. Palden Sherpa**  
**Research Scholar**  
**Presidency University**

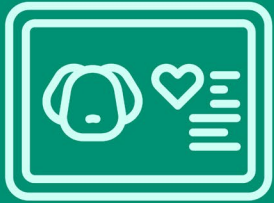
Ms. Gurung presented on the activity that the Youth Group of Darjeeling Himalayan Initiative had led as part of SMDSX along with the youth from other states. As part of their activity, the group working on Zoonotic Diseases made a scan of digital media spaces using key words to understand the coverage of zoonotic disease in the IHR with the following questions - What is the extent of reporting on zoonotic diseases by the media in the IHR? How has it been reported? Can digital media become an active contributor to disease surveillance and be streamlined in this public health function? The findings from the survey were presented as part of the session.

- All states and UTs in IHR except Ladakh reported zoonotic diseases.
- Scrub typhus was prevalent in all states except Ladakh region.
- The findings were used to create a database of zoonotic diseases for the IHR.
- The role of media was found to be very important as it provides early information on any disease outbreak. Media also provides socio- economic information which may be missing in other reports. Only few major, more prevalent diseases and more prominent cases are reported in mainstream media. However people's access to social media is more common and easier. Factoring social media in ground reporting is crucial, as they are raw. This information can be used to cover more ground report
- Health awareness through the media can be very important. There is a problem with reporting of the diseases. Transboundary movements that cause zoonotic diseases were limited in the media. In meat eating communities, there's a need to build awareness about zoonotic transmissions. Risks regarding Bushmeat is one instance. Regulation needs to be in place in transboundary movements, and no banning is required if healthy meat is promoted for consumption.
- Comprehensive approach needs to be put in place for enabling the communities to understand the issue and address it themselves accordingly

### 4.4 KEY RECOMMENDATIONS FOR ACTION AND WAY FORWARD



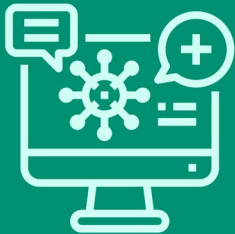
One Health approach is the key to moving forward. This approach calls for interdisciplinary collaboration. Building convergence and synergy with key agencies and departments for implementation of the overall approach



Conservation of wild relatives of domestic animals through sensitization should be a priority. They must be monitored regularly for diseases. Mobilization of resources through convergence to ensure sustainability



A robust system for active surveillance and monitoring of zoonotic diseases must be put in place. Collaborative and interdisciplinary work should be prioritized for monitoring. At the same time, mapping of affected areas and phenology is important. Long term surveillance and monitoring is crucial by strengthening local infrastructure for diagnosis by collaborating at interdepartmental levels such as the Forest Department, Veterinary Medical Biologist and community for detection of these diseases. This calls for more inter and intra-agency cooperation and institutional mechanisms.



Communication and awareness are the key to reporting and monitoring. Health education for rural communities, identifying stakeholders and working closely with them is important. Strengthening of local communication and frontline staff for enhanced management of zoonotic diseases is necessary. Golden rule is to follow the 3C: Communicate, Collaborate and Coordinate- in practice with relevant stakeholders. Awareness on Anti-bodies needs to be a top priority.



05

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# Biodiversity and Ecosystems for Human Health

**Session Leads:** Dr. Sarala Khaling, Dr. GS Rawat, Mr. Deependra Sunar, Ms. Shalini Thapa



## 5.1 INTRODUCTION

Biodiversity is a key environmental determinant of human health; the conservation and the sustainable use of biodiversity can benefit human health by maintaining ecosystem services and options for the future. The mountain ecosystems generate a diverse set of ecosystem services for human wellbeing. In line with the IPBES workshop on Biodiversity and Pandemics, this session tried to explore mechanisms that can provide mountain specific policy-relevant scientific information on the links between human-animal and environmental health, mainstreaming One Health approach in different sectors in the mountains, restoration of mountain landscapes for biodiversity and ecosystems, indigenous knowledge, traditions and practices that conserve biodiversity and ecosystems, identification of critical knowledge gaps and disasters and health

## 5.2 PRESENTERS IN THE SESSION

- Objectives of the session and introduction to the session speakers:  
**Dr. GS Rawat, IMI Member / SDFU / Former Dean - Wildlife Institute of India.**
- Biodiversity, Ecosystems for Human Health: An overall perspective of research, action and policy in the IHR  
**Prof. Uma Rama Krishnan (NCBS, Bangalore)**
- Ecosystem Restoration in the IHR: A critical need for human and animal health  
**Dr. Nakul Chettri (ICIMOD, Kathmandu, Nepal)**
- Traditional knowledge, systems and practices underlies One Health in the IHR  
**Dr. Melari Nongrum, (Martin Luther Christian University, Shillong, Meghalaya)**
- Good practices of biodiversity conservation  
**Ms. Shalini Thapa (DHI/WWF- India)**  
**Mr. Palden Sherpa (Research Scholar)**



Photo: Kunga Tashi





### Biodiversity, Ecosystems for Human Health: An overall perspective of research, action and policy in the IHR

**Prof. Uma Rama Krishnan**  
NCBS, Bangalore

Prof. Krishnan started off by presenting that 60% of all infectious diseases in humans, and 75% of all emerging infectious diseases are zoonotic in origin, being transmitted from animals, mainly mammals. She elaborated that emerging zoonotic diseases most often originated from live animal markets, wildlife hunting, intensive wildlife farming and domestic animals. Citing the example of the Hendra virus, she presented on how spillovers occurred from bats that shed viruses to horses that had then infected humans, and how from a One Health perspective understanding this interaction, and the dependence of human

health on the health of the bat, and health of the animals, which we only tend to understand only after it has occurred. She further elaborated that there are several barriers for outbreaks to happen, such as reservoir density, pathogen prevalence, infection intensity, etc. however these barriers are being overcome.

Shedding light on the understanding of places where spill-over has occurred and in recent cases such as COVID-19 and Hendra virus, it was mostly seen around areas with high human population interaction, for example the livestock markets. Therefore India and China are more vulnerable, and there is an urgent need for preparedness. She further highlighted that the mountain regions and north east region have high bat and rodent diversity, which are known reservoirs for zoonotic diseases making the region even more vulnerable, and poised for future outbreaks.

Prof. Krishnan presented their study in the Eastern Himalaya, particularly the bat harvest in Nagaland, from where it was found that there are potential pathogens circulating in these bats, and that 3 antigenically filoviruses in bats and two in humans shared antigenic response. The study concluded that there was a high risk interface which provided a good system to study spillovers, and screening for several other viral families was ongoing.

Elaborating on longer-term goals, she mentioned that understanding hazard and risk through study of local abundance / behaviour, seasonal populations, etc. were important to lower the exposure and risk to humans. In conclusion, she mentioned that integrated understanding was important of the interface between humans, animals, land use, land cover change, etc. A project in Bengaluru, 'One Health city' is underway that focuses on integrating human health with disease ecology in a global urban centre.



### Ecosystem Restoration in the IHR: A critical need for human and animal health

**Dr. Nakul Chettri**  
ICIMOD, Kathmandu, Nepal

Dr. Chettri began by sharing how the landscapes have been in transition through a stage of natural ecosystems, to frontier clearings that led to the advent of subsistence agriculture to a stage where a large proportion of the landscape was now used for intensive agriculture, while smaller portions were reserved for protected areas and natural ecosystems. He further stated that mountain landscapes are undergoing an unparalleled transition with increase in human habitation, which has implications for human and wildlife health, adding that rapid land cover changes have been recorded in the

Hindukush Himalayas from 2000-2018. Changing landscapes alter the balance in different types of natural ecosystems, Dr. Chettri reiterated, presenting the deforestation rates across the Himalayan Temperate Forest leading to fragmentation. Referring to a study from Degroot et.al of 2010.

Dr. Chettri spoke about differences in service provision between natural ecosystems that provided everything from forest, diseases mediation, climate control, water quality and flow, etc. and intensive croplands where none of the services were available except crop production. Striking a balance between the two and how croplands needed to be restored to provide ecosystem services should be the future pathway, he stated, which could be brought about by a nexus approach that looks at balancing food and agriculture, water and energy security. On the issue of redefining restoration, Dr. Chettri mentioned that there is the need to look beyond plantations only and include resilience. One needs to look at the increased protected area spaces across the HKH and also fragmentation with corridor and connectivity losses, invasive species intrusions that have increased human-animal interphase.

In his last section, Dr. Chettri discussed the topic of One Health and resilience, stressing that beyond the simplified understanding of interface between human, animal and environment health, there are many complexities that need to be understood at a deeper level. Highlighting the need for generating more interest in biodiversity, he elaborated that climate change had been at the center of most discussions over biodiversity, citing the examples of media coverage that had more articles on climate change, as well as research publications that were fewer on biodiversity issues. He concluded that there is need for scenario based planning to bring about transformative change that is inclusive of all stakeholders, institutions, knowledge and processes that includes well being, resilience values in addition to biological values. He concluded initiatives of ICIMOD that are building blocks for way forward.





### Traditional knowledge, systems and practices underlies One Health in the IHR

**Dr. Melari Nongrum,**  
**Martin Luther Christian University,**  
**Shillong, Meghalaya**

Dr. Nongrum began by elaborating on the definition and importance of Traditional Knowledge (TK), how it underlies the existence and identities of indigenous communities, pertaining to food systems, healing systems, arts and crafts, ecological knowledge systems, etc. with each community or tribe having their own traditions and systems of knowledge. Linking One Health and indigenous peoples,

Dr. Nongrum mentioned that indigenous concepts already encompass the interface of human health, animal health and environment

health, and that communities believe good health to be more than just the absence of diseases or illness.

Delving deeper into traditional knowledge systems of the Khasi community of Meghalaya, Dr. Nongrum, presented their traditional food system and that it is based on jhum cultivation, bun (adaptation from jhum) wet cultivation, agroforestry, kitchen gardens, fallow lands, rivers, lakes and ponds. She also referred to the FAO case study of Nongtraw, which highlighted the variety of food received from the ecosystem such as cultivated, wild edibles and fruits, insects, animals and fishes, which makes them self-sufficient. Similarly, another study conducted in 18 villages in Meghalaya and Nagaland found that only two thirds of the household felt insecure about food, and none of the households experienced severe food insecurity- going without food for a day.

She also debated the misperception that wild food is poor man's food, highlighting that these foods from the wild were more nutritious than some of the common food. At the same time, Dr. Nongrum highlighted that because of changing diets there were cases of children from 6 - 59 months, that were underweight, stunted, wasted, and anaemic, as well as pregnant women being anaemic. The connection between traditional knowledge and animal health was also highlighted, and that animals are often treated with indigenous methods with the use of 46 species for wounds, diarrhea, foot and mouth disease, bone fracture, etc.

There are lessons for striking this balance in human, wildlife and ecological health in the traditional knowledge of indigenous mountain communities. Indigenous communities' concept of health is holistic, physical, emotional, cultural and spiritual well-being. People should be made aware of the traditional knowledge and the relation between scientific and traditional practices.



*Photo: Panborlang Tai, Meghalaya*



Best Practices of community - based biodiversity conservation and ecosystem management from the IHR



Ms. Shalini Thapa,  
Darjeeling Himalaya Initiative  
and WWF India



Ms. Susadhna Gurung,  
ATREE

As part of the youth engagement under the Biodiversity and One Health session, the youth group had conducted a study in the various states on Best Practices of community - based biodiversity conservation and ecosystem management from the IHR with examples from Arunachal, Uttarakhand, Sikkim, Darjeeling, Meghalaya and Nagaland.

Case studies highlighted were the Amur Falcon conservation from Nagaland, where earlier the migratory bird was killed in huge numbers, community initiative for springshed management in Uttarakhand, community conserved areas in Arunachal Pradesh, sacred groves of Meghalaya, lake conservation or Pokhari Sanrakshan Saimitees in Sikkim, and conservation of Himalayan Salamander in Darjeeling.

Spring rejuvenation practice of Uttarakhand

Himalayan Springs are a source of major rivers feeding millions of people. Almost 3 million springs originate from the IHR. Uttarakhand has been at the forefront of spring rejuvenation with various community driven initiatives.

Community Conserved Areas of Arunachal

CCAs are administered by Management Committees formed by people who act as intermediaries between different stakeholders. The committee develops management plans for CCAs which looks at sustainable harvesting practices, tourism management, etc. The CCA model is now being followed in other community forests

Sacred Groves of Meghalaya

125 Sacred groves are in Meghalaya. The local tribal people of Meghalaya believe that 'U Basa' or goddess dwell among these thick and virgin forest. The Sacred Groves serve as protected area, wildlife corridor for a variety of species. Storehouse of medicinal flora, including endemic, rare and threatened taxa. Perfect example of a traditional method of biodiversity conservation.

Pokhari Sanrakshan Samiti of Sikkim

Tsomo Lake in Sikkim one the main tourist hotspots receives around 4 lakh tourists annually. This high altitude wetland is rich in biodiversity with migratory bird species, and the entire area houses many important flora and fauna. Tsomo Pokhari Sanrakshan Samiti was formed for management of the lake and its surrounding area. Committee empowered to collect a conservation fee of INR 10 from every tourists. Funds are used for managing waste, biodiversity monitoring, conservation awareness, etc.

CCAs ingrain the principles of One health

The Himalayan Salamander found in the Darjeeling Hills is a unique species of these parts. Found in marshy areas and wetlands of the midhills, this species is fast losing its habitat across the hills. Communities got together to conserve the salamander's habitat in Namthing Pokhari, Darjeeling. Awareness programmes were conducted on importance of the species. Habitat protection and improvement measures were also undertaken.

Friends of the Amur Falcon - Nagaland

Amur Falcon, the longest travelling bird of prey (26,000 km) has its roosting site in Pangti Village in Nagaland. There were reports of around 1 lakh Amur falcons being hunted in 2012. After that Government and wildlife conservationists worked with local communities to ensure safe passage for the falcons. Massive awareness programmes were launched with active participation of communities to stop the killing of the falcons. Tourism opportunities were facilitated for local communities. It is now one of the most successful conservation stories



# Q&A

## Are there any studies on zoonotic exposure from the Sikkim area that are emerging from increasing landuse change?

This area of study is understudied. Only examples are from Western Ghats on small mammals in mixed-use landscapes, trying to understand on higher spillovers due to landuse change.

## Are we anywhere near to predicting the next pandemic?

We cannot predict for sure what the next pandemic.. We can only be better prepared. The process of proving pathogenecity itself is a long drawn process. High risk interfaces can however be identified which will help in preparedness.

## Is a One Health approach in the mountains possible and what would need to happen to bring that into implementation?

One health concept is not new, and it is fairly similar to what was happening in the landscape-based approach that demanded a more collaborative and integrated way of doing things. A prominent realisation is that health systems are not adequate and definitely need to be strengthened.

Interdisciplinary approach in India is very difficult, and will be a huge challenge to implement One Health. However some aspects can be piloted through strengthening of surveillance for diseases, which can be interdisciplinary, which might be good places to begin. Strengthening systems at community level such as quarantine after hunting season, etc. are also good practices.

## How do we move forward from here in terms of key actions, be it at policy level or for raising awareness?

As part of ICIMOD, a platform has been created under the 6 urgent call to action. Task force has been formed with Government representation and other stakeholders. These are opportunities that can be tapped into for moving forward.

## 5.4 KEY RECOMMENDATIONS FOR ACTION AND WAY FORWARD





06

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# Sustainable Food Systems

**Session Leads:** Ms. Binita Shah, Mr. RP Gurung, Mr. Roshan Rai, and Mr. Abishek Pradhan



## 6.1 INTRODUCTION

The IHR has a rich diversity of food cultures from cultivated, foraged and pastoral agroecology which include culinary processes, preparation and preservation. This diversity has provided nutritional security and livelihoods to mountain people. However, mountain food cultures are fast eroding with the onslaught of the food industry, globalisation and homogenisation of food and taste. This has impacted the agrobiodiversity, traditional knowledge and practices of food, loss of dietary diversity and nutritional security. Dietary shifts that are highlighted by "packaged and processed food markets have doubled in India with the overall per capita sales going from USD 31.3 in 2012 to USD 57.7 in 2018 (Law, Cherry et al. "Purchase trends of processed foods and beverages in urban India." Global food security vol. 23 (2019): 191-204. doi:10.1016/j.gfs.2019.05.007)" and have deep ramifications on health and livelihoods across the IHR.

Some of the mountain specific actions in line with the UN Food Systems Summit's Action Tracks prioritised for discussion in this session were:

- Sustainable land use practices (Action Track 3: Boost Nature-Positive Production)
- Diversification of livelihoods (Action Track 4: Advance equitable livelihoods)
- Policy coherence and inclusive participation in decision-making (cutting across all Action Tracks)
- Consumption patterns

## 6.2 PRESENTERS IN THE SESSION

- Setting the context: Food culture diversity of the IHR, Challenges and trends  
**Ms. Binita Shah (IMI Treasurer, SDFU, Secretary, CEO -SARG)**
- Indigenous peoples' food systems: Opportunities and challenges  
**Mr. Phrang Roy - Coordinator, The Indigenous Partnership for Agrobiodiversity and Food Sovereignty**
- Positive stories of sustainable food systems of the IHR  
**Biju Negi: Core Member, Beej Bachao Andolan**
- Industrial food production: linkages with health, livelihood and environment  
**Mr. Amit Khurana: Director, Food Safety and Toxins programme, Centre for Science and Environment, India**
- Changing Consumption Patterns: Setting the context  
**Mr. Roshan Rai: Councillor IMI; DHI; DLR Prerna and Zero Waste Himalaya**
- Rapid assessment of challenges on local food cultures  
**Mr. Abishek Pradhan, Youth Representative, DHI and Zero Waste Himalaya**



### Setting the context: Food culture diversity of the IHR, Challenges and trends

**Ms. Binita Shah**  
**Treasurer, Integrated Mountain Initiative (IMI),**  
**Secretary, Sustainable Development Forum of Uttarakhand**  
**CEO -SARG**

Ms. Shah in her address highlighted how the evolution of food systems had gone hand in hand with the evolution of human civilization and how food systems are linked with animal husbandry, forest systems, handicrafts, trade and how they were based on natural systems and seasonal changes. She made a point that there had been an erosion of food systems, which had moved from being the holistic system that encompassed all land-based activities, and the question to ask was how can it be relevant today. Highlighting how food production has moved from family farms to commercial production feeding into industry, and how farms have become industrial houses, she talked about how India was also moving into this system.

Her presentation reflected on the negative sides of industrial food production with environmental degradation, chemical contamination of food and even increased zoonoses, and how all of these threatened human health. Sustainable Development Goals rightly pointed to the interdependence of small systems related to production, value chain, consumption and disposal systems while talking of food systems. Some of the good policy initiatives that were taken in the country were also highlighted such as the minimum support price on millets, ICAR setting up Centre for Integrated Farming Systems to reverse monoculture farming; organic farming policies spearheaded by mountain states since 15 years ago, and GOI's organic farming policy which by definition promoted traditional seeds, fibre and systems. She concluded with questions on how these models would be able to address the issue of food systems and livelihoods of farming communities, and how they could be promoted for holistic benefits of food, condiments, medicine, fibre, feed and climate resilient properties that used the entirety of traditional food systems.



## Indigenous peoples' food systems: Opportunities and challenges

**Mr. Phrang Roy**  
Coordinator, The Indigenous Partnership for Agrobiodiversity and Food Sovereignty

Mr. Phrang Roy began by sharing his experiences as a Khasi from Meghalaya in the Indian Administrative Services and the lack of awareness of the rich cultural diversity of North East India. He reflected on his realisation of how many of us go through life without being aware "of the value of diversity and of the fact that there is no agriculture without agrobiodiversity, a fact known to the people of North East India, and affirmed by FAO and other international organisations". He narrated his insights from Adivasis of Thane on how their local resources of diverse plants and meat gave them the food

security they needed as long as they had a respectful approach to nature. This had become his turning point and a reminder that Indigenous Peoples have a sacred relationship with nature and biodiversity which is very important to them. Indigenous food systems have a holistic vision of being part of nature with governance systems that value solidarity and dignity of all, he remarked.

"There is abundant oral knowledge and diets rich in agrobiodiversity that are resilient because they respect biodiversity and planetary boundaries." Bah Phrang went on to present that during the UN Food Systems Summit and COP26 meetings, voices of hope were heard in the deliberations but only if our current dominant narrative changes and we appreciate real game changing solutions such as indigenous peoples' food systems. Highlighting studies undertaken by FAO and McGill University of Canada, and by NIN in Hyderabad, Mr. Roy presented that the diverse food systems of indigenous peoples are in fact productive, equitable and sustainable and in some cases, may have already achieved zero hunger for some indigenous communities. He also referred to the study during the COVID period conducted by TIP and NESFAS in collaboration with FAO on food insecurity in 18 indigenous peoples villages of Meghalaya and Nagaland using FAO's "Food Insecurity Experience Scale". The study showed that severe food insecurity is virtually non-existent, while moderate food insecurity in 2020 was experienced at 11.3% as against the South Asia level of 43.8% and the global level of 30.38%.

He elaborated upon the richness of North East India as mega biodiversity hotspots citing a study that had recorded, on average, villages had 200 food plants (including crop varieties, mushrooms, and condiments) with some having more than three hundred food plants. Despite such richness, Indigenous peoples were often considered vulnerable by mainstream narratives, he reflected, however mentioning that with regard

to dietary diversity, surveys showed only 36% of the respondents consume a diverse diet (at least 5 food groups out of 10). This was an indication that much more work has to be done to link nutrition, health and the environment with local food practices.

In conclusion, Bah Phrang reiterated how equitable food systems are being disturbed and how the current global food system is broken and stressed on the need to craft a new agrobiodiversity narrative that will create an environment where the wonders of contemporary science and indigenous peoples' food systems are equitably blended.



## Voices from the mountains- Positive stories of sustainable food systems of the IHR

**Mr. Biju Negi**  
Beej Bachao Andolan

Mr Negi opened his presentation with the term 'Kheti-Kisani', mentioning that no other term could adequately connote what the oldest occupation in the world is - its characteristics and role in the shaping of society. He further elaborated that the 'culture' in Agriculture has been relegated to the margins or even lost and Beej Bachao Andolan has long been seeking to address this question – how or why did we lose, and how the "culture" in agriculture could be revived. As the negative impacts of the green revolution increased, it was getting more pertinent to bring in Kheti-Kisani. He highlighted how Beej Bachao (seed saving) and the revival of Baranaja- traditional multi-cropping system and documenting agro-biodiversity was an evolutionary process, building on the consciousness of the Chipko movement. Beej Bachao is not just about saving seeds but is a principle and a philosophy, he said, further enumerating some key learnings from his experience of the movement.

- Traditional agriculture is not just about seeds and crops but about its principles that seek to maintain balance among human, animal, plant, water, air and the earth.
- It is about the local context and geography that facilitates the development of indigenous knowledge and wisdom and ensuring its sustained practice, social survival and well being.
- Kheti-Kisani is a collective and shared occupation that is continual all year round and generates many mutually dependent occupations as well as art and culture creating a self-sufficient community.

Critiquing the green revolution that focussed on increased production(linear single factor) using industrial agriculture, Mr. Negi reiterated that it had failed to look at issues of proper and equitable distribution, and management of food, further adding that we are still the third largest hungry nation. He disagreed with the notion of mountain agriculture as subsistence



agriculture saying that "Self-abundance" would be a more accurate term to describe traditional Kheti-Kisani, because it boasted a most diverse and complete range for food crops, from seasonal to perennials, from cultivated to gathered -grains, pulses, vegetables, spices, oils and a whole gamut of edibles in between. Dismissing the idea of industrial production, Mr. Negi reiterated that we do not need more production from less people but rather more production from more people.

He emphasised on food sovereignty over food security, which gives people the power to make decisions on how much and what to grow, which is closely linked to access to land, water and forest that would make food sovereignty possible. He highlighted how even green trends like organic farming were in the hands of a few, and accessible to urban elites only, and not farmer based.

In the end he reflected on how the pandemic showed the importance of agriculture, and called for continual research on Kheti Kisani, focussing on small farmers and local markets.



### Industrial food production: linkages with health, livelihood and environment

**Mr. Amit Khurana,  
Centre for Science  
and Environment**

Mr. Amit Khurana's presentation was based on the actions undertaken by the Centre for Science and Environment on "Industrial food production: linkages with health, livelihood and environment ". His presentation looked at three key issues to elaborate his topic 1.Junk food labelling, 2. Business of honey adulteration, and 3. Antibiotic misuse and overuse in food - animal production and antibiotic resistance.

Highlighting the significance of junk food labelling, Mr Khurana mentioned that these foods that were factory-made products with high sugar, salt and fat content should be called as factory products, further elaborating that these were highly addictive, low in micro-nutrition and linked with many non communicable

diseases. He explained that because the threshold set for sugar, salt and fat were very high many products passed instead of having warnings like tobacco. All Junk food should have stronger, easily understood front of label packaging as well as clearer, factual nutritional details and health implications, he mentioned further adding that present day labeling gives a wrong impression to the consumers who continue their consumption.

Mr. Khurana also spoke at length about the CSE's study on honey and how out of 13 brands only 3 passed the adulteration test in India, and brands failed the tests done in Germany, which revealed that Indian standards for honey purity could not detect adulteration. With increased honey consumption especially during COVID19 the possibility of these adulterated honey doing harm is high, he said, adding that beekeepers also lose out due to adulteration as they fail to get the right prices for their raw honey.

In the last part of his presentation, Mr. Khurana highlighted the dangers of antibiotic misuse in food animal production, mentioning that Antimicrobial Resistance(AMR) is a silent pandemic unlike COVID19. Explaining how antibiotic resistance sets in mainly because of overuse of antibiotics and bacteria becoming resistant, highlighting that a global 'public good' that has been continually misused and overused has been responsible for the steep rise in resistance.

Resistant bacteria can pass between and among humans, animals, plants and environment, he said and stated that its impact therefore is much beyond just human health and also impacts health of animals, plants, therefore impacting food productivity, livelihood, economy and development. He presented that an estimated 10 million lives per year were at risk by 2050, if no action is taken on AMR and about 90 per cent of lives at risk are in Asia and Africa. He highlighted existing industrial food systems that use antibiotics indiscriminately in crops, livestock, poultry, apiculture and aquaculture to be the main reason for the increase in resistance.

There is a direct linkage with industrial food systems, zoonosis and climate change, he said, adding that the narrative of industrial food systems to end hunger needs to change, as the industrial food systems are not sustainable as it does not talk about equity, governance and access. Talking about consumption patterns and how shifts of consumptions by geographies, and sections of people would make a big difference in hunger and sustainability, he mentioned that there is a need to look at foodsystems without the use of antimicrobials as well as serious re-invention of the way we do business with our food and environment and prevent pollution and overuse of chemicals.



### Changing Consumption Patterns: Setting the context

**Mr. Roshan Rai,**  
Councillor,  
Integrated Mountain Initiative  
Darjeeling Himalaya Initiative  
DLRPrerna

Mr. Roshan Rai began his presentation by highlighting the diversity of food cultures across the IHR which is being threatened with the dramatic shift towards processed and packaged food. Using the phrase - we are what we eat, he further explained that this shift had repercussions on our food and nutrition security, especially in the context of COVID19 pandemic. He brought in the findings from The Himalayan Cleanup (THC) conducted the Zero Waste Himalaya and Integrated Mountain Initiative since 2018 that has consistently shown plastic packaged and processed food is the top trashed items. 85% of household waste in THC 2021 home based audit was plastic, with 71.8% of it non-recyclable, and the highest plastic materials were from food packaging at 63%.

In the brand audit, Hindustan Unilever, Nestle and PepsiCo India, Asian Thai Foods, Choudhary Group of Foods India, Hindustan Coke, Gujarat Cooperative Milk Marketing Federation (GCMMF or Amul), Parle Products, Indian Tobacco Company Ltd (ITC) and Parle Agro Pvt Ltd respectively emerged as the top ten brands whose plastic waste pollute the IHR, he further presented stating that there is a clear link between our waste crisis and big food. He highlighted that industrial food production, increased packaged food and drink consumption intersects with our ill health as well as planetary well being, and there is a need to address it in a holistic manner. Top polluters need to take responsibility for their plastic waste while at the same time, the ill health arising from packaged and processed food need to be recognised, Mr. Rai concluded.



The IHR has a rich diversity of food cultures from cultivated, foraged and pastoral agroecology which include culinary processes, preparation and preservation.

This diversity has provided nutritional security and livelihoods to mountain people..



RAPID ASSESSMENT OF CHALLENGES ON LOCAL FOOD CULTURES AND CHANGING FOOD PATTERNS. MAPPING LOCAL MARKETS -SPOTLIGHT ON LOCAL MARKETS.



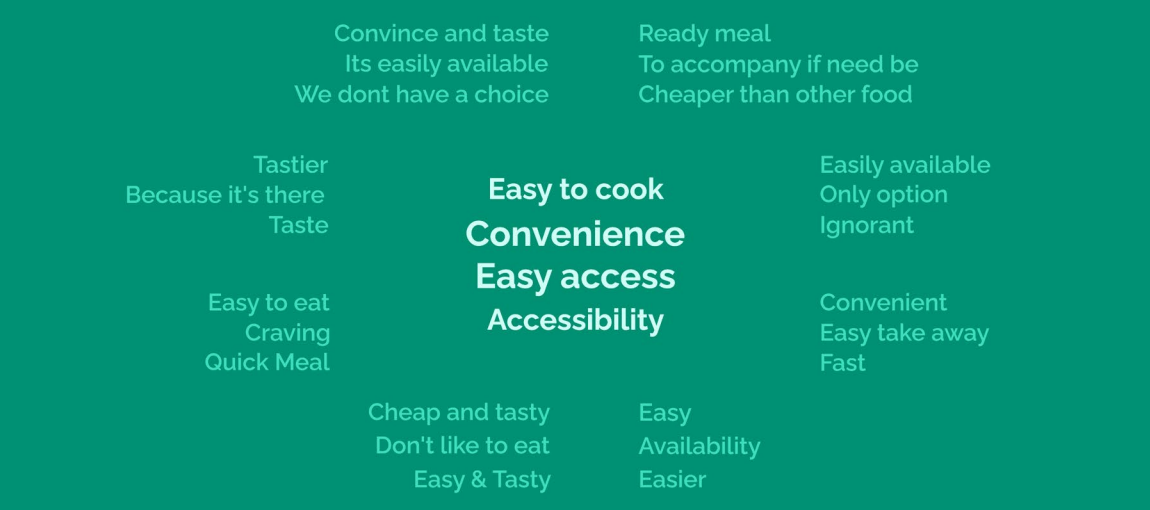
Mr. Abishek Pradhan,  
Darjeeling Himalaya Initiative,  
Zero Waste Himalaya

Mr. Abishek Pradhan, DHI, Youth Representative, presented the interventions taken by his team who conducted online surveys on challenges of local food cultures and changing food patterns These online surveys were spread across the IHR leveraging the IMI and ZWH networks. He also shared the initiative Spotlight on Markets that was a visual narrative project of the rich local markets across the IHR and then uploading it on google maps for greater reach and access. Mr Abishek conducted an online POLL with participants of the session, the results are shared below. Mr. Abishek then presented the Spotlight on Local Markets through a short film where photographs and descriptions of local markets from across the IHR were uploaded on google maps as a means for promoting them. He called on all to continue this campaign beyond the SMDSX.

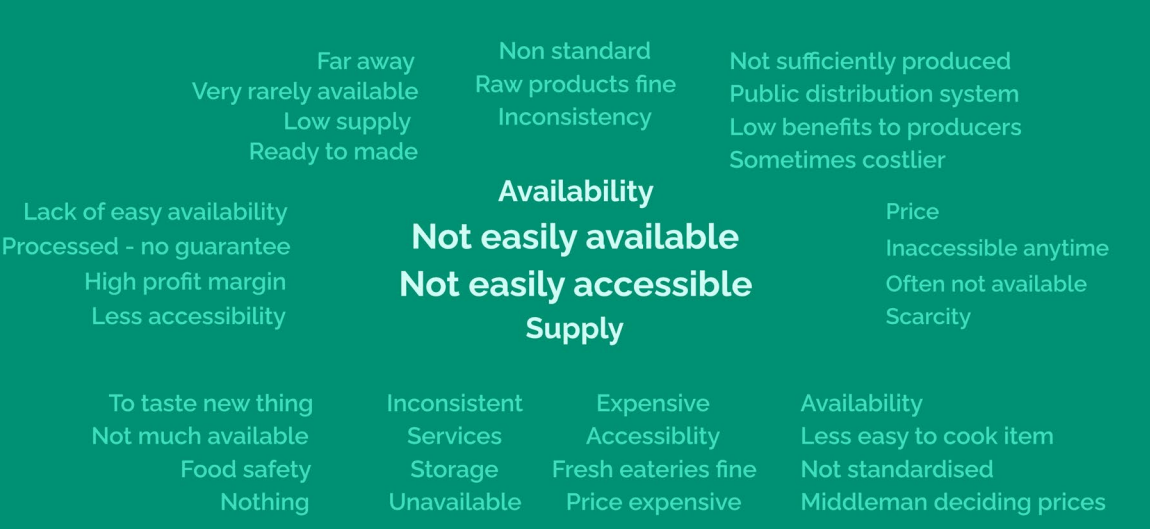
1 How often do you eat traditional food?



2 Why do we eat packaged food?



3 What prevents you from buying from local markets?



6.4 KEY RECOMMENDATIONS FOR ACTION AND WAY FORWARD



Junk food must have proper, easily understood front of label packaging in terms of salt, sugar, fat and nutritional content.



There is a need to craft a new agrodiversity narrative where the wonders of contemporary science and indigenous peoples' food systems are equitably blended



Policies and practices must be sensitised and sensitive to indigenous food systems, its diversity and that are food and nutrition secure



The understanding of hunger needs to expand beyond nutritional requirements only to include equity and access and its resolution needs to go beyond linear production models



The lens of food security must be expanded to include food sovereignty where lots of farmers engage in food systems and food production. Even the new age organic farming systems need to be equitable and accessible to all.



Continual research is needed on traditional and indigeous food systems focussing on small farmers and local markets.



Current food systems are broken, we need to craft and promote agrodiversity. There is a need to broaden the knowledge of young people to be more indigenous to increase the biodiversity on our plate



We need a robust communication and awareness programme on our changing consumption patterns and facilitating the switch to 'old ways' of buying and consumption in mountain states



Antimicrobial resistance due to the rampant use of antibiotics must be considered as an extremely serious issue and policies drafted to regulate and stop its use.



Honey adulteration must be taken seriously for its possible health implications, livelihoods of bee farmers as well as pollination services that bees provide.



Agriculture without the use of antimicrobials must be promoted while re-inventing food systems that are environment friendly, prevent pollution and overuse of chemicals



The intersection of food and waste, changing food consumption patterns, ill health and waste crisis must be acknowledged and addressed holistically



There is a need to create more awareness about food, nutrition, waste and environment linkages, through robust communication and awareness programmes especially among the younger generation.





07

# Governance that promotes One Health

**Session Leads:** Mr. PD Rai, Mr. Alemtemshi Jamir, Mr. Ramesh Negi,  
Ms. Priyadarshinee Shrestha, Mr. Roshan Rai

## 7.1 Introduction and setting the context Mapping the intersect of One Health



**Dr. Sarala Khaling**  
ATREE  
Darjeeling Himalaya Initiative

This session focussed on creating a cross sector learning environment for One Health- on mechanisms for specialised departments with domain experts to learn from environments that address issues with an interdisciplinary approach. Other areas of discussion were institutional analysis for One Health implementation and mainstreaming One Health in the local self-government institutions, identifying and mainstreaming the issues of gaps in science, policy and knowledge transfer for the mountains regarding One Health.

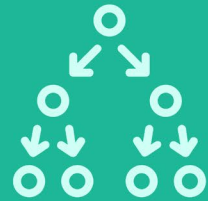
- Mapping the intersections and actors of One Health has been carried out under National Mission on Biodiversity and Human Well Being (NMBHW) in West Sikkim which is a good schema to present One Health.
- The process mapped actors who were to be involved and created a roadmap for intervention that outlined some key takeaways.
- The key actors involved: Agriculture, health, wildlife, armed forces, urban development, veterinary and public health and disaster management who are all interconnected in the One Health approach. Amongst all these sectors the most important sectors are health, animal and wildlife department and district administration.
- Keywords for One Health: cross-sectoral, interdisciplinary, multi-disciplinary, trans-boundary approaches.
- Multi actors and multi-sectors are involved in the process of disease prioritisation, identifying surveillance sites and network maps.
- Diseases prioritisation: Scrub typhus, Rabies and avian flu most important diseases which needed to be taken into consideration
- Sentinel surveillance according to majority of stakeholder is Gyalshing
- Supra departmental coordination committee is needed to take One Health forward.
- District collector should be coordinating department to lead the One Health Coordination Committee (OHCC) in Sikkim
- State One Health policy to initiate OHCC, infrastructure, surveillance facilities, laboratories and an effective outbreak response team is needed.
- Dedicated central funds and roadmap at the state and district level is crucial
- Effective and efficient chain of reporting is needed. Panchayat is an important source of reporting.
- Better life and convergence should be Vision for One Health

## 7.2 INSIGHTS FROM PREVIOUS SESSIONS:

Session leads presented key insights, outcomes and recommendations from the first three thematic sessions to set the context for discussing Governance that Promotes One Health. They are highlighted in the following section:



ONE HEALTH RESPONSE TO ZONOSSES:  
DR. SUNITA PRADHAN



There should also be focus on mapping trans boundary disease transmissions.



Documentation and focus on grounded and contextual experience in One Health Approach is essential



Disease prioritization in IHR is needed: Focus should be on Wildlife Diseases



Dedicated funds and resources are crucial for One Health. Strong collective recommendations for allocation and pooling of funds and resources in One Health approach are needed



Disease surveillance is needed at all levels: Digital and print media must also be used for active surveillance



Strengthening the Science Policy Interface is needed and calls for research findings to be institutionalised in policy making. Significant findings should be highlighted in government policies and action plan

BIODIVERSITY AND ECOSYSTEMS FOR HUMAN HEALTH:  
DR. SARALA KHALING



Food health and biodiversity have to be approached in an integrated manner and not as separated, individual pillars.



Interface in human and animal health needs to be studied in the IHR



Human animal conflict especially in protected areas needs to be prioritised



There is an inadequacy in the investment of media coverage of such diseases and climate change and redress is needed so that the needed community action can be leveraged through the media coverage.



Restoration of ecosystems and biodiversity needs to be redefined and resilience value approach should be an important guiding framework for any policymaking for biodiversity restoration and conservation plans



Trans boundary movement is an important aspect to consider and joint interdisciplinary research must become an outcome of the SMDSX

## SUSTAINABLE FOOD SYSTEMS: MR. RP GURUNG



The lens of food security must be expanded to include food sovereignty where lots of farmers engage in food systems and food production. Even the new age organic farming systems need to be equitable and accessible to all.



The understanding of hunger needs to expand beyond nutritional requirements only to include equity and access and its resolution needs to go beyond linear production models



Honey adulteration must be taken seriously for its possible health implications, livelihoods of bee farmers as well as pollination services that bees provide



Junk food must have proper, easily understood front of label packaging in terms of salt, sugar, fat and nutritional content.



There is a need to craft a new agrobiodiversity narrative that will create an environment where the wonders of contemporary science and indigenous peoples' food systems are equitably blended. Policies and practices must be sensitised and sensitive to indigenous food systems, its diversity and that are food and nutrition secure



Continual research is needed on traditional and indigeous food systems focussing on small farmers and local markets



Antimicrobial resistance due to the rampant use of antibiotics must be considered as an extremely serious issue and policies drafted to regulate and stop its use.



Agriculture without the use of antimicrobials must be promoted while re-inventing food systems that are environment friendly, prevent pollution and overuse of chemicals.



The intersection of food and waste, changing food consumption patterns, ill health and waste crisis must be acknowledged and addressed holistically.



There is a need to create more awareness about food, nutrition, waste and environment linkages, through robust communication and awareness programmes.



7.3 RESPONSES AND REFLECTIONS FROM IHR

Mr. Mayur Dixit, DM,  
Uttarkashi

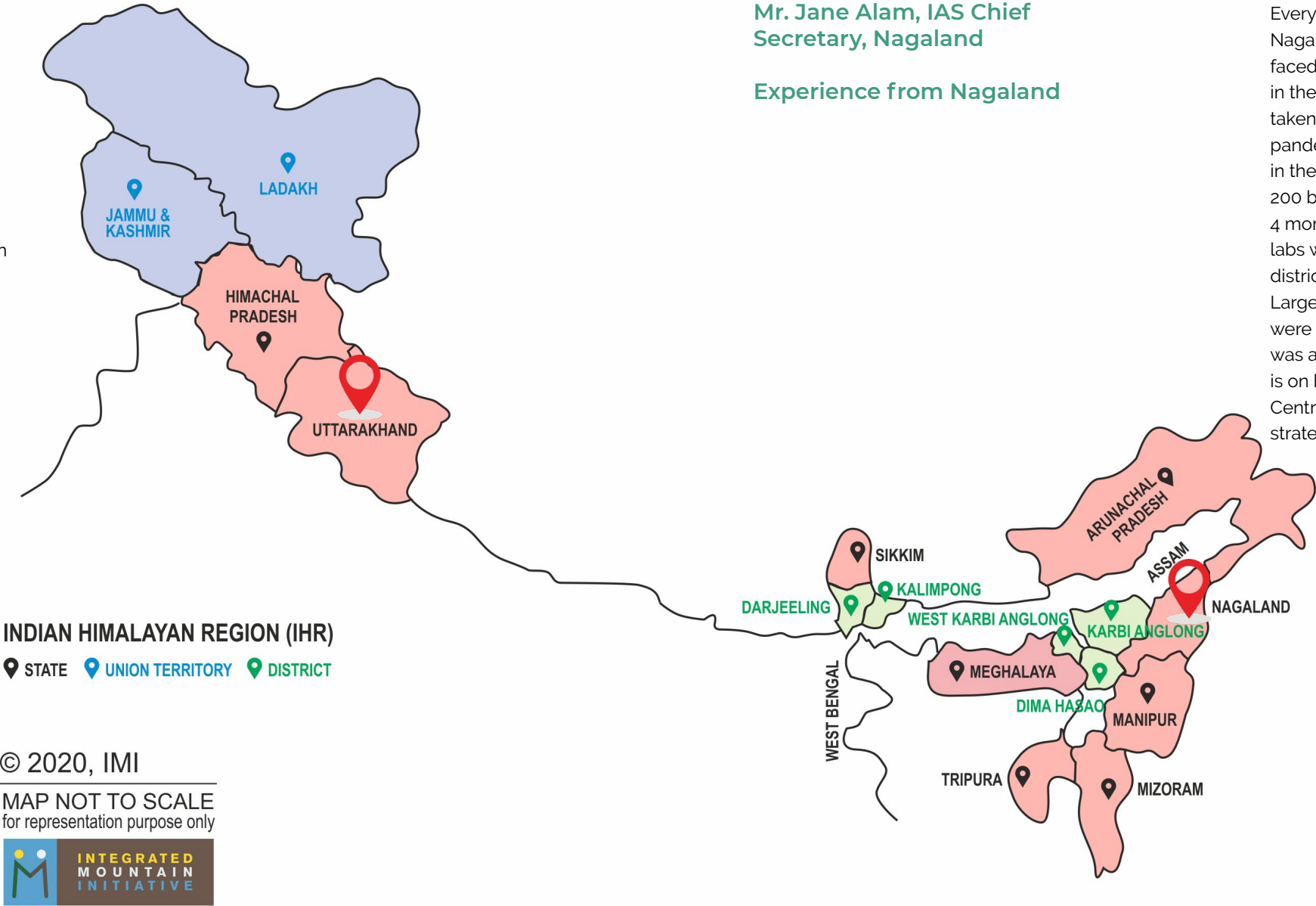
Experience from Uttarakhand

The pandemic called for collaboration within all sectors. Initiatives had to be taken with the One Health approach. Convergence is very important when it comes to One Health. District administration organised workshops in villages with local health practitioners like ASHA and ANM to spread awareness about COVID. Vehicles with a laboratory set up in it were sent across the district. Primary health centres were equipped with better facilities. There is a lot of scope for further improvement in the health sector and both government and private funds are needed to improve the health facilities. We also need to build and sustain infrastructures for transboundary movement from one state to another. Proper transportation facilities for transferring of wild animals is a concern that needs attention.

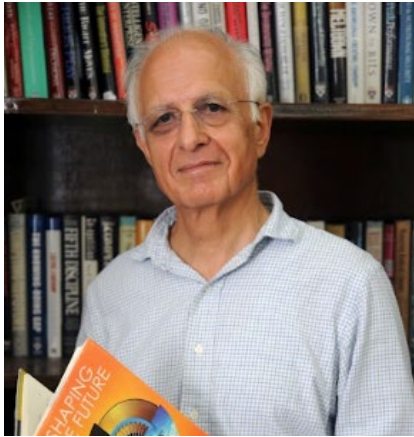
Mr. Jane Alam, IAS Chief  
Secretary, Nagaland

Experience from Nagaland

Everyone was affected by the pandemic including Nagaland. The state, much like the rest of India, faced problems related to infrastructural facilities in the health sector but collective measures were taken to deal with the issue. However, during the pandemic period, there has been an improvement in the health facilities. An acute care hospital with 200 beds has been opened in Dimapur, set up in 4 months. Oxygen plants, ICU facilities and testing labs were scaled up during the pandemic. All district hospitals were equipped with oxygen plants. Large number of doctors and medical practitioners were appointed. The overall economy of the State was affected. Going forward the focus of the State is on health and education. With the help of the Central government and foreign agencies new strategies are being introduced and implemented



## 7.4 INPUTS AND RESPONSES FROM THE PANEL- CHALLENGES, POLICY ENVIRONMENT AND CAPACITY



**Dr. Arun Maira, Former member,  
Planning Commission**

All the organs need to be healthy to make a healthy human body and on a larger note, it also includes the social system's health. Those who live in good social conditions live long as its health also affects the health of every human being. And the social system cannot be healthy unless the environment is healthy. Today, we have a global health crisis and local system solutions are required to deal with it. More expertise and wisdom on the ground is needed. Science itself is broken and it needs to come together with different disciplines of science and social science. The system must come together with more collaboration of stakeholders on the ground. "Science needs to be humble; leaders need to be humble too." Humans think that with technology we can rule nature but nature is all supreme and firing back. Indigenous approach, which is a community approach, is the source from which global problems could be solved.



**Shri C K Mishra, Former Secretary,  
Government of India**

Apart from the devastating COVID-19 pandemic cost in the past two years, it has taught us a number of lessons. It is extremely critical and timely that we understand and follow the One Health principles and concept. We need to ponder on what we did to the environment to deserve the tragedy that we just saw. What is human being's role in this problem? It is time we learnt and changed. We need to look at the importance of One Health, acknowledge and accept that there is a bit of health in everything we do. The 2017 health policy is a well written document but it needs to give equal importance to governance to actualise it. We need to look at health not just of human beings but beyond that. Zoonotic diseases are an area of concern now. The principle drivers of emergence of zoonotic diseases are unregulated human activity which are changing the ecosystem, irreversibly in many cases. There is a clear need for countries to have the capacity to maintain an alert and response system.

Finance and funding are needed for building solid foundations and adequate infrastructure to invest in critical research. In addition to availability of funds, we need the capacity to utilise the funds optimally.

With One Health, the goal is to achieve optimum health outcomes. This calls for integration of planning and efforts of multiple sectoral stakeholders including government, non-governmental and civil society organisations.





**Dr. Madhu Verma,**  
**Chief Economist,**  
**World Resources Institute**

Policies fail often because they are based on limited knowledge and a narrow view of the issue they aim to address. It is not a zoonotic problem that led to COVID-19 pandemic but anthropogenic activities. Simply solving local level national level problems is not going to be solved, problem solving has to be multi-tiered.

In looking at zoonotic diseases, the solution is not the one that pitches conservation against development. Ecosystem services, only a fraction of which can and has been quantified, contribute immensely to health. Value of One Health approach lies in assessing nature's contribution to people (IPBES 2019). It has immense value for human health. Every £1 invested in afforestation has been assessed to yield £2.79 in economic and social benefits. On the other hand, US \$20 billion has been spent since 2003 in response to bird flu. Therefore, the focus should be on conserving and restoring biodiversity in order to achieve health goals with a One Health worldview. Indigenous knowledge must be foregrounded in policy planning. Green jobs can come up with the restoration of biodiversity.

There are challenges in implementation of One Health approach some of which are institution proliferation, fragmentation of research and efforts, competition for resources and donor driven vertical programs



### 7.5 CHAIRPERSON'S REMARKS

**Dr. V B Mathur,**  
**Chairperson, National**  
**Biodiversity Authority**

Traditionally, collaboration between human and animal doctors has been the centre of One Health. However, recent experience and scientific facts indicate that a paradigm shift in our approach is required, with an emphasis on local communities. We must consider our local communities as well as their natural surroundings. And we need to include the local community in our approach, as well as the centre. One Health approach must include human health, wildlife health, and animal health. We need to combine soil health in this lens but all in the context of the community. These are just a few of the messages that have been delivered at the SMDSX. Those who are most vulnerable must be included in the planning and decision-making. Surveillance is mainly about exchanging information and those who bear the brunt of it must be included.

We have a lot of data and a lot of information and we need to share it. It is about encouraging people to work together and collaborations must be encouraged. Nature must be a partner in our efforts. These are some of the key insights from a transdisciplinary approach that should be utilised.

While there are many specialisations, we need to get people together that is interdisciplinary, crosses across sectors, and bring multiple specialisations and knowledge together. We need to come out of our silos, this is the only way to achieve One Health. We require credible and capable research institutions that combine science and veterinary practice. We need to have continual monitoring of disease, disease pathogen and sites for sentinel surveillance. We must build a common shared vision with a Participatory Disease Surveillance Systems (PDSS) beyond health care systems as well as Sentinel Surveillance Sites (SSS). Community engagement and youth participation in PDSS are critically needed for a successful one health implementation. Finally, the five C's are important. Coherence, we must bring coherence to our actions. Convergence; we must converge our actions as there are many stakeholders who must come together. The third C stands for Complementarity of the different participants. The fourth C is the Community because these three things will not happen unless they are happening in the context of the community. If all the 4 Cs are addressed, Conservation will also be addressed.

7.6 KEY RECOMMENDATIONS FOR ACTION AND WAY FORWARD



There is a need to look at health not just of human beings but beyond. Zoonotic diseases are an area of concern now and the wider lens of One Health is crucial to address it. This calls for integration of planning and efforts of multiple sectoral stakeholders including government, non-governmental and civil society organisations.



With the COVID19 pandemic, states are relooking at health and education strategies which should include the One Health lens



There is a clear need to have the capacity, institutional processes and resources to maintain an alert and response system.



Indigenous knowledge foregrounded in policy planning.



A multisectoral institutional process that is based on convergence is needed that is supported by state and national One Health policies.



Science needs to come together with different disciplines of science and social science. A transdisciplinary, collaborative approach is needed.



Finance and funding are needed for building solid foundations and adequate infrastructure to invest in critical research. In addition to availability of funds, we need to build capacities for greater impact.



The pandemic also highlighted the need for collaboration and convergence and the important role of local health practitioners like ASHA workers and ANMs whose inclusion must be strengthened. More expertise and wisdom on the ground is needed.





08

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## Other Events



# Mental Health and Youth in IHR



## 8.1 YOUTH REFLECTIONS AND WAY FORWARD Youth and mental health in Indian Himalayan Region

**Ms. Raj Mariwala, Director,  
Mariwala Health Initiative**

As per United Nations (UN) population prospects, the youth population (15-29 years) globally stands at 1.8 billion out of which every fifth resides (20%) in India (366 million), reflecting the importance of this segment of people in the country. Nearly 10-30 per cent of young people suffer from health impacting behaviours and conditions that need urgent attention of policy makers and public health professionals. At least 20% of young people are likely to experience some form of mental illness. WHO states that the mental health workforce in India is not upto the mark and there is a huge shortage of psychiatrists and psychologists in the country as compared to the number of people suffering from mental health issues. WHO also estimates that about 7.5% Indians suffer from some mental disorder and predicts that by the end of this year roughly 20% of India will suffer from mental illnesses. The Himalaya is celebrated for the beautiful landscape but this also masks the hard life in the mountains. Life in the mountains is challenged with geography, access to social infrastructure and support. Opportunities are limited in the mountains and return on investment for agriculture and services is not equitable and commensurate with the efforts. This results in large-scale out-migration of young people from the IHR. This brings challenges including mental health challenges to not only the ones who migrate but also to the families who stay back. These are all exacerbated by the impacts of climate change that affect life and livelihoods. The COVID-19 lockdown has added a series of challenges and vulnerabilities to the existing situation in the IHR. All these issues and challenges of the mountains have bearing on the mental health of the people of the



mountains, but it does not feature prominently in the development discourse of the mountains. In most instances, care and support for mental health whether it be clinical or community based is extremely limited in the mountains. There is still stigma related to mental health within communities and institutions and there is no everyday language that encompasses mental health issues in the mountains.

Raj Mariwala presented the work of the Mariwala Health Initiative as a grant making, advocacy and capacity building philanthropy working exclusively on mental health. She started by presenting the data on youth as per United Nations (UN) population prospects mentioning that the youth population (15-29 years) globally stands at 1.8 billion. Providing context on India's youth, she stated that out of the total youth in the world, every fifth resides (20%) in India (366 million), reflecting the importance of this segment of people in the country, adding that a large number of Indian citizens have mental health problems. The other points she mentioned were 80% of people living with mental health care in India do not have access to care and support. India has the highest number of adolescent population in the world with a very high suicide rate among people between 15 to 29 years old with most care and support only in large metros leaving out geographies like mountains.

Coming to the mountains, Dr. Mariwala highlighted that mental health care facilities are not easily accessible, therefore making it even harder for the mountain people to get care, support and treatment that are available at the district level in many parts

of the country. The Mental Health Care Act May 2018 which talks about the duty of the state to provide health services to all citizens and guarantees mental health care and support to all citizens; states that mental health care must be available in sufficient quantity; be geographically accessible and of good quality and acceptable scientific and medical quality. This needs to be looked at from what it means for the mountains and the geographic availability must be advocated at various levels.

The COVID19 pandemic has highlighted the link between mental health and physical health. The pandemic also highlighted the issues of social safety net, reduced opportunities and employment, food insecurity, and education lead to a higher probability of mental health problems of persons and communities. Taking the example of food, food insecurity is a risk factor for both physical and mental health. Besides the immediate physical ill health, food insecurity relates to mental health issues too like relentless distress, anxiety, shame, guilt and powerlessness. Food insecurity is linked to higher probability of non communicable diseases such as diabetes, cardiovascular disease, depression and anxiety. This further leads to increase in health care costs, which increase the likelihood for an individual to slip into poverty. Individuals who already have mental health issues are most at risk of social drifts, mental ill health increases an individual's exposure to economic shock.

Individuals who have mental health concerns face barriers in availing education, finding jobs and getting their civil rights. To engage with mental health there is a need to shift to an intersectional and intersectoral approach. Mental Health is connected with education, gender inequalities, physical inequality, violence and other global challenges. Our social context interacts and influences our psychological context, which includes emotions, feelings, thoughts and reactions. When we look at mental health psychologically the interventions and plans should lead to approach which means to look at mental health connected with the context and environment.

Mental health barriers also affect education which further impacts employment opportunities resulting in poverty. Food insecurity and malnutrition are causes of mental health. According to the mental health care act 2018 the state is responsible for meting out scientifically acceptable mental health care services without any discriminations. These services must be of proper standards, affordable, culturally accepted and should also be geographically accessible.

There is a link between physical and mental health. People inhabiting the natural disaster prone areas are mentally distressed. Also the people affected by diseases like HIV, are vulnerable to mental health issues. Climate change may affect mental health directly or indirectly especially among the youth which can be referred to as the eco-anxiety.

The COVID19 pandemic led to financial and food insecurity. This further led to mental health issues which caused distress and anxiety. Psycho social context is very important to deal with mental health issues. Intervention and plan should be linked to food security and nation building. Community members should be trained since they would be able to provide better services to the affected individuals. If we want sustainable support we need to equip the society, for instance in Orissa, which faces disasters frequently, local people receive training on psycho social first aid and linking it with government welfare schemes.

8.1 YOUTH RECOMMENDATIONS



Mental health is a risk factor for patients suffering from diabetes and cardiovascular diseases. Its treatment must be integrated for HIV patients



The social and economic aspect of mental health must be addressed



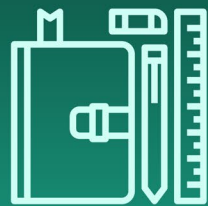
The youth should be involved and make intervention by taking into account all the psychosocial and climate change factors for mental health



Every district should have mental health care and support services.



Comparative research work must be carried out in the Indian Himalayan Region and the other areas. The best practices must be adopted from these areas



Grassroots community support must be built for livelihood and education.



Awareness programmes must be undertaken at the primary level in the health care system



They should also build a network and formulate frameworks to tackle the problem.



The Indian curriculum for psychosocial models for learning is slow. DLR Prerna runs models for psychosocial understanding for children which will contribute to a mountain discourse and intervention.



Hyper local solutions such as building community resources by producing experts, professionals and nurturing community support by training local people for affected individuals are necessary to provide mental health services sustainably. The inclusion of the community members would be beneficial in addressing the mental health issues as they would be aware of the psycho-social context, community needs and the linkages to mental health.



A part of the stigma around mental health in society is constructed by the way community members talk about it. There is a requirement to normalize the talk about common mental health stressors and culturally acceptable words should be used in dealing with stress, linking it to the cause of it.



The government should take necessary steps to address mental health issues. Political leaders must be advocated to invest funds for mental health in the right place since the central and state governments have budgets for it.





## 8.2 MOUNTAIN LEGISLATORS' MEET

The Mountain Legislators' Meet (MLM) 2021 with theme 'Pathways for Plastic Waste Management in the Indian Himalayan Region' was taken forward in partnership with the United Nations Environment Program (UNEP) CounterMEASURE-II project with an objective of creating awareness of plastic pollution in the riverine systems of India in general and ultimately reduce marine plastic pollution. Within the project, IMI focuses on the issue of plastic pollution in the IHR states and Uttarakhand in particular, advocating for a mountain-sensitive policy and practice.

With rapidly changing production and consumption systems, urbanisation and fast growing tourism in the IHR, the problem of plastic pollution is becoming more grave. Plastic waste management is coupled with numerous institutional and infrastructural hiccups in the region due to remoteness, weak institutional setups, lack of infrastructure, lack of waste disposal facilities and connectivity issues. Systemic changes in the long run and not just the end of the pipeline solutions are much required. Designing out plastic pollution and companies taking responsibility for their waste is the narrative shift essential to redress the waste crisis.

Besides, there is a need to contextualise waste management rules including plastic waste management with a mountain lens wherein they are sensitive and acknowledge the specific issues and challenges of the mountains. This calls for an appropriate resource allocation and support that is

considerate of and reflective of the rich biodiversity, ecological sensitivity and fragility of the Indian Himalayan Region besides specific geographical challenges of mountain waste management. Recent promulgations like the Extended Producer Responsibility (EPR) within the plastic waste management rules must be made feasible to the mountain states.

### MLM deliberations

Mr. PD Rai, President, IMI and former Lok Sabha MP (Sikkim) opened the meeting by welcoming the dignitaries and participants. He welcomed Mr. Chowna Mein, Deputy Chief Minister, Arunachal Pradesh, who was the Chief Guest of the meeting and representatives from different levels of Indian federal structure including MPs, MLAs, members of local bodies joined the meeting. Mr. Rai emphasised on building resilience in the mountains and highlighted challenges concerning the mountains such as development disability, accessibility, and climate change induced challenges. He also reiterated the notion of 'One Health' which is a lens that collectively looks at the intersection of human, animal and planetary health that was deliberated in the three-day Summit.

He also stressed on devising a layout of actionable items to bring about the much needed change.

Dr. Sumit Sharma, Programme Officer, UNEP, presented on UNEP's initiatives for actions against marine plastic Litter and plastics waste. Quoting a WWF report that almost 5 grams of microplastics are





ingested on a weekly basis by all of us, he mentioned that marine litter has its origins on land and the negative impact of plastic waste is not only limited to marine life, but through food chains, even humans are under great harm. Dr. Sharma mentioned that UNEP is working at global, national and state levels to tackle the problem working with the Ministry of Environment and Forest and with governments like the Uttarakhand government at the state level. During his presentation, he also detailed UNEP's flagship 'CounterMEASURE' project, highlighting that assessment of concentration of plastics in the rivers and the hotspots in city areas contributing to this issue must be revisited. He listed several initiatives and ways of management of plastic waste such as the social media campaign "Plastic Se Behtar", seeking alternatives to plastics. Efforts are also being made for better engagement of youth to ensure individual action and leadership on plastic waste. Talking about policy interventions, he stated that UNEP's policy inputs include recommendations on the National Action Plan for tackling marine and riverine plastic pollution, policy briefs for cities like Patna, Prayagraj, Haridwar, Agra, and specific policies for mountain states focusing on Uttarakhand, besides many other things.

Mr. Roshan Rai, Councilor IMI and member of Zero Waste Himalaya shared his insights on the issue of plastic waste as faced in the mountain regions. Highlighting the absence of a mountain-centric waste management lens, he stressed that the socio-ecological importance and fragility of mountains needs to be considered, building a case for appropriate and adequate resource allocation

for mountain states. Waste and brand audit data conducted as part of The Himalayan Cleanup 2021 were presented that showed 85% of household waste audited to be plastic and 72% of it non-recyclable which revealed the scale of the plastic pollution crisis. The need for Extended Producer Responsibility (EPR) by companies that pollute the IHR was highlighted by Rai in his presentation, stating that in its existing format, EPR is not viable in the mountains, though much needed to redress the waste crisis. He mentioned that 66% of the plastic waste was from food packaging showing how waste intersects with food systems and "Eating Right". Education, awareness, better implementation of policies, and behavioural change will aid in effectively handling the plastic waste crisis.

Dr. Gopal Rawat (IMI, SDFU) provided a brief of the work undertaken by Sustainable Development Forum Uttarakhand (SDFU) as part of CounterMEASURES-2 project, along with Mr. Anoop Nautiyal (SDFU) who gave details on the stakeholder consultations and Focus Group Discussions. Various groups, people's representatives and individuals had participated in those discussions and provided their valuable insights on the plastic waste crisis and its management. Mr. Nautiyal shared that plastic waste management can also be incorporated into the syllabi wherein children from a very young age will comprehend the nuances of this situation.



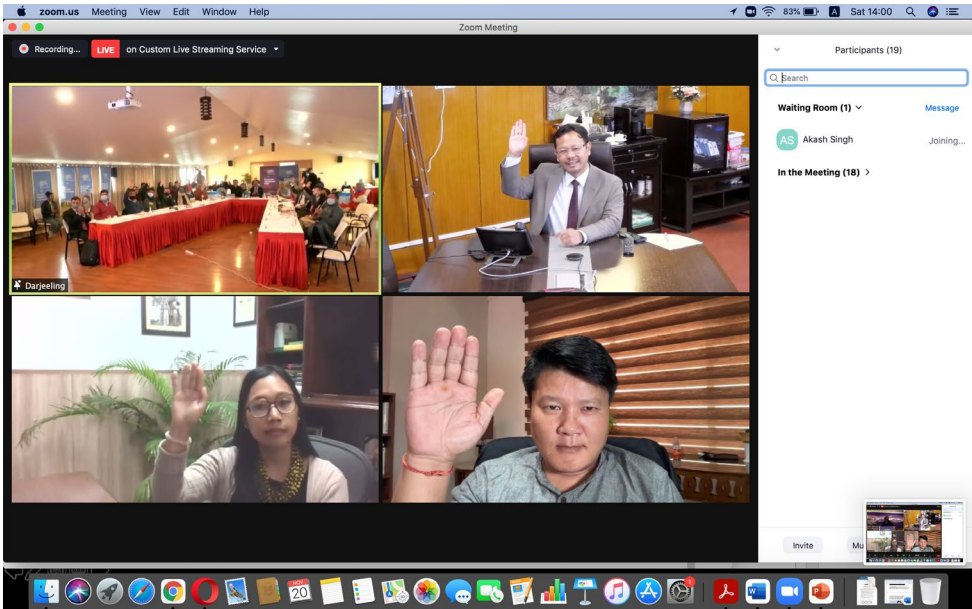
### Open house discussion

Smt. Agatha Sangma, MP and Member, Standing Committee on Water Resources talked about innovative mechanisms and alternatives to control plastic wastes and called for taxation on production of plastics as is done in various other countries, highlighting that manufacturers should be encouraged to use less virgin plastic and use more recycled plastic. She argued that the natural elements that are available in the Northeast in abundance can be used as alternatives which can lead towards employment generation as well. Mr Vincent Pala mentioned that the world has woken up to the plastic crisis, which is now being equated to the climate crisis. Recognising this, India has already taken a call to be free from Single Use Plastics, he stated and that everyone must cooperate and collaborate to make our mountains free from Single Use Plastic.

Mr. James Sanga, Minister Forest and Environment from Meghalaya, stated that it was time for IHR states to institutionalise and integrate environmental governance in their hearts as part of their polity and stressed the importance of bringing nature into economic and legislative possibilities.

Mr. Chowna Mein outlined that plastic waste crisis needed to be tackled effectively to lead to a significant strengthening of the tourism sector in the Himalaya. He voiced that all the mountain states have overlapping requirements and they should collectively spearhead sustainable climate initiatives and work towards the protection of the environment.

Mr. Sushil Ramola, former President of IMI, delivered the concluding remarks in which he placed three sets of actions to tackle plastic pollution. Interventions at the policy level, community awareness and action, and collaborative work through various stakeholders.



## DARJEELING DECLARATION MOUNTAIN LEGISLATORS' MEET 2021

We, the representatives and former representatives of various elected bodies of the Himalayan States, Union Territories and districts of India, having heard, discussed and deliberated on several important issues of the Indian Himalayan Region, especially on the pathways for plastic waste management in the region, collectively do hereby:



Acknowledge that there is an urgent need for bringing about stringent policies and legislation against Single Use Plastics due to the fragile Himalayan ecosystem and resolve to commit to the vision of a Zero Waste Himalaya



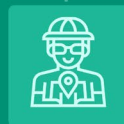
Facilitate and support the contextualisation of all waste management rules to be sensitive and acknowledge the regional specific issues and challenges of mountain/hill states.



Advocate for Extended Producer Responsibility (EPR) to be made feasible to the mountain states by addressing the specificities of mountain economy and bringing in commitment from the industry



Support the Central government's call to eliminate Single Use Plastics and take measures for eradicating SUPs in the Indian Himalayan Region by urging our state governments, Union Territory administrations, district councils, traditional institutions and other civic bodies for sustained cooperation and collaboration in a serious fight against plastic pollution.



Engage relevant stakeholders to take proactive steps to explore solutions for a sustainable tourism in the Indian Himalayan Region which is possible only with arrest of the existing waste crisis and reducing plastic pollution in the region.

### Approved via signatures:

Shri Vincent Pala, MP  
Shri H.M. Shangpliang, MLA  
Shri S.T. Venchungpa, MLA  
Smt. Miani D. Shira, MLA  
Shri Pravat Chowdhury, MLA  
Shri Tashi Gyalson, CEC, LAHDC  
Shri Sunil Uniyal, Mayor, Dehradun  
Shri Kishore Upadhyay, former MLA  
Shri K.T. Gyaltsen, former MLA/Speaker  
Shri Rigzin Spalbar, former CEC, LAHDC

### Approved via virtual confirmation:

Dr. Sanjay Jaiswal, MP (Bihar) and Chairman,  
Standing Committee on Water Resources  
Shri Chowna Mein, Deputy Chief Minister,  
Arunachal Pradesh  
Shri James Sangma, Minister, Environment and Forest,  
Govt of Meghalaya  
Smt. Agatha Sangma, MP, Meghalaya  
Shri M. Kikon, MLA, Nagaland and Advisor, Dept  
of New and Renewable Energy 6. Shri Ninong Ering,  
MLA Arunachal Pradesh  
Shri Mutchu Mithi, MLA Arunachal Pradesh  
Shri Pushpendra Tripathi, former MLA, Uttarakhand

### Other dignitaries:

Shri P.D. Rai, Former MP Sikkim and President, IMI  
Dr. V.B. Mathur, Chairman, National Biodiversity Board  
Dr. Sumit Sharma, Programme Officer, UNEP  
Shri Reuben Gergan, Consultant, UNEP  
Dr. Thomas Chandy, IFS, Chairman, State Pollution Control  
Board of Sikkim  
Shri CP Rai, Administrator, Darjeeling Municipality



### 8.3. DR. RS TOLIA MEMORIAL LECTURE AND AWARD



**Dr. Eklabya Sharma**  
Lead at GB Pant, ICIMOD

#### Dr. RS Tolia Memorial Lecture - Dr. Eklabya Sharma

A short introduction to Dr. RS Tolia, the founding President of Integrated Mountain Initiative and his vision that gave birth to the IMI was given by Ms. Priyadarshinee Shrestha, Secretary IMI. With his loss in 2016, IMI in 2017 instituted the Dr. RS Tolia award and the Dr. RS Tolia Memorial Lecture was also established in the same year to continue his inspirational legacy in the Indian Himalayan Region.

Dr. Eklabya Sharma shared his close links with Dr. R. S. Tolia since his GB Pant and ICIMOD years, the evolution of the idea and institution of IMI and how he was involved at the personal level. He went on to deliver his lecture on, "Climate Change Challenges in the Indian Himalayan Region: Solutions for Stakeholders" on three major areas which were the global perspective, IHR, the scenarios, stakeholders and resilience building and not mitigation.

He narrated that 1 billion people live in the mountains at the global level but do not get acknowledged for 50% of goods and services that the mountains provide to the planet. He talked about the biodiversity importance of the mountains, which have nearly 50% global biodiversity hotspots that contribute to the food security of the planet. 240 million people depend on the Hindu Kush Himalaya and 1.9 billion depend on the HKH for food, water and energy. HKH has 4 global biodiversity hotspots and the largest store of water besides the poles with a diversity of cultures living here. IHR is within the HKH (10.76% of HKH landmass) and is an extremely important landscape where a diversity of cultures thrive (36.42% of the population of HKH live in the IHR) and whose lives and interventions will be critical in building

resilience. The IHR is high in socio-ecological diversity and endemism and provides a host of ecosystem goods and services to the nation state and needs to be recognised and acknowledged.

With respect to climate change discourse in Paris and Glasgow there was a large focus on mitigation but for developing nation states adaptation is also extremely important and has not received its due. If adaptation is given its due mountains would also get greater recognition. If one were to look at 1.5 degrees celsius limit in global temperature as it is being discussed in the global summits when it comes to the HKH this is already too much as the mountains have had higher temperature rise than the global average. If temperature rise is maintained at 1.5 degrees the impacts would mean that the HKH glaciers would lose 1/3 of their volume by 2100 and in present day trends 2/3 volume would be lost with great impact on water security leading to possible conflicts. It would also mean that Indus, Ganga and Brahmaputra would have run off issues with changing precipitation patterns impacting agriculture and forests productivity. In the mountains, climate change results in reducing quality of resources as well as increasing disaster risks that affect the well being of the people including casualties. Thus we need to relook at what development means in the mountains and move into nature based solutions. Policy makers in the IHR must be more reliant on evidence based policy making frameworks as well as give priority to adaptation along with mitigation. Industry and corporations must move to green technologies as well as incorporate adaptation and mitigation in their business strategies. Entrepreneurs have to look at social entrepreneurship as well as use green labelling and marketing. Academia has a great role to play in research and policy while

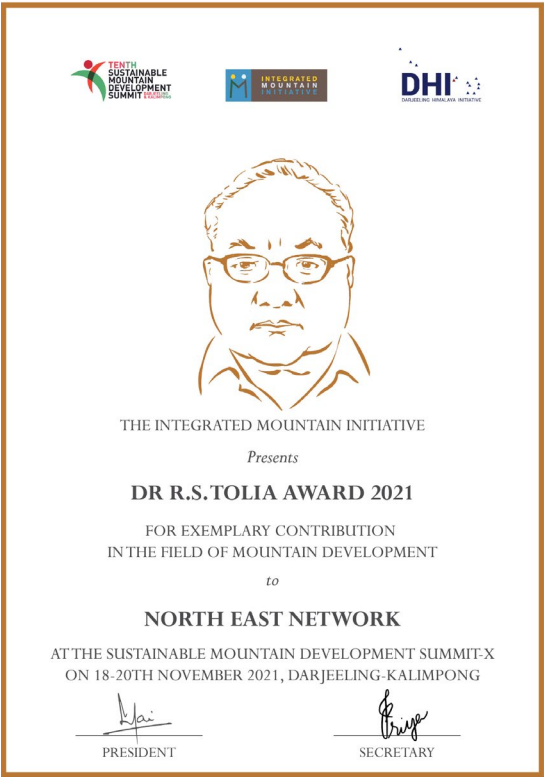
NGOs and CSOs must enable on ground adaptation and resilience building. Ultimately one also has to look at a continuum of mountains to oceans with everyone having a role to play in climate change mitigation and adaptation.

Dr. Sharma then went on to narrate solutions like springshed recharge interventions, forest fire management that have to be taken forward. He also highlighted the need to bring in mountain specificity to Sustainable Development Goals with integrated, inter and transdisciplinary approaches that bring about resilience. For the mountains it is important to link resilience building to livelihood diversification and entrepreneurship. In the mountains one also needs to focus on tourism as an important stakeholder in resilience building. One needs to emphasise and recognise that mountains are highly impacted by climate change that needs climate social protection systems for future shocks; resilience building and supported by climate finance dedicated for the mountains.

Dr. Sharma shared some key IHR initiatives of Himalayan States Regional Council for Sustainable Development in the Indian Himalayan Region; Niti Ayog IHR reports; National Mission on Sustaining Himalayan Ecosystem and National Mission for Himalayan Studies that IMI and partners needs to leverage to take forward for intervention on climate change in the mountains. He went on to highlight central schemes, bonds and funds that are available but not coming to the mountains. IMI needs to take a proactive role in bringing these resources in the IHR and this would be continuing the legacy of Dr. Tolia who was a man of action and loved the mountains.

Announcement of the Dr. RS Tolia Award for 2021

The announcement was preceded by a screening of a short film showcasing Dr. Tolia's life by Ms. Priyanka Tolia. Ms. Priyadarshinee Shrestha, Secretary IMI thanked the jury for their voluntary services in judging the winner of the Dr RS Tolia award.



Dr. RS Tolia Award 2021 was conferred upon the North East Network (NEN).

The journey of North East Network (NEN), started in 1995, as a preparatory process of the World Women's Conference in Beijing. Since then they have established themselves as a women's rights organization working to strengthen women's groups in north east India viz. Assam, Meghalaya and Nagaland, particularly on issues of economic, social, cultural and environmental rights. In Nagaland, NEN is based at Chizami village and works in 5 districts of Nagaland - Phek, Kohima, Dimapur, Tuensang and Noklak. Over the years, NEN has engaged with women (farmers, vendors, artisans), young people and community leaders in safeguarding and conserving community natural resources; indigenous food and farming systems; and traditional weaving and textiles. They have strengthened communities in their capacities to respond to climate change through agricultural production, food security, and natural resources management.

As a member of the Millet Network of India (MINI), their promotion of millet farming engaging women farmers of Phek District, Nagaland has produced a network of 290 Millet Sisters in 16 villages, leading to millet revival in several areas of Nagaland. NEN has also worked on developing Community Seed Banks to revive and enhance traditional social seed networks with 10 community seed banks operational under Phek and Noklak Districts with local women groups. These seed banks generate

awareness and understanding on the importance of indigenous food systems and revive lost seeds.

In 2016, NEN Farm schools were also started to create awareness on the growing issue of food, nutrition and ecological insecurity among young urban students.

NEN also has a Wildlife and Biodiversity Conservation Education Programme to undertake conservation education, research and documentation, and awareness action with young people. The NEN Hoolock Gibbon Eco Club Chizami has documented a total number of 81 species of Birds, 217 species of butterflies amongst other biodiversity documentation.

The Chizami Weaves, initiated in 2008 as a livelihoods' project of NEN Nagaland with 7 weavers, today has 900+ weavers in Phek, Kohima and Tuensang Districts. The enterprise has enabled women to increase their income and also visibilized the rich textile weaving tradition of Nagaland as its products have been marketed all over the country and even outside.

NEN has been engaged in building grassroots women leadership, dialoguing with and creating awareness on gender-inclusive development and participation of women in decision making processes at the community level since the beginning of its work in Nagaland. One of the significant outcomes seen in some villages where NEN has intervened is the attitudinal change towards women's participation

as well as women's representation in decision making. NEN also engages in addressing Gender Discrimination & Violence against Women and Girls through various awareness workshops, campaigns and events to engage young people, women, and community leaders. NEN Nagaland, as a member of the InsightShare Network, a network of Participatory Video Hubs, trains young people on research and documentation of their indigenous culture and issues and on themes such as environment, food systems, livelihoods, climate change, gender. These videos have been making an impact at the community level in influencing community attitudes, decisions and actions. NENs work has affected women's lives, changed attitudes and created spaces for women in decision making, influenced policies, promoted environmental friendly livelihoods based on indigenous socio-ecologies. For their commitment, action and impact for sustainable mountain development the Dr R. S Tolia 2021 award is conferred to the North Eastern Network. The award was accepted by Ms V. Tsuhah, State Co-ordinator, NEN, Nagaland



8.4 Indian Himalaya Photography Contest 2021

The Indian Himalayan Photography contest with the theme 'Food cultures of the Indian Himalayan Region' was organised as part of SMDSX. 46 participants from across the mountain states submitted their photographs for the contest, which was judged by a panel of eminent jury members.



First place -  
Pokhraj Rai,  
Sikkim

Shortlisted photographs were displayed during the SMDSX at Chowrastha, a prominent public space in Darjeeling during the SMDSX as well as the Mountain Day celebration in Kalimpong.

Photographs were judged by an independent expert panel and the winners were announced at the International Mountain Day 11 December 2021 at Kalimpong.



Third place -  
Pravin Tamang, Darjeeling



Second place -  
Momo Irengbam,  
Manipur



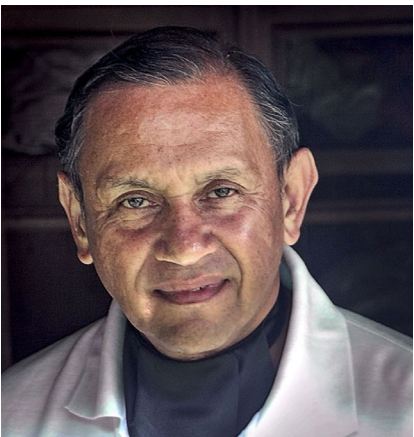




09

# Valedictory Session





### 9.1 OPENING ADDRESS

**Mr. Praful Rao, President - DHI and STH, Kalimpong**

Wing Commander Praful Rao President DHI thanked IMI, Legislatures and participants for the SMDSX and highlighted the commonality of the mountains that brings us together at the Integrated Mountain Initiative and voice our collective thoughts and concerns. He acknowledged that the SMDSX is a badge of honour for DHI and recognised the hard work of the IMI and DHI members in getting the summit in the Darjeeling and Kalimpong Himalaya.



### 9.2 OUTCOMES OF SMDSX

**Ms. Priyadarshinee Shrestha, IMI Secretary and WWF India**

Ms. Shrestha outlined the process of SMDSX and highlighted the keynote addresses of Dr. Somya Swaminathan WHO and Dr. Pema Gyamtsho ICIMOD. She went on to narrate how the context was set by the luminary panelists of Mr. Ravi Singh WWF India, Dr. Vandana Shiva, Navdanya and Dr. Sandeep Chaudhuri and chaired by Dr VB Mathur, National BioDiversity Board. She summarised the technical sessions of Zoonosis;

Biodiversity and Sustainable Food Systems which had excellent speakers who highlighted key issues and insights for One Health in the IHR. The Mountain Legislatures Meet deliberated on plastic pollution in the mountains and on pathways to redress it. The Youth deliberated way forward of the summit as well as focussed on Mental Health and Youth in the IHR

The SMDSX had key takeaways that were brought together in the session on governance that looked at a road map for One Health in the IHR. She then went on to elaborate key outcomes and recommendations of SMDSX presented in the following section.





Enhance disease surveillance at all levels



Collaboration beyond silos  
- Interdisciplinary approach  
although challenging is the  
only way to move forward

**STRENGTHEN PRACTICES  
THAT PROMOTE ONE  
HEALTH IN THE INDIAN  
HIMALAYAN REGION**



Promotion of traditional  
food systems that are  
nurturing for human health  
as well as the planet



Documentation and focus on  
grounded and contextual  
experiences.



Restoration beyond  
reforestation of biodiversity and  
ecosystems in the mountains.

KEY OUTCOMES

**MOUNTAIN SENSITIVE  
POLICIES ON ONE  
HEALTH REQUIRED**



IHR single use plastic bans



Front of label packaging for food for  
promoting good health.



Strengthened Policy on restricted use  
of antimicrobial drugs in agriculture.



Mountain One Health policy that fosters  
cooperation / collaboration  
(transboundary focus)



Mountain sensitive waste management  
policies and extended producer  
responsibility.

KEY OUTCOMES





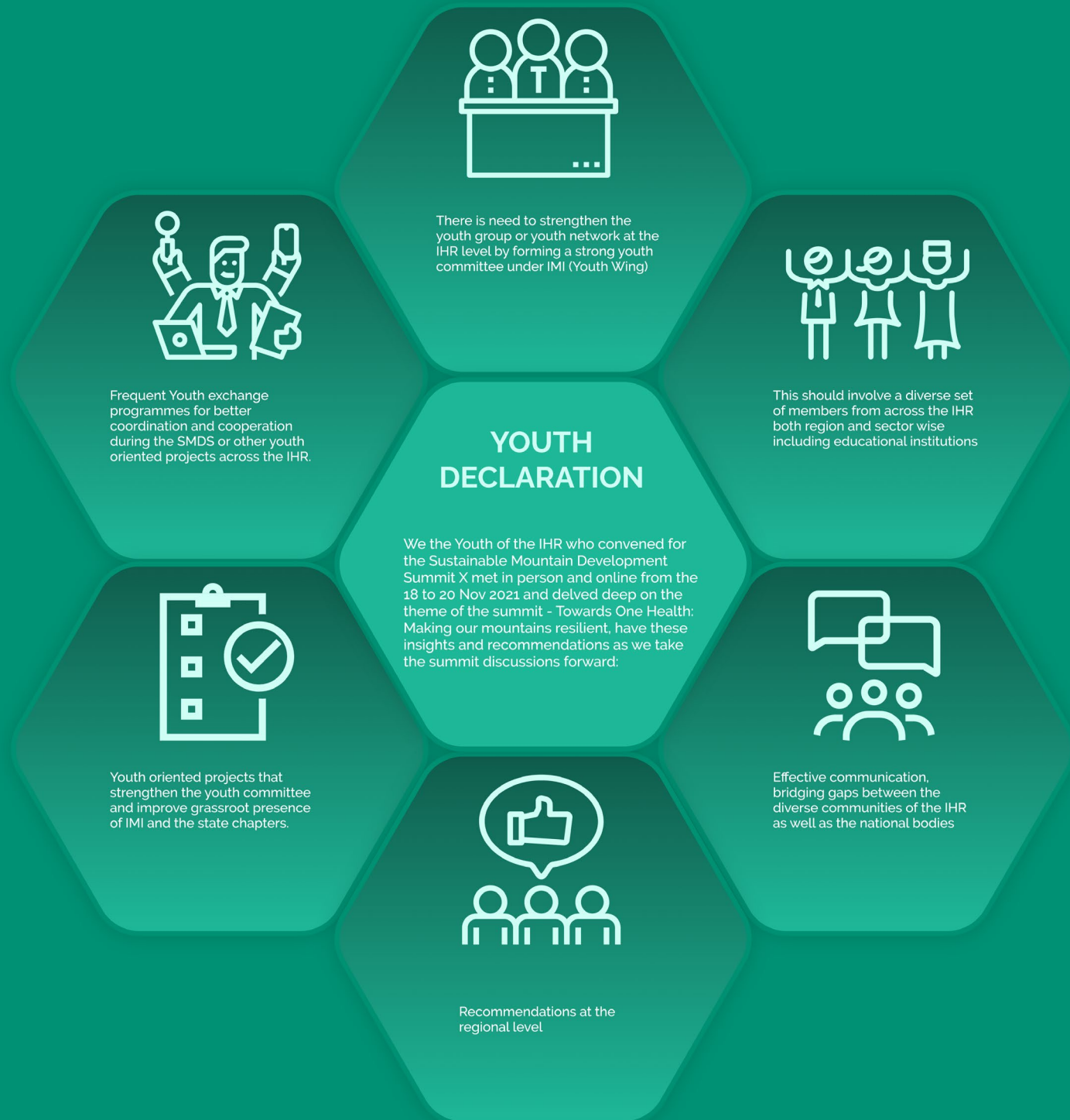
### 9.3 STATE CHAPTER WAY FORWARD

**Ms. Binita Shah**  
**Treasurer, Integrated Mountain Initiative (IMI),**  
**Secretary, Sustainable Development Forum of Uttarakhand**  
**CEO -SARG**

Ms. Binita Shah outlined key actions that IMI and State Chapters need to undertake from the key outcomes and recommendations of SMDSX. Her way forward looked at key interventions and thoughts from the various thematic sessions of SMDSX. From the session on Zoonosis, she questioned the existing industrial meat industry and the need for the IHR to think about animal husbandry models that are small-scale, viable, organic and disease free. These would be suitable for the mountains but also highlights the dichotomy between national policies and practices that are designed for the plains and not always suitable for the mountains. State Chapters and IMI need to rethink and replan small scale business models in animal husbandry. She highlighted the rabies management undertaken in Sikkim and presented in the zoonosis session that needs to be scaled to the IHR along with the need for a zoonotic diseases data repository for the IHR. The biodiversity session intersected with food systems and zoonosis and the key takeaway for IMI and the State Chapters is the need to invest in scenario planning that is long term that is interdisciplinary and based on interdependence. From a systemic lens biodiversity would be root to buffer from disease crossovers from the forest to agricultural systems

The biodiversity session interfaced with the food systems session and there is a need for IHR to rally for an action research centre for integrated farming and food systems in different agro-ecological context of the IHR. This would be necessary to respond to the specific context across the IHR as well

as to build market systems. This offers a wide range of livelihood options to youth, especially the many who have returned during the COVID19 lockdown. The opportunities for local food systems across the IHR for youth entrepreneurship is tremendous and we should have a vision of the IHR offering traditional food and not processed food. State chapters could promote local food systems and link it with tourism and fairtrade. The Darjeeling Declaration from the Mountain Legislatures Meet 'Pathways for Plastic Waste Management in the Indian Himalayan Region' must be taken at the various Legislative Assemblies across the IHR and the Parliament that has to be taken by the IMI and the State Chapters. She concluded by expressing the need for National Missions to have a mountain lens as well as for IMI and the State Chapters to develop on the ground proposals to manifest the missions.



9.5 PRESIDENT’S REMARKS

Mr. PD Rai,  
President IMI

Mr. Rai thanked Ms. Priyanka Tolia for bringing in the documentary on Mr. RS Tolia that is the vision behind IMI. He went on to narrate the co-creation of the SMDSX theme of One Health with DHI, which is the testimony of Dr. Tolia's impact on IMI. He talked about IMI as a platform that brings about diverse people and SMDSX has shown the possibility of access and participation to the discourse and debate of such summits. He talked about how this summit has brought about important and critical learnings to take forward. He also talked about how embedding the Youth in the summit has been extremely meaningful and shows the possibility of a youth wing of IMI that would energise the IMI movement.

He highlighted that the One Health discussions have brought about the need to work more across vertical and horizontal lines. He talked about the need to embed One Health into SDGs that will link One Health to commitments at the national and global levels. He thanked all the presenters and participants at the SMDSX and acknowledged the importance of the Mountain Legislatures Meet 2021 too. He mentioned that the MLM discussion on plastic waste was critical and the legislatures brought in a lived experience of plastic pollution and offered deep solutions for redress. He recognised the key role played by Dr V. B. Mathur took the theme of One Health at the SMDSX and called on him for work in the future.



## 9.6 PASSING THE BATON OF SMDSXI TO LADAKH

Wing Commander Praful Rao, President of Darjeeling Himalaya Initiative handed over the baton for Sustainable Mountain Development Summit XI to Shri Tashi Gyalson, CEC, Ladakh Autonomous Hill Development Council in the presence of the IMI President, Mr. PD Rai.

Shri Tashi Gyalson, CEC, LAHDC invited participants to Leh Ladakh for SMDSXI.







9.7 VOTE OF THANKS

Mr. Roshan Rai,  
Councillor,  
Integrated Mountain Initiative  
Darjeeling Himalaya Initiative  
DLRPrerna

Mr. Roshan Rai, IMI Councillor, DHI and DLR Prerna proposed the vote of thanks on behalf of IMI and DHI. He thanked all Legislators and Elected representatives who joined in person and online for the Mountain Legislators' Meet to discuss plastic pollution in the IHR.

He thanked all the speakers and presenters who brought One Health to the IHR context, as well as all the session leads who curated SMDSX.

On behalf of IMI and DHI he expressed his gratitude to the donors and partners of SMDSX - Gorkhaland Territorial Administration, UNEP, ICIMOD, Break Free From Plastic. Mariwala Health Initiative, Projectwerkstatt Tekampagne, National Biodiversity Board, UNDP, Sustainable Development Forum Uttarakhand, IISc Bangalore, UCOST - Uttarakhand who enabled the fruition of SMDSX.

He went on to thank all the participants in person and online who joined in for the SMDSX. He placed on record thanks to the media, sound and visuals persons, hotels and logistic support of the SMDSX.

He ended by thanking IMI members, IMI Secretariat team, DHI members and the DHI Youth representatives for their proactive participation and support in taking forward the SMDSX.



SMDSX a Zero Waste Event

IMI upholds a strong belief of ensuring all its events to be zero waste. SMDSVIII Shillong 2019 was the first zero waste SMDS and SMDSX continued the tradition by not using single-use plastic throughout the event. All SMDSX stationery was plastic-free and care was taken to ensure procurement from small scale local entrepreneurs. All the summit food, snacks, water and beverages was freshly prepared and locally sourced. All communication materials used at the event were biodegradable. In person participants had been informed prior to the summit of the zero waste event protocol.



ANNEXURES- YOUTH REPRESENTATIVES FROM IHR

Name	Sub Theme	State
Mary Pali	Zoonosis	Arunachal Pradesh
Katyani Sood	Zoonosis	Himachal Pradesh
Tanvi Rai	Zoonosis	Kalimpong Darjeeling
Palden Tamang	Zoonosis	Kalimpong Darjeeling
Shreya Gurung	Zoonosis	Kalimpong Darjeeling
Deepsikha Sharma	Zoonosis	Kalimpong Darjeeling
Dr Shahnawaz Ahmad Dar	Zoonosis	Kashmir
Sangay Lamo	Zoonosis	Ladakh
Meghna Limboo	Zoonosis	Sikkim
Shirsha Pant	Zoonosis	Uttarakhand
Saurabh Gurung	Zoonosis	Darjeeling Kalimpong
Aakash Thapa	Zoonosis	darjeeling Kalimpong
Abishek Pradhan	Sustainable Food System	Darjeeling Kalimpong
Megha Moktan	Sustainable Food System	Darjeeling Kalimpong
Sento Debbarma	Sustainable Food System	Tripura
Bamelaii Walang	Sustainable Food System	Meghalaya
Gargi Kashap	Sustainable Food System	Assam
Etosha Chatterji	Sustainable Food System	Uttarakhand
Fariha Fatima	Sustainable Food System	Ladakh
Akash Viswa	Sustainable Food System	Dibrugarh, Assam
Arundeeep Singha	Sustainable Food System	Shillong, Meghalaya
Christi Sylvia	Sustainable Food System	Ladakh
Siddhant Umaria	Sustainable Food System	Uttarakhand
Manisha Kumari	Sustainable Food System	Arunachal Pradesh
Avishek Khattiwara	Sustainable Food System	Sikkim
Ankit	Sustainable Food System	Ladakh
Surekha Bhattarai	Sustainable Food System	Darjeeling Kalimpong

Name	Sub Theme	State
Mirem Talong	Biodiversity & Ecosystem	Arunachal Pradesh
Pema Yangden	Biodiversity & Ecosystem	Sikkim
Susadhna Gurung	Biodiversity & Ecosystem	Darjeeling Kalimpong
Arundeeep Singha	Biodiversity & Ecosystem	Meghalaya
Kapil Chettri	Biodiversity & Ecosystem	Darjeeling Kalimpong
Nikita Biswakarma	Biodiversity & Ecosystem	Darjeeling Kalimpong
Easha Pradhan	Biodiversity & Ecosystem	Darjeeling Kalimpong
Shalini Thapa	Biodiversity & Ecosystem	Darjeeling Kalimpong

RAPPORTEURS LIST

Yougesh Tamang  
Tapan Thapa  
Choden Dukpa  
Anamika Sharma  
Pratik Dahal  
Prabinta Bhujel  
Pema Yangden  
Passang Lepcha  
Aditya Pradhan

SMDSX - Steering Committee Members

IMI Members	IMI Secretariat Team
Mr. PD Rai – President, IMI	Mr. Golan Naulak
Mr. Amba Jamir – Vice President, IMI	Ms. Prerana Baisnab
Ms. Fantry Jaswal - SDFA	Ms. Sekulu Nyekha
Mr. Rigzin Spalbar, Ladakh	Mr. Akash Singh
Mr. Reuben Gergan, Ladakh	Ms. Nupur Sarkar
Mr. Krishna Rautela, SDFU	
Mr. STS Lepcha – SDFU	
Ms. Binita Shah, Treasurer, IMI	
Ms. Priyadarshinee Shrestha, Secretary IMI	
DHI Members	
Mr. Praful Rao, President DHI	
Mr. Roshan Rai, GC member IMI	
Dr. Sarala Khaling, ATREE	

ANNEXURES- List of Participants of SMDSX

Speakers

Dr. Pema Gyamtso, Director General ICIMOD  
Dr Soumya Swaminathan, Chief Scientist, WHO  
Dr. Vandana Shiva - Founder, Navdanya  
Mr. Ravi Singh, CEO, WWF- India  
Mrs. B.V. Umadevi - IFS, Addl. Secy, MOEFCC  
Dr. Eklabya Sharma - Vice Chancellor, TERI  
Mr. Amar Singh Rai - Vice Chairperson, Siliguri  
Jalpaiguri Development Authority, Ex. MLA, Darjeeling,  
West Bengal  
Shri Jane Alam - IAS,Chief Secretary, Nagaland  
Shri Mayur Dixit - DM, Uttarkashi  
Dr. Arun Maira -Former Member, Planning Commission  
Shri C.K. Mishra - Former Secretary, Gol  
Dr. Vinod B. Mathur - Chairperson, National Biodiversity  
Authority, GOI  
Dr. Madhu Verma - Chief Economist, World Resources  
Institute  
Mr. Phrang Roy - Coordinator, The Indigenous  
Partnership for Agrobiodiversity and Food Sovereignty  
Dr. Sandeep P. Choudhury - Asst Prof Veterinary  
College Nagpur, One Health Mission, Maharashtra  
Mr. Amit Khurana - Director, Food Safety and Toxins  
programme, Centre for Science and Environment, India  
Mr. Biju Negi - Core Member, Beej Bachao Andolan  
Dr Lallianpuui Kawlnei - Scientist, Wildlife Institute of  
India  
Dr. Uma Ramakrishnan - NCBS, Bangalore  
Dr Nakul Chettri - ICIMOD, Kathmandu, Nepal  
Dr Melari Shisha Nongrum - Associate Professor, Martin  
Luther Christian University, Shillong, Meghalaya  
Dr. Thinlay Bhutia - Joint Director-cum-Programme  
Coordinator, SARA, Government of Sikkim  
Rajarshi Chakraborty - State Project Officer, Gol-UNDP-  
GEF SECURE Himalaya Project, Sikkim

Dr. Ramesh Dhiman - Former Scientist 'G' and  
Sr Consultant, ICMR, Govt. of India  
Raj Mariwala - Director, Mariwala Health Initiative

IMI Members and IMI State Chapters

Mr. PD Rai - IMI, President and former MP, Lok Sabha,  
Sikkim  
Dr. Rajendra Dobhal - IMI, Vice President and SDFU  
Mr. Amba Jamir - IMI Vice President, SDFN  
Ms. Priyadarshinee Shrestha - IMI, Secretary, DHI, WWF  
India  
Ms. Binita Shah - IMI Treasurer, SDFU, Secretary, CEO  
-SARG  
Mr. Ramesh Negi - IMI Councilor  
Dr. Vincent Darlong - IMI Councilor and MIMDI  
Mr. Lalbiakmawia Ngente - IMI Councilor,MizoramSDF  
Mr. Egam Basar - IMI Councilor and SDFArunachal  
Mr. Rigzin Spalbar - IMI Councilor and SDF Ladakh  
Mr. Roshan Rai - IMI Councilor, DHI Secretary, DLR  
Prerna  
Ms. Fantry Jaswal - IMI / SDF Arunachal  
Mr. Sushil Ramola - IMI Member  
Mrs. Bharati Ramola - IMI Member  
Mr. Praful Rao - DHI, President, Save the Hills  
Dr. Sarala Khaling - Regional Director ATREE, DHI  
Dr. Sunita Pradhan - ATREE, DHI  
Dr. Gopal S. Rawat - SDFUttarakhand, IMI  
Mr. STS Lepcha - Vice President, SDFUttarakhand, IMI  
Mr. Rajendra Gurung - Sikkim State Chapter IMI, CEO  
-ECOSS  
Mr. Tony Marak - President MIMDI, Chairman,SEIAA,  
Meghalaya  
Dr. Subhasish DasGupta - Associate Professor MLCU,  
MIMDI,Meghalaya  
Dr. Satyadeep Singh Chhetri - Associate Professor

Gangtok College and Sikkim Chapter IMI  
Mr. Karma Bhutia, Sikkim State Chapter  
Mr. Krishan Rautela - IMI Member, SDF Uttarakhand  
Ms. Thingreiphi Lungharwo - Nodal person, Manipur IMI  
State Chapter  
Mr. John Zothanzama - Secretary, Mizoram SDF  
Mr. Deependra Sunar - DHI, Treasurer, WWF- India  
Mr. Bishnu Chettri - DHI, KKKS,  
Dr. Jyotsna Sitling - Principal Chief Conservator of  
Forests, DHI  
Mr. M P Sood - IMI and PR consultant

In person participants

Dr Prabhat Pradhan, President Darjeeling Earth Group  
Dr. Sonam Lama - Assistant Professor, Darjeeling  
Government College  
Mr Cassian Dukpa, Hayden Hall, Darjeeling  
Ms Dipika Adhikari, Hayden Hall Institute, Darjeeling  
Ms. Gunkesari Pradhan, Secretary, AIWC, Darjeeling  
Ms. Lalita Pradhan - Executive Member, AIWC  
Darjeeling  
S Lama, Scientist CSIR - NEERI  
Prageet Ruchal - Government Cinchona Plantation  
Suman Rai - FOSEP, Darjeeling  
Ms Gardinia Nongbri, Joint Secretary MIMDI, Meghalaya  
Dr. Larilin Kharpur - Assistant Professor, MLCU,  
Meghalaya  
Mr Pankaj Suryavanshi , DFO Darjeeling Forest Division  
Mr Vaivab, Mother Earth Foundation  
Mr Devesh Prasad - Lions Club Darjeeling  
Mr Deepak Pradham, Engineer, Darjeeling  
Mr Jeet Singh, Rajiv Gandhi Foundation  
Sonam Tashi Gyaltsen - Director, Echostream  
Abha Patil- Designer, Echostream  
Sabina Subba -Finance Manager, DLR Prerna

Ujjain Moktan - Project Officer, DLR Prerna  
Choden Dukpa - Research Associate, DLR Prerna  
Tapan Thapa - Project coordinator, DLR Prerna  
Anamika Sharma - Project Officer, DLR Prerna  
Kriti Rai - Project Officer, DLR Prerna  
Arpana Thapa - DLR Prerna  
Swastika Thapa - Project Coordinator, DLR Prerna  
Priscilla Giri - Research Administrator, DLR Prerna  
Kareena Lama - WASH Coordinator, DLR Prerna  
Pasang Dorjee Lepcha - Rapporteur  
Pratik Dahal - Rapporteur  
Poonam Rai - ATREE  
Sailesh Sharma - Program Manager, DLR Prerna  
Lak Tsheden Theengh, WWF- India  
Uden Bhutia - KCC, Sikkim  
Shuvam Sharma - DHI Youth Representative  
Mr. Aashwin Pradhan - Darjeeling Children's Trust  
Ms. Barsha Rai IMI Sikkim Office  
Tulku Ngawang, Buddha Pada  
Tejistha Pradhan - Designer

Registered participants

Priyanka Tolia - Uttarakhand  
Smt Usha Lachungpa - Green Circle, Sikkim  
Dr. Kathrin Gassert - Teekampagne  
Dr. Smriti Basnett, DCC, IISc  
Dr. DhruPAD Choudhury - ICIMOD  
Dr. Lakpa Tamang - Assistant Professor in Geography,  
Calcutta University  
Vikram Rai - Assistant Professor, St Josephs College,  
Darjeeling  
Namrata Rawat - Junior Researcher  
John Paulraj  
Rinan Shah - PhD Candidate  
Rinzi Lama - DHI Assistant Professor North Bengal University



ANNEXURES- List of Participants of SMDS X

Shri Ravi Pradhan - ECOSS	Yuraj Pradhan - Co-Founder, Scavengers
Shri Loday Chungyalpa - ECOSS	Christina Humtsoe - Evaluation Intern
Samuel Thomas - ICIMOD	Megha Prakash - Independent Journalist
Susan Rai - Sikkim Youth State Delegate , Engineer	Rinchen Lama - PhD Researcher
Melissa Namchu (PhD) Glenn Family Foundation	Monojit Mandal - Journalist
Sharad Kumar Jha - Break Free from Plastic	Semsang Bomzon - PhD student
Dr Rajesh Joshi - GB Pant, Sikkim	Prava Rai - Founder Reading Room
Piyush Joshi - Senior Scientific Officer - UCOST	Siddhant Karki - Software Developer
Archana Vaidya - Consultant, IMI	TOPDEN LEPCHA - Assistant Accountant
Namrata Kabra - Consultant, IMI	Vivek Verma - Manager
Pribat Rai - Dean, Geography Department, St Joseph's College, Darjeeling	Lt. Gen. (Dr) Rajan S Grewal
Rohit George - ATREE	Shri Karma Nedup Bhutia
Dr Nim Tshering Lepcha -	Narendra Kumar Gurung
Gurinderjit Goraya - PCCF (Retd)	Mohammed Latif Khan
Arunavh Dam - NVSE	Mantopi Martina de Porres Lebofa
Dominic Savio Rai - NVSE	Ibasaralyne Thabah Synthiang
Catherine Canavan - DLR Prerna	Jennifer Lama
Yashwant Rawat - Asst Professor	Sunder Subramanian
Dr Punchok Tashi - Executive Councilor	Noel Giri
Sangay Tamang - Research Scholar	Ashish Sanyal
Matrika Ghimiray - PhD Scholar	Bibhuti Debbarma
Anjani Sharma	Aparajita Goswami
Ravinder Yadav	Darshan Yonzon
Rakesh Sharma	Anmol Subba
Sarat Kumar Yadab - Research Scholar	Yashika Subba
Arati Gurung - Student	Suvechha Ghatani
Ankit Shah - Secretary	Pauline Laravoire
Joshitha Sankam - Research Associate	Shiwangi Rai
President Darjeeling Mother and Child Welfare Sanstha	Subham Gurung
Shoyeta Chatterjee - Rotary Club, Darjeeling	Vinit Gupta
Karma Detsen Ongmu Bhutia - Assistant Professor	Anusha Rai
Seema Sharma - Program Director	Dennis Lallienzuol
Shomita, Waste Warriors	Vivek Chettri
	Rohit Rajora

Simran Sharma	Dr D Purohit	Bandhana Sharma	Vibha Puri Das
Aparupa Datta	Prof Deepak Sharma	Akshit Sangomla -	Tashi Ongmu
Hamsini Ravi	Prof Bidhan Subba	Anuradha Rai	Upendra Pradhan
Shrikant Gheesing	Kathula TK	Raiy Shiwath	Asha Rao
Nirvan Pradhan	Harsh Yadav	Nandita Gurung	Nishan Chettri
Dr Sonam Wangmo	Ashish Chettri	Shailesh Bagtharia	Somnath Roy
Dr Dorjey Angchok	Amy Jakhalu	Ron Kemprai	Kalyan Paul
Sonam Rigzen	Rajan Kapur - Retired	Meena Uttarakhand	Bhagat Sigh Burfal
Tenzin Dhadon Kanika	Dr Anand Pariyar	Dhanraj Sakhare	Naveen Kumar K
Jazzmine Raine r	Dipen Pradhan	Dr Karma Sikkim	Rayan M. Mofareh
Priya Kanwar	Nivedita Khandekar	Kuldeep Chauhan	Karthik M
Anusha Kaushik	Shruti Sharma	Tanya Gurung	Sravanthi
Ranjoy Gupta	Bhawana Pradhan	Karishma Pradhan	Varsha Torgalkar
Dr. Aniket Mahapatra A	Aditya Pradhan	Anupama Nair	Rajesh Rai
Muhammed Nahar	Ushnata Priya Thapa	Jency Maria Sojan	Ravi Prakash
Tejaswini Nagesh	Kabita Ghimire	Remya Namboodiri	Sahith Ravindra
Yashika Subba	Rabindra Kumar Singh -	Gopika J S	Tejal Shirsat
Adarsh Rai	Praban Yolmo	Ishaan Ajay	Pradeep S
Sachin Tamang	Mudit Joshi	Ashwin Chhetri	Dip Roy
Dechen Dolker	P.Dorje Gyamba	Arun Sarkar	Asi Guha
Moses Kunzang	Abriti Moktan	Maitreyi Murali	Rummit Lepcha
Thangsuanlian Naulak	Yougesh Tamang	Arya A R	Dharti Solanki
Ayushi Nirola	Suvha Lama	Roja Asharaf	Gayathri Balachandran
Dr. Anil Jaggi	Prabinta Bhujel	Pradeep T L	Rajnish Karki
Dr. Luk Bahadur Chetry	Ms. Topie Kamdak	Anasuya Gangopadhyay	Preeti Tolia
Cassia Patel	Shri Pem Taba - NA	Veena Prasad	Elphin Joe
Yugal Baraily	Shri Amat Namchoom	Bhagat Singh Burfal	Pema Dolma
Mr. Arbin Lepcha	Shri Solemso Ama	Prasanth S	Paola Agostini
Mr. Basavaraj Holeyach	Rahul Bhushan	Udai Gurung	Sofia Goldstein
Dr. Sangay Dorjee Bhutia	Dr. Rinju Rasaily -	Nishtha Tewari	Neha Vyas
Dr B.M. Chhetri	Jaya Upadhyay	Suwashana Rai	Mercy Amai
Dr Pemba T Bhutia	Sangita Pradhan	Yangchu	Jigmet Namgyal
Dr Suresh Rasailly	Anurag Kataria	Abhipsha Pradhan	Maimuna Ali
Shri Udai Gurung	Sanjeev Sharma	Mebaaihun Shisha Sunabi	Sonam Dukpa
Ms. Dichen Lachungpa	Hemanth rai	Nidhiya Jose	Mujataba Hussain
Dr B.B. Rai	C M Gurung	Mandira Ghissing	Trupti Desai
Prof Avinash Khare	Ram Gurung	Vicky Sharma	Neha Mehta

ANNEXURE- List of Participants of SMDSX

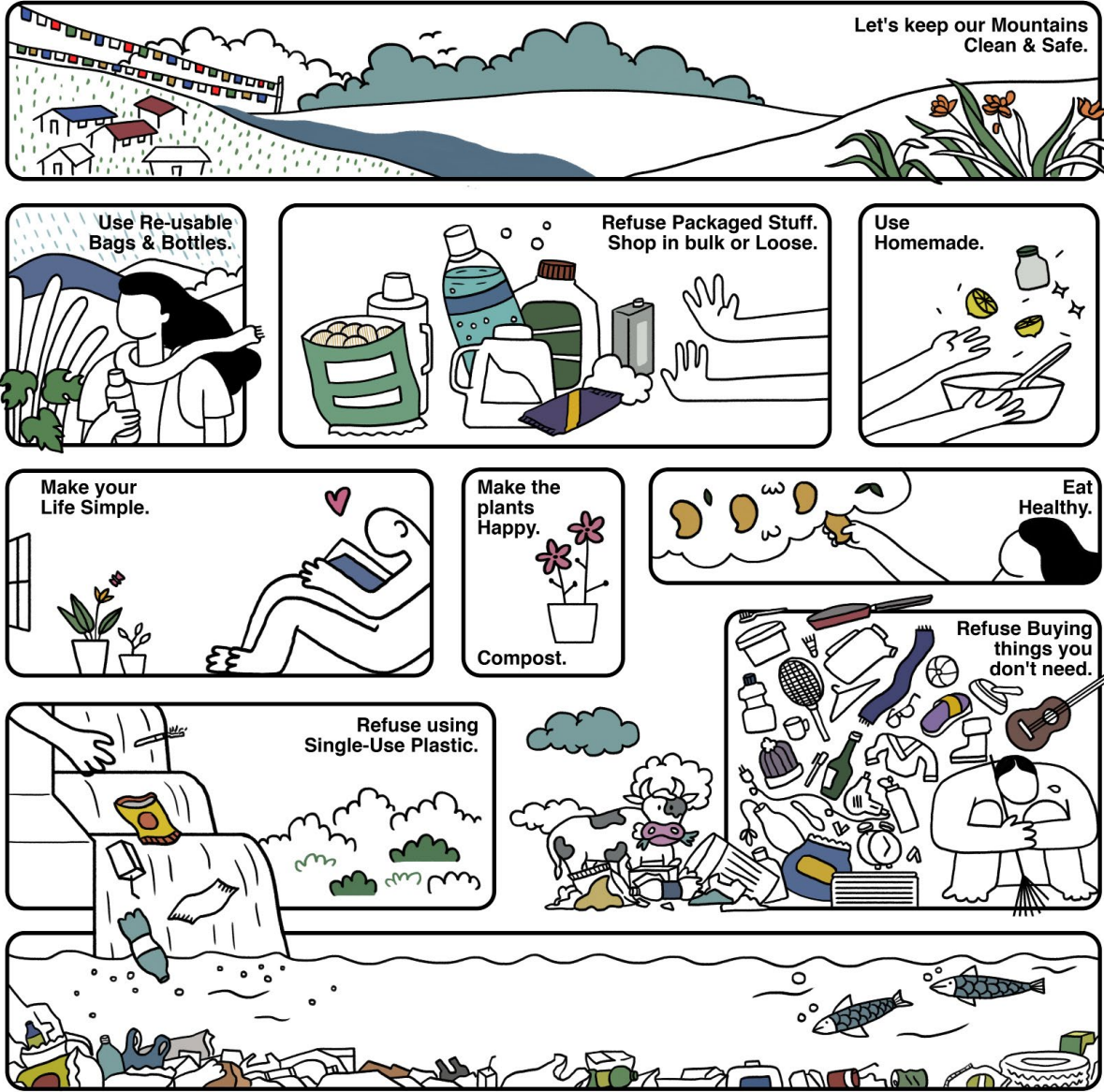
Ivy Namchu  
Shekhar Aryal  
Pawan Kumar  
Prishka Pariyar  
Tashi Nima  
Nikita Rai  
Abhinay Bhandari  
Haritima Bahuguna  
Tashi Bhutia  
Maroof Shah  
Vijay Sinha  
Eheeta Gurung  
Prakash Mridha  
Vansham Gurung  
Sandeep Negi  
Dr. Sandra Pinel  
Yurri Asai  
Balqiaz Khan  
Jeet Singh  
Deepak Pradhan  
Rhonden Kikon  
Edward Stevenette

**Media and Press in Person**  
Bishal Gupt  
Pasang Sherpa  
Devraj Chettri  
Vikram Hingmang  
Amitava Bannerjee  
Smrita Khawas  
Arun Subba  
Bishal Rai  
Biwash BK  
Swapan Pal  
Sunil Sharma  
Prashant Singh  
Deven Gupta  
Vivek Chettri  
Reza Pradhan

**Participants at MLM In person**  
Shri Vincent Pala, MP  
Shri H.M. Shangpliang, MLA  
Shri S.T. Venchungpa, MLA  
Smt. Miani D. Shira, MLA  
Shri Pravat Chowdhury, MLA  
Shri Tashi Gyalson, CEC, LAHDC  
Shri Sunil Uniyal, Mayor, Dehradun  
Shri Kishore Upadhyay, former MLA  
Shri K.T. Gyaltzen, former MLA/Speaker  
Shri Rigzin Spalbar, former CEC, LAHDC  
Dr. Sanjay Jaiswal, MP (Bihar) and Chairman, Standing Committee on Water Resources  
Shri P.D. Rai, Former MP Sikkim and President, IMI  
Dr. V.B. Mathur, Chairman, National Biodiversity Board  
Dr. Sumit Sharma, Programme Officer, UNEP  
Shri Reuben Gergan, Consultant, UNEP  
Dr. Thomas Chandy, Chairman, SPCB (Sikkim)  
Shri CP Rai, Administrator, Darjeeling Municipality  
Mr. Sushil Ramola - IMI Member  
Mrs. Bharati Ramola - IMI Member  
Ms. Priya Shrestha, IMI  
Ms. Binita Shah, SDFU  
Mr. RP Gurung, IMI  
Mr.Roshan Rai, IMI

**Online**  
Shri Chowna Mein, Deputy Chief Minister, Arunachal Pradesh  
Shri James Sangma, Minister, Environment and Forest, Meghalaya  
Smt. Agatha Sangma, MP, Meghalaya  
Shri M. Kikon, MLA, Nagaland  
Shri Ninong Ering, MLA Arunachal Pradesh  
Shri Mutchu Mithi, MLA Arunachal Pradesh  
Shri Pushpendra Tripathi, former MLA, Uttarakhand  
Dr. GS. Rawat, SDFU  
Mr. Anoop Nautiyal, SDFU

TACKLING THE PLASTIC CRISIS: What can Individuals do?







www.inmi.in

Pic: Nawang Polkit, Chogjamsar Ladakh



# SMDS XI 2022 LADAKH