E-NEWSLETTER

World ENVIRONMENT day

June 2020 Volume- 2

Webinar

AGROBIODIVERSITY OF INDIAN HIMALAYAN REGION

With special emphasis on traditional food

The Indian Himalayan Region (IHR) is a part of Himalayan biodiversity hotspots and significantly contributes for its biodiversity richness and representativeness. Himalayan agrobiodiversity is believed to be unique due to the prevalence of diverse varieties of traditional crops. In IHR, appx. 80% people depend on agriculture for their food and livelihoods; therefore, they maintain the diverse genetic resources of traditional crops. Across IHR, the variation in crops at genetic level is remarkably high due to diverse ecological conditions. Following this variation in agrobiodiversity, the food habits also vary considerably. Food system, which form a part of biodiversity (food biodiversity) is defined as the diversity of plants, animals and other organisms used for food, covering the genetic resources within species, between species and provided by the ecosystems. Rich diversity of indigenous landraces/ varieties of cereals, millets, pulses, vegetables, spices, oil producing varieties of plants, wild edibles, fruits, and nuts is available in IHR, which are in use by the indigenous local communities since generations. In real sense, the traditional cropping systems and practices of Himalayan communities have conserved the diversity of crop genetic resources, which forms a huge wealth of Himalayan people. However, the young generation is now more attracted towards the food that is not grown in the region thereby ignoring the potential of agrobiodiversity of their own landscapes. On the contrary, such location specific traditional crop produces are increasingly being appreciated across the world as the possible solution to food and nutritional security. Various varieties as well as the traditional cuisines made from these have been found nutritionally rich and full of antioxidant potential. Therefore, consumption of such traditional cuisines can help the locals in developing immunity to combat the COVID-19. As the Himalayan region is witnessing mass come back of people under corona pandemic situation, there is a need to systematically motivate them to cultivate traditional crops which will not only meet their food requirement but also earn money. This calls for policy and program level interventions. The theme for World Environment Day 2020 is 'Biodiversity' with a tagline 'Time for nature'. In this context, the living beings are dependent on the nature for food, fresh water, and air. However, through our deeds, we have harmed the nature and make our environment unsafe for life. In the current situation of COVID- 19, nature has proven that we must go towards the safe environment and sustainable utilization of natural resources. In view of this, the webinar intends to generate a fresh debate on potential of Himalayan agrobiodiversity and food systems.

FROM THE DIRECTOR'S DESK

I am pleased to share the 2nd volume of e-newsletter published by the institute to cover special events. This volume covers the contents of events organized as part of celebration of World Environment Day (WED) 2020. The theme of WED 2020 was Biodiversity. The theme covers both wild and domesticated components of biodiversity. However, considering the current situation of COVID pandemic, when larger focus is on increasing the immunity of the human being, the institute has targeted the food system, which depends on agrobiodiversity. We believe, the right types of food can be helpful in boosting once immunity. The Indian Himalayan Region (IHR) is rich in Agri-biodiversity and traditional food systems that have been maintained by local communities for millennia. The consumption of area specific nutritionally rich food can increase immunity level of the consumers. This e-Newsletter includes views of different experts, who were part of the webinar(s) conducted in the institute's HQs and different regional centres. The possibilities of promoting traditional food-based tourism for improved livelihoods have been discussed. Various other events conducted by Regional centres on WED have been included. We shall welcome the critical inputs of readers.

Dr. R.S.Rawal
Director
G.B. Pant National Institute of Himalayan Environment

Idea of the Event

Recognizing that the agrobiodiversity is an important component of Himalayan Biodiversity, Dr. R. S. Rawal, Director of the institute, shared the idea and asked Dr. Vasudha Agnihotri for taking a lead and convene the event. She conceptualised the idea of bringing together the experts working in such aspects across the Indian Himalaya to deliberate on the issues related to agrobiodiversity in IHR with special emphasis on traditional food. The concept was further strengthened with the creative inputs received from Er. Kireet Kumar, Head, Centre for Land and Water Resource Management, GBP-NIHE. This resulted in the formulation of a concept note for holding the webinar.

Aim and Objectives

The purpose of the webinar was to bring together experts working on different aspects of Food biodiversity and to discuss on various issues related to IHR.

The webinar considered the following major subjects for the discussion:

- Status of agrobiodiversity-based food systems in Indian Himalayan region (IHR)
- Nutritional aspects and health benefits of traditional crops and cuisines
- Possibility of Culinary or food tourism across Indian Himalayan region

Participants/ Panelists

The panellist of this webinar represented different Indian Himalayan states. From Uttarakhand state, experts of HNB Garhwal University, Srinagar (Garhwal), Uttarakhand, Uttarakhand Tourism Development Board; NGO/ CSI representatives- SARG Vikas Samiti, The Foundation for the Contemplation of Nature; from Sikkim, expert from Sikkim State University, Sikkim Central University; from Meghalaya, experts from Martin Luther Christian University, Shillong, North - Eastern Hill University, Shillong; from Arunachal Pradesh, expert from Central Agricultural University Pasighat, Arunachal Pradesh; from Himachal Pradesh, experts from Himachal Pradesh University, Shimla and Ecotourism Planner, HP were involved in this webinar. In addition, the faculty of the institute at North-East Regional Centre, Itanagar; Sikkim Regional Centre Pangthang; Garhwal Regional Centre, Srinagar, Garhwal and HP regional centre, Kullu joined the webinar.

Box 1

Agrobiodiversity hotspot in Indian Himalayan region

Hotspot	Location and extent
Cold Desert region	*Ladakh:* Leh (Nubra valley) *Himachal Pradesh:* LahaulSpiti
Western Himalayan region	*Jammu & Kashmir:* Anantnag, Badgam, Doda, Jammu, Kathua, Kupwara, Phulwama, Srinagar, Udhampur *Himachal Pradesh:* Bilaspur, Chamba, Hamirpur, Kangra, Kinnaur, Kullu, Mandi, Shimla, Solan, Una *Uttarakhand:* Almora, Bageshwar, Chamoli, Champawat, Dehradun, Garhwal, Hardwar, Nainital, Pithorgarh, Rudraprayag, Tehri Garhwal, Udhamsingh Nagar, Uttarkashi
Eastern Himalayan region	*Sikkim:* Sikkim East, Sikkim North, Sikkim south and Sikkim West. *Arunachal Pradesh:* Anjaw, Changlang, Lower Dibang valley, Upper Dibang valley, East Kameng, East Siang, Lohit, Lower Subansiri, and Kurung Kurney, Papum Pare, Tawang, Tirap, Upper Siang, Upper Subansiri, West Kameng, West Siang *West Bengal:* Darjeeling
Khasia, Jaintia, Garo Hills	Meghalaya East Garo Hills, West Garo Hills, South Garo Hills, East Khasi Hills, West Khasi Hills, Jaintia Hills and Ri-Bhoi.
Northeast Hills	*Manipur:* Imphal (East), Imphal (West), Bisnupur, Thoubal, Senapati, Ukhrul, Tamenglong, Ukhrul, Chandel *Nagaland:* Kohima, Dimapur, Phek, Mokokchung, Mon, Tuensang, Wokha, Zunheboto *Mizoram:* Aizwal, Lunglei, Champhal, Kolasib, Lawngtlai, Marnit, Chhimtuipui, Serchhip. *Tripura:* North Tripura, West Tripura, South Tripura, and Dhalai.

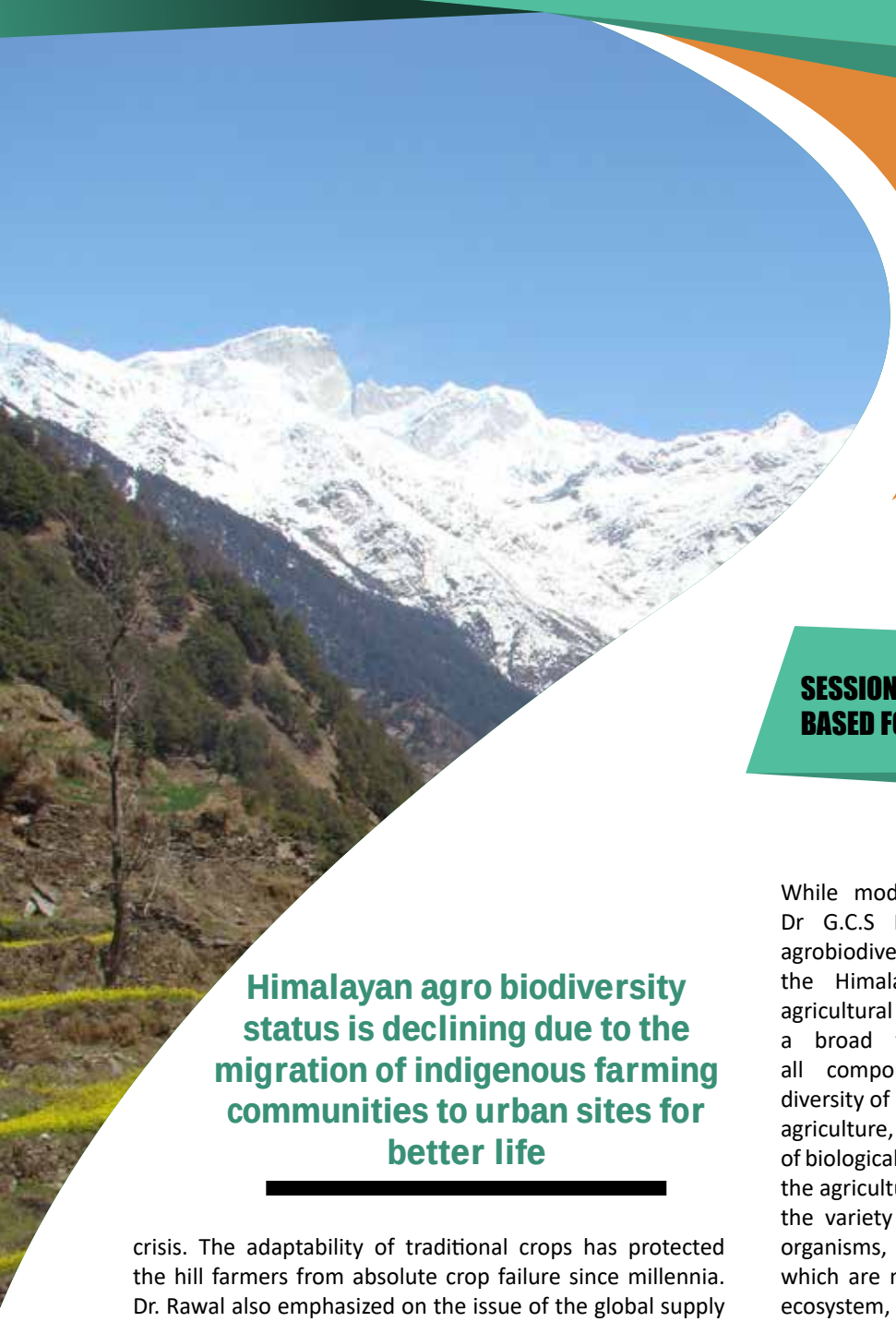
Webinar design

The webinar was designed in a way to optimally utilize the time given to the eminent panellists. The whole webinar was divided in four sessions. First session was the opening session, Session II was related to Status of agrobiodiversity-based food systems, Session III was related to Nutritional aspects and health benefits and session IV was related to Culinary or food tourism. Each session was given 30 minutes duration for discussion. The deliberations of the various sessions were summed up during the concluding session.

SESSION I: OPENING SESSION

While opening the webinar, Dr. R.S. Rawal, Director of the Institute (GBP-NIHE), welcomed panellists and mentioned that the objective of the webinar is to deliberate on solution providing potential by Himalayan biodiversity, especially in view of the slogan of "Vocal for Local" given by the Prime Minister of India. Dr. Rawal highlighted global significant of IHR as being larger part of Himalayan biodiversity hotspot, which is important for flow of ecosystem goods and services, that sustain life beyond the boundary of Himalaya. He underlines the potential of biodiversity, particularly the agrobiodiversity, in food security and providing livelihood options in general and under COVID 19 Pandemic scenario. He highlighted the value of agrobiodiversity in nutritional security in the Himalayan region and underlined that traditional crops/ varieties provide resilience in harsh situations like COVID

Release of News Letter



Himalayan agro biodiversity status is declining due to the migration of indigenous farming communities to urban sites for better life

crisis. The adaptability of traditional crops has protected the hill farmers from absolute crop failure since millennia. Dr. Rawal also emphasized on the issue of the global supply chain of food which felled during COVID crisis. Considering this, he suggested that COVID-19 crisis has provided us an opportunity to harness the potential of locally available traditional crops and their wild relatives in the IHR for food security and also to enhance the livelihood of the local inhabitants.

A newsletter ***'Biodiversity Holds the Future for Himalayan People'*** was released by Prof GK Niroula Chhetry (SSU, Gangtok) at Sikkim Regional Centre of the Institute. Following a formal introduction of the panellists, the webinar was made open for discussion under different sessions.

SESSION II : STATUS OF AGROBIODIVERSITY-BASED FOOD SYSTEMS

While moderating the session, Dr G.C.S Negi elaborated on agrobiodiversity status all over the Himalaya. He mentioned agricultural biodiversity is a broad term that includes all components of biological diversity of relevance to food and agriculture, and all components of bibiological diversity that constitute the agricultural ecosystems, also named as agro-ecosystem, the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes. Dr. Negi invited the key speaker for deliberation.

Prof. G.K. Niroula Chhetry, gave brief information of agricultural biodiversity in Sikkim. He mentioned that indigenous farmers in Sikkim Himalaya, through generations of innovation and experimentation, have established variety of land use systems to nurture a great diversity of both wild and

Session: II

Moderator

Dr. G.C.S.Negi, Head, CSED, GBPNIHE

Panelist

Prof. G K Niroula Chhetry,
Vice Chancellor, Sikkim State University
Dr. R.K.Maikhuri,
Professor, HNBGU, Srinagar,
Uttarakhand
Dr. R.C.Sundriyal,
Professor, HNBGU, Srinagar,
Uttarakhand
Ms. Binita Shah,
Founder/CEO, SARG Vikas Samiti

Concluding remarks

Prof. G K Niroula Chhetry
Dr. G.C.S.Negi

domesticated plants and animals. Local agrobiodiversity features more than 126 landraces of cereals, including rice (77), maize (26), and millet (7); 18 cultivars of oilseeds; 34 cultivars of pulses/beans; 132 species of vegetables; 38 species of spices/ condiments; 33 landraces of tubers/ roots; and 64 species of fruit. Sikkim's traditional system of cultivation also supports more than 200 species of wild edibles, 119 species of multipurpose agroforestry trees, 52 crops with high social and cultural value, and 69 species of plants considered sacred by indigenous communities. These varieties are being conserved by the indigenous communities since long time and they have been propagating this knowledge to their younger generations. Their way of maintaining agro-biodiversity is very much effective. Prof. Niroula underlined the need community to promote the agrobiodiversity which has been conserved by the communities since generations. Once this trend continues community will become empowered, encouraged, and self-sufficient in terms of food and environmental security. He said Jhoom cultivation in north-eastern parts is a necessary evil practiced by the people of this region, but they preserve the diversity. The food produced by communities through traditional cropping system supports their food chain so that they are not dependent on the supply chain from the plains which are already contaminated, chemical mixed. Most of the farming system in the Himalaya is organic in nature. If we talk about Sikkim state it is mostly organic farming state. Rice and different varieties of legume crops are the most important crops of the north eastern region. These legumes are grown throughout the year and fulfil the requirement of the vegetables. Other important agrobiodiversity of Sikkim region includes the indigenous fruits, plants, and many rich diversities of aromatic plants. Because of these traditional crops, tourism can be further increased as tourist like to taste the local fruits and food.

He explained, how local inhabitants of the IHR have developed a symbiotic relationship with biodiversity including agro-diversity. However, it needs to maintain this relationship involving the young generation. He highlighted that the Himalayan agro biodiversity status is declining due to the migration of indigenous farming communities to urban sites for better life. This has to be checked by creating awareness about the importance of traditional farming system pertaining to the nutritional aspects of traditional foods in boosting immunity system to combat diseases. Himalayan farming communities can be motivated by supporting premier and minimum support price to tradition food commodities. He also indicated that farming

communities are attracted for better option like replacement of traditional crops by cash crops which in the long run is not sustainable. Prof. Chhetry suggested that Himalayan farming communities must be encouraged for in-situ conservation of agro-biodiversity genetic resources using their rich traditional knowledge. He further, suggested that millet and pseudo-cereal ingredient based traditional food may be incorporated in Child Development Services (ICDS) Scheme and Public Distribution System (PDS) to create a sense of belonging to Himalayan farming communities and nutritional supplements to consumers as well.

Recommendations by Prof. G.K. Niroula Chhetry

Create awareness about the importance of traditional farming system pertaining to the nutritional aspects of traditional foods in boosting immunity system to combat diseases.

Motivate the Himalayan farming communities by supporting premier and minimum support price to tradition food commodities.

Encourage In situ conservation of agrobiodiversity genetic resources using rich traditional knowledge for improved food and environment security

Millet and pseudo cereal ingredient based traditional food may be incorporated in ICDS and PDS to create a sense of belonging to Himalayan farming communities and nutritional supplements to consumers are ensured

Conservation of traditional crop diversity and sustainable land use development through institutional and policy support is required in the Himalayan region

Dr. RK Maikhuri emphasized on the impacts of globalization and homogenization in replacing local food and culture. The area under cultivation of many of traditional crops in the Himalayan region is shrinking rapidly due to adoption mono-cropping of high yielding varieties, cash crops and horticultural crops. Land use has changed in large tracts for short-term economic gains in the form of cash crop production in the region. The changes in agro-biodiversity have led to the dramatic increase in soil loss and runoff from the croplands together with the increased pressure on forests. He underlined the fact that the traditional crops like *Echinochloa frumentacea, Setaria italica, Panicum miliaceoum, Hordeum himalyens, Pisum arvense, Glycine soja, Vigna unguiculata, Vigna angularis* and *Fagopyrum esculentum* either have been abandoned or area under cultivation has declined to large extent.

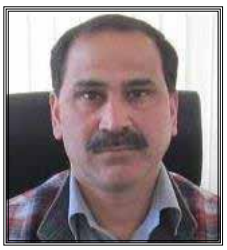
He told that the traditional agriculture system of Himalaya is overly complex and have close interdependency and linkages with animal husbandry. Environmental, biological, socio cultural and economic variation in the region have led to the evolution of diverse and unique traditional agroecosystem, crop species and livestock across the Himalayan region. About 80% of people in the Central Himalaya practise subsistence agriculture. Mixed cropping is common under rainfed conditions. Over 40 crop species, often mistakenly termed 'lesser known crops', comprising cereals, millets, pseudo-

cereals, pulses, oilseeds, tubers, bulbs and spices, are cultivated. The huge diversities have been maintained over the centuries by the traditional communities. Uttarakhand is now in the transition phase and recently a variety of changes have been noticed in the traditional agriculture system of the Uttarakhand and it was found that about 65-95% crops have been reduced under cultivation. Many crops are facing threat of the conservation. Production of traditional crop has important role in rural systems as these crops are used in cooking, brewing, as medicines, and for many other purposes. Crops like amaranth, buckwheat are used by the people throughout the year. It is imperative to develop an adaptation strategy through policies that prioritize community-based biodiversity management programmes and registers maintained by local biodiversity management committees. The Sikkim government has initiated an 'organic mission' to make Sikkim's agricultural landscape fully organic. Adaptation strategies include the integration of agroforestry, farmland, and livestock into production systems; cultivation of a higher diversity of locally adaptive traditional crops and improved varieties of crops (developed by farmers); and improved water and soil management within the agricultural production system.

It should be documented that how many types of foods prepared from the local crops by the traditional communities and what local names are given to those cuisines. Beside these, there exists diversity of wild edibles which contribute directly or indirectly to the food system of the Himalayan communities. Around 40 wild edible plants are being used by the local communities for making variety of useful products which they consume. Huge opportunity is arising as the demand for organic food is increasing. Recently, increasing demand for traditional crops such as amaranth, buckwheat etc have been noticed. Women empowerment must also be addressed as they are the main conservers and managers of these traditional crops in Himalaya region. Efforts are also to be made to make traditional cuisines available during festivals so that people become more familiar. Value addition of traditional crop is another viable option for their conservation as well as employment and income generation. It is necessary to create awareness to masses through education and effective communication for conservation and management of traditional crops on one end and economic profit on the other. Finally, there is a need for announcing minimum support price for traditional mountain crops and ensure purchasing of agricultural product which can regularly be used in mid-day meal schemes as healthy foods so the health of children can be improved.

Dr. Maikhuri recommended *conservation of traditional crop diversity and sustainable land use development through institutional and policy support* in the Himalayan region. In the pursuit of designing appropriate policy in the IHR states, he mentioned that it is necessary to examine the existing policies, rules, regulations, and general institutional environment that are playing significant role in hindering sustainable agricultural development. He also recommended for value addition in traditional crops/ varieties to link this with eco-tourism in the region as a source of livelihood. He further recommended for fixing *Minimum Support Prize for the purchase of traditional crops* by the government

to maximize their cultivation and marketing. Finally, he strongly recommended for *linking or use of traditional crops products in Mid-Day Meal system of schools* in the IHR states for providing better return to the traditional food growers as well as healthy food to children.



Dr. R. C. Sundriyal, talked about the biodiversity as key feature for food and agriculture system in IHR. Biodiversity makes the community resilient to any kind of stress including COVID and other such situations. He mentioned that around 170 ethnic communities exist in the IHR. Out of 15 agroclimatic zones of the country we have 5 in the Himalayan region. Particularly zone 1 western Himalayan region and zone 2 eastern Himalayan regions then there is zone 3, 4, 5 also. The verticality and horizontality of the system gives us a huge scope for utilizing this rich biodiversity and that's why people here are practicing many traditional cropping systems. He underlined that 20% of current global production of food is met from traditional multi-cropping systems, which also helps in maintaining ecological equilibrium and sustaining crop gene pool. In India, there are 356 species that are being cultivated as cereals, pseudo cereals, millets, pulses. Out of these about 38% are being cultivated in western Himalayan region, 33% in central Himalayan region and 47% in northeast region. If this biodiversity gets reduced, humanity will become more vulnerable to the pandemic situations like COVID. We need to conserve this genetic diversity at species and ecosystem level and continue diversifying our systems. It is now well-established fact that biodiversity for food is declining at all levels like we have genetic erosion, species erosion, ecosystem decline.

Another important aspect is that the traditional food system includes large number of wild items, which are not only good as food but also provide many micronutrients which are useful for human health and can avoid malnutrition. Estimates suggests 30-40% of local agrobiodiversity and 24-34 % of wild species are decreasing in their abundance and that is very alarming situation. There is no effort of on farm conservation of crop diversity till date. Present major policy focus is on big farm, and the focus on small or marginal holders commonly known as family farming, unfortunately, is lacking though they meet 60-70% of their food demand. Prof. Sundriyal highlighted role of small farms

Millet and pseudo cereal should be incorporated in ICDS and PDS to create a sense of belonging to Himalayan farming communities

in the conservation of genetic resources in the Himalaya and emphasized for policy planning to promote small scale farming in the region as the land holding in the region is very small. He highlighted that Himalaya is represented by rich diversity of wild edibles with high nutritional and medicinal value, but only a few species are being used in nutraceuticals, cosmoceutical industries and as alternative food. Farmers of the region possess enough knowledge about various crop resources and wild edibles for their subsistence need and other uses. Therefore, research on the value and value addition of their produce may help in providing alternative food and improving livelihood of the people in the region. Role of diversity in traditional food system has multiple functions i.e. it not only fulfil the food requirement but also increases our ecosystem services. Therefore, we need to promote diversity rich farming system.

While recommending for extension or adaptation of on-farm conservation in the IHR, Prof. Sundriyal underlined that on-farm conservation is 'the sustainable management of genetic diversity of locally developed traditional crop varieties with associated wild species'. He indicated that there is need to protect rights not only to traditional knowledge itself, but to all the inter-linked components of traditional knowledge systems, including biogenetic resources, cultural and spiritual values, and customary laws. The need for preservation, protection, and promotion of traditional knowledge has become inevitable for self-sustenance, economic prosperity of knowledge holders, and competitive business advantage. Prof. Sundriyal finally stressed upon the need of assessment of ago-diversity of the IHR along the elevational and horizontal gradients, so that the actual data on agro-diversity would be apparent which is vital for conservation and sustainable use planning.

Ms. Binita Shah, highlighted the way Uttarakhand government has promoted the marketing of traditional crops through a well-developed value chain of selected crops. She provided many successful stories of value chain development i.e., value chain for Eleusine coracana, Glycine soja, Amaranthus viridis, which has provided direct benefits to the rural farmers. She also highlighted that Uttarakhand government has established small scale factories/ processing units for value addition in traditional crops.

Her organisation, SUPA Agricultural Research Group (SARG) India and Uttarakhand Agriculture Marketing Board (Mandi Parishad) has entire focus on promoting millets of Uttarakhand and a multigrain processing unit has been established in Rudrapur. She had mentioned about various measures and attempts that had been made in this aspect but it was in very low scale therefore is not transferred to the next generation. She also shared other success stories

such as:

Glycine soja (White Soyabean) used to prepare tofu. Now the rate for this has suddenly come to almost 45 rupees per Kg.

Amaranth cultivation has increased especially organic amaranth and beyond the use of it as chaulai ke laddoo several other uses such as flour or breakfast cereal. Rate of amaranth from 14-15 rupees per Kg in 2008-09 has now increased to 45 rupees per Kg.

She informed that after 2018, Government of India has declared all our millets as Nutracereals and they are no more termed as "Mota Anaja". Minimum support price (MSP) for finger millet, buckwheat has now been declared. Most of the millets now will be processed into either a malt or ready to eat products or either will be integrated with the mid-day meal program.

Hemp is also a traditional plant of Uttarakhand which has become important and several policies have been made for hemp.

This provides the state an opportunity to harness the potential of traditional crops/ varieties as option of income generation in mountains areas of the region. She highlighted that the benefit earned by the govt. of the state, 30-40% of that goes to the farmers linked through Self-help groups. Ms. Shah recommended for developing 'Business Model' for marketing and value addition of high demanding traditional crops at micro-level (i.e., Block, District etc.) in all IHR states. This will motivate the famers for large scale cultivation, which ensured on-farm conservation of traditional crops in the region.

In situ conservation of agro-biodiversity genetic resources using rich traditional knowledge, for improved food and environment security, should be encouraged'

SESSION III : NUTRITIONAL ASPECTS AND HEALTH BENEFITS

At the outset, moderator of the session Dr. I.D Bhatt gave a brief remark on nutritional aspects and health benefits of traditional foods including wild edibles. He mentioned that this session is important because of two reasons firstly, humanity is looking for strengthening immune system for fighting against COVID-19 pandemic and secondly, there are around 50% of the people suffering from food insecurity and 50% in the form of some malnutrition. In India, around 47 million young children suffer from malnutrition that leads to increase in chronic diseases. Large number of women and children are under nourished. Talking about the market of nutraceuticals, he informed that it is expected to be 8.58 billion dollar by 2020, and the sale of vitamin and supplements is about 1.3 billion dollar per year indicating how the people are conscious about their well-being or about their health.

This session basically focussed on following questions:

- How to improve nutritional security and health of local indigenous community?
- How to develop local products, market and supply chain?
- What could be the alternative options for nutrition and health as agrobiodiversity is diminishing?

Dr. Vincent Darlong, as key speaker of this session,

Session: III

Moderator

Dr. I.D.Bhatt, Head, CBCM, GBPNIHE

Panelist

Dr. Vincent Darlong, VC, Martin Luther Christian University, Shillong

Prof. Jyoti Prakash Tamang, Department of Microbiology, Sikkim University

Dr. Savitri, Assistant Professor, HPU, Shimla

Dr. Ajay Rastogi, The Foundation for the Contemplation of Nature

Dr. T. Shantibala, IBSD, Manipur

Concluding remarks

Dr. Vincent Darlong

Dr. I.D. Bhatt

focussed on north-eastern part of IHR. The people in north east take 200-300 varieties of food which are collected from the forest, around 100 varieties from the agricultural field, 70-80 varieties from their streams, rivers, wetlands, and other places. In the northeast, people have migrated, and the availability of food have made them to settle where they are such as Nagas in Nagaland, Khasis in Meghalaya, etc. Folktales of the mountain communities particularly the tribal people in Eastern Himalayas, more so, in North East India mentioned of close link between historical migration of the communities and their settlement in particular area in relation to availability of foods (and land for growing or cultivating foods).

He mentioned that the mountain communities often refer their traditional foods as "original foods". In their perceptions, "Original Foods" are those they source from their surrounding landscapes including forests, fallow

Recommendation from Prof Vincent Darlong

Indigenous knowledge and framework for restoring culturally and nutritionally important foods needs to be revisited and introduced.

Revival of traditional food systems through research, community engagements and extension services need to be promoted; academic institutions should be supported to incorporate local food systems and promotion of recipes in their courses.

Promotion of home gardens, school gardens, biodiversity gardens, community conserved areas, could also be ways of re-introduction of traditional food crops in the region.

Food festivals of native foods and promotion as power foods, healthy foods, organic foods, could go a long way, which is being organised by many communities during tourist seasons in Eastern Himalayas.

Externally aided multilateral projects funded by IFAD and World Bank; bilateral projects funded by Kfw, JICA, IDRC, etc. demonstrated promising strategies for conservation and revival of local and traditional nutrition-rich food crops in many states in North East India. Best practices from these projects should be replicated / scaled-up.

Many traditional mountain foods require promotion for popularising as nutritious and healthy food. Some of the food types may require special advocacy or promotional strategies. For example, fermented soybean, smoked meat, etc are "signature foods" of the North Eastern communities. However, cultural acceptability of such foods beyond the region require more innovative communication and advocacy.

lands, rivers/streams and wetlands, and traditional crop varieties that they grow in their jhum, terrace fields and home gardens. These people believe the traditional or original foods as nutritious and healthy as these foods, including plant and animal, provides sustenance, helping to create vibrant, healthy native communities for countless generations. These practices have close link with the religious, cultural, economic, nutritional and medicinal knowledge of the people. The mountain communities reciprocate this by maintaining the health of food by way of traditional cultivation, conservation of seeds, processing such as fermentation, smoking, steaming, roasting etc. Prof Darlong mentioned that a rapid survey, done in North-East India, showed amazing food varieties across the tribes. It was found that the people consume nearly 100 varieties of foods including rice, pulses, legumes, root and tuber crops, leafy vegetables, oilseeds, fibre seeds, millets etc, which they cultivate through jhum and terrace farming as well as from home gardens. Over 200 varieties of foods range from forests that included insects, mushrooms, ferns, fruits, root and tubers, small animals, jungle fowls, etc. and about 70 varieties of food from rivers, streams and wetlands including varieties of fishes, prawns, crabs, snails and insects. Their cooking methods also varied.

Looking on the way how the people have preserved the nutritional aspects, here the knowledge that is linked to the way how the food is processed; eaten and preserved. For example, fermented dishes are very-very popular in north east such as fermented cheese, fish, soybean, fermented rice etc. these fermented food as be preserved for the longer period. They use these fermented foods for seasoning which enhances the nutritional aspect of the food, some of them eat it in smoke and roasted form. Comparing between western and eastern Himalaya the food pattern here is basically non vegetarian. The availability of the food resources is decreasing, practices of sourcing their agricultural practices are also reducing the food crops and thus the traditional nutritious food is declining. Climate change, changing food habits, different ways of food processing are also the reason of reduction of traditional nutritious food.

Prof. Jyoti Prakash Tamang discussed about the gastronomy of the Indian food culture, and mentioned our food culture is more than 8000 years old that is oldest in the world. In the North East region, rice is a staple food followed by soybean which may include fermented, non-fermented and any milk products and alcoholic beverages. Moving towards the north western side, wheat is the staple food specially naan and chapatti and other dairy products. There are more than 1000 traditional foods in the Himalayas and around 100 different types of fermented foods in the entire Himalayan region.

Talking about common ethnic fermented foods of North East India, he mentioned that this part of the country has huge variety of soybean and the ethnic communities of the region have vast knowledge regarding soybean fermented food production. Some Bacillus fermented soybean foods of northeast India include Kinema of Nepali and Bekang of Mizoram which are very nutritious and popular among inhabitants. Kinema is one of the important components of the diverse food culture of the ethnic communities in the Eastern Himalayan regions of India, Nepal and Bhutan. He presented his current research work on nutritional genomics of soybean which revealed that soybean fermented food has fibrolytic enzyme and thus can be used in Covid-19 treatment. The Kinema have various functional benefits and can combat diseases. Kinema is a whole-soybean fermented food with a sticky texture, gray tan in color and flavorful. It is similar to Japanese natto. Kinema production is an income generator for some families. It is sold in all local periodical markets, called “haats” in these regions, by rural women.

Usually, it is sold by volume measured in a small silver mug containing 150-200 grams of kinema, and packed in the leaves of Ficus hookeriana, and then tied loosely with straw. Polyethylene bags are not used for packing kinema. One kilogram of kinema costs about 30 Indian rupees (72 yen). An average of five kilograms is sold by each seller in a local market and brings a profit of about forty percent. This small profit is spent on children's education and on domestic expenses. This trade has been protected as a hereditary right passed from mother to daughter. Though there is a good market for kinema, and some rural women are involved in it for income generation, processing is still restricted to the individual household; there is no organized processing unit or factory. An inexpensive and ready-to-use pulverized starter culture of Bacillus subtilis has been developed for kinema production, which can be adapted to local conditions for more income generation.

Prof. Tamang mentioned the traditional food system plays a significant role in maintaining the well-being and health of Indigenous People. Yet, evidence suggest traditional food base and knowledge of Indigenous People are eroding. This has resulted in the use of fewer species, decreased dietary diversity due to household food insecurity and consequently poor health status. The knowledge of the traditional food system can change this scenario. Awareness created on traditional food system can contribute to create a healthy society to build strong nation. The traditional knowledge of food is the best for geographical indication. Changing food pattern can damage the good health of the society. This calls for knowing the importance of good food habits of our own traditions.

Promotion of home gardens, school gardens, biodiversity gardens, community conserved areas should be encouraged

Mr. Ajay Rastogi discussed about agrobiodiversity of Uttarakhand and said that traditional knowledge regarding ethnic foods is decreasing at fast pace. Younger generations are not very much interested and acquainted with traditional food recipes and it is the need of the hour to document our traditional knowledge regarding food and agrobiodiversity. He suggested to popularize our traditional foods and its health benefits, through food festivals, and recipe books. He also highlighted initiatives of Uttarakhand to promote traditional foods. During the study, while doing workshop with women of the age group >65 years, information of around 377 recipes was obtained, while the women group in the age group between 25 and 40 years, could document only about 150 recipes. The students of local inter collage knew only 51 recipes. This clearly indicates how the knowledge of traditional recipes is diminishing from generation to generation. He stressed on reviving the local or traditional food system to fight against malnutrition. For reviving the traditional food, his team conducts the food fest and invite the people every year on 8th March so that they can cook and taste the traditional food. During collecting information on the traditional food recipes, they also ask about the food eating pattern of the people and concluded that one should focus on processing of recipes because knowledge of various ingredients is lost when information is passed from one generation to another. Various programs have been initiated by the government to fight the malnutrition or to promote nutrition such as National food Security Mission, Millett Mission, Pulse mission etc. He emphasised that we should revive the traditional knowledge of the food system to fight

against malnutrition. Uttarakhand government has passed a gazetted notification on 2014 that ICDS, mid-day meals and the THR (Take Home ration) should buy local crops cultivated or produced by local communities. Our agriculture system is based on three dimensions, the fourth dimension is about the duration of what is available when. We need to focus on how the longevity of availability of the produce and that is the agro biological dimension of our agricultural system.

Dr. T. Shantibala gave brief presentation on edible insect species diversity of Manipur. She said that traditional knowledge concerning edible insects has vital role in the State of Manipur. She further emphasized that recognition of multifold utilities of insect bioresources and biotechnological interventions in these insects for economic prosperity of the region is need of the hour. Edible insects are source of many novel biomolecules and thus can be used in drug discovery, she mentioned.

Dr. Savitri spoke about the status and future prospects of traditional fermented foods in Himanchal Pradesh, where number of fermented foods and beverages are produced and consumed which are prepared using locally available raw materials like cereals and legumes. Some ethnic fermented foods, commonly prepared in Himachal Pradesh, are bhaturu, manna, marchu, siddu, dosha, chilra (lwar), bedvin roti, gulgule, seera, pinni/bagpinni, pakk, thuktal, borhe, sepubari, bari, churpa, and aska. Mostly these fermented foods are prepared from cereals, viz., wheat, barley, and buckwheat, but some are also prepared from legumes and milk too. Traditional fermented alcoholic beverages of Himachal Pradesh include sura, chhang/lugri, angoori/ kinnauri, daru/chakti, chulli, behmi, and arak/ara which are prepared from cereals (rice/barley), fruits (apple/wild apricot/grapes), jaggery, and millets. She further discussed about the local beverage called "sur" and its processing method. As it is prepared by using 35 different types of herbs through fermentation process, it can be a good source of nutrition. In addition to this there are various varieties of fruits and vegetables used to prepare differ varieties of pickle. The fermentation of these helps in increasing the shelf life of these products and improves their organoleptic properties. These ethnic fermented foods and alcoholic beverages are especially used during the local festivals, religious ceremonies, and marriage functions in the rural and urban areas of the state and form an important part of the day-to-day life of people of Himachal Pradesh. Most of the food are the staple food of Himanchal villages and are good source of nutrition to these people and helps in increasing the food security. The impact of these traditional foods in nutrition is in two ways i.e. direct and indirect ways. Food fermentation directly increases total protein, vitamins, essential amino acids etc, and have curative effects to the consumers health. Later she compared traditional roti with fermented food as sudu which clearly shows the increase in nutritive values. The fermentation also increases digestibility of food products and eliminates the toxicity of food products and thus lowers the chances of food contamination. In addition to this some lactic acid is produced during fermentation which is biologically active compound and is helpful in suppressing biological microorganism and lowers the chances of food contamination. These fermented products are also very good source of probiotics microorganisms; probiotics imparts better health benefits to the consumers. Probiotics effects include balancing of intestinal micro-flora, anti-cancerous properties, reduction in serum cholesterol level, effects in hypertension, improvement in lactose metabolism, immunomodulatory effects and it also has anti allergic effects thus imparting better health benefit to the consumers. Along with probiotics, these fermented products also contain certain prebiotic content which helps in the growth of probiotic organisms. In case of COVID-19 pandemic these fermented products can serve as the good immunity boosters. As well as creating awareness about

SESSION'S HIGHLIGHTS

The session III focused on fermented foods and its health benefits, and suggested that to:

(i) Improvement in nutritional security and health of local indigenous communities, studies on ethnic foods and associated technologies are vital.

(ii) Systematic scientific interventions are needed to develop value added products.

(iii) Popularization of ethnic foods of Himalaya may bring economic prosperity to the region.




these fermented foods can help in replacing harmful junk food with the healthy traditional fermented products. Thus, we can say that these fermented foods, beverages, and pickles have remarkable role in health nutrition and social wellbeing of the population. It is the need of scientific intervention in this field and the scientific community should come forward to advocate and popularise as well as to preserve these fermented products so that our present as well as future generation gets nutritious and healthy foods.

Popularization of ethnic foods of the Himalaya may bring economic prosperity to the region

SESSION IV : CULINARY OR FOOD TOURISM

Er. Kireet Kumar, as session moderator, welcomed all the participants and briefed on the importance and relevance of the topic of the session which focuses on Culinary or food tourism and its relevance to Indian Himalayan region in the present scenario. He mentioned that the session is important in terms of improving livelihood or economy of the people residing in the Himalaya. He said that that the biggest challenge is traditional food we eat is not getting much popularized among the people who are not from this region. Thus to popularize these traditional cuisines among the people who visit our places as tourist is a challenge and if we accept this as a challenge to popularize our traditional cuisines and are successful in it then it can boost tourist sector in the Himalayan region. The

Session: IV

MODERATOR
Er. Kireet Kumar, Head, CLWRM, GBPNIHE

PANELIST
Dr. Utpal Kumar De, Professor, Economics, North-Eastern Hill University

Mr. Ashish Bhatgain, Director, Uttarakhand Tourism Development Board

Dr. Ghanashyam Sharma, Program manager, TMI, India Office Sikkim

Dr. Saurabh Kumar Dixit, Associate Professor, North-Eastern Hill University, Shillong

Mr. Ankit Sood, Ecotourism Planner, HP

CONCLUDING REMARKS
Dr. Utpal Kumar De

Er. Kireet Kumar

session broadly targeted two important aspects: (i) role of traditional food in enhancing tourism in Indian Himalayan Region, and (ii) the economic benefits communities can gain by promotion of traditional food.

Dr. Utpal Kumar De as key speaker discussed about the Food tourism and mentioned that it is like visiting an area and enjoying its traditional food culture. Mostly culinary tourist or food tourist is mostly interested towards the festivals of local areas i.e tourist or visitors when they visit these places during such festivals, they can enjoy the local food. Earlier the traditional food was limited to such festivals but now these local food items are much known or popular and available in market. The availability of these traditional foods is dependent on the availability or production of the specific ingredients in the region. Now a days food tourism is also being popularised, as a result when we visit some place such as Rajasthan, we take the local food based on the specific ingredients of the natural biodiversity. People also like to purchase non-perishable traditional food items and are being commercialised over the years. The local vendors especially women are involved in such activities. Therefore it has emerged as a strong mode of income generation. Once the visitors collect the local ingredients or take away the processed food, they spread knowledge of these ingredients, food or beverages which are specific to a particular area of the region, the food becomes national or global thereby and can increase more employment possibility or capacity. All the items are mostly naturally collected items therefore it is sustainable or environmentally friendly. We can include medicinal plants in the broader aspect of food tourism. Popularisation of traditional food can be done through effective use of the media. Thus, we can say that it has a scope of a bigger economic aspect in the traditional, especially the tribal societies who are living in the Himalayan and sub Himalayan region. All the activities such as marketing and other are to be addressed in an organised manner.

Mr. Ashish Bhatgain talked about the traditional food system of Uttarakhand, that have a lot of potential. Focusing on the strategic promotion of traditional food and cuisines from different part of hills as the need of the hour, he mentioned this sector has lot of potential to attract people as it reflects a region, culture, tradition, and lifestyle. Besides being delicious, these traditional foods are also rich in medicinal values as it grows in high altitude, which is the main attraction and promotional tool for the development of tourism of Uttarakhand. Consumption of local food of an area can be used for the development of image of a specific destination image. Culinary tourism is required for overall development of various tourist destination in Himalayan states. He talked about Uttarakhand, which consists of two main regions i.e Kumaun and Garhwal. The recipes of both the regions are delicious with high nutritional value. He told about unique gastronomic culture in Uttarakhand state which is reflected in number of tasty and nutritious local dishes that are hardly known outside the state. Therefore, there exists the need to promote local traditional Himalayan cuisines. He informed about the Uttarakhand government initiatives as various schemes, under which ethnic cuisines are being popularised among tourists visiting Uttarakhand on annual basis. He mentioned about other ways of popularizing the traditional cuisines such as:

- With the help of various “Self-Help Groups (SHGs)” like in NRLM “National Rural Livelihood Mission” under which several SHGs are created across the state who are making

many traditional recipes and snacks such as biscuits of Mandua etc.

- Government introduced Indra Amma Canteen to promote several traditional food items such as mandua ki roti, jhangora ki kheer, bhatt ki chutkani, kulath ki daal.

- Homestays are also promoted in large scale in Uttarakhand, with flavour of Uttarakhand traditional cuisines.

Dr. Ghanashyam Sharma talked about the agro biodiversity richness of Sikkim Himalayas. He told that the local agrobiodiversity of Sikkim features more than 126 landraces of cereals, including rice (77), maize (26), and millet (7); 18 cultivars of oilseeds; 34 cultivars of pulses/ beans; 132 species of vegetables; 38 species of spices/ condiments; 33 landraces of tubers/roots; 64 species of fruit; and more than 200 species of wild edibles. Sikkim being the organic state has various traditional cuisines with high nutritional content. Several cuisines of Sikkim includes Gundruk, Sel-roti, Dulbhat, Mesu, Raksi, Churpi, Janar Phapar ki roti, kodo ki roti, daal bhaat tarkari, momos, herbal tea, thupka etc that can be promoted not only in the country but across the world as they are nutritious and have pro-organic nature. Sikkim Government has promoted the practice of Home stays in Sikkim villages. Mountain institutes along with several NGOs are promoting them and trying to give the training and capacity building so that they can do some culinary activity to attract tourist and providing local cuisines in these home stays. Apart from this, the government organizes the food fest in the Gangtok market to attract tourist. Among the traditional products Sikkim has several fermented foods, such as, kinema, gudrunk, mesu, sinki. All of these have high nutritional as well as medicinal properties. Sikkim being the only organic state in India can provide nutritious cultural food without any chemicals and foreign harmful elements. Further he attributed decline in traditional cuisines and their knowledge with a focus on out-migration with increasingly declining interest on traditional foods.

Dr. Saurabh Kumar Dixit introduced the audience to Gastro-tourism and its products, by explaining the different dimensions of Tourism based culinary promotion through Food trails, Food and drive events, Agro-tourism, vocal for local, etc., to enhance the local food industry in Himalayan regions. From very basics to technical food consumption

models, Dr. Saurabh provided the audience with a very different aspect of traditional foods and tourism, its promotion and production-consumer demands and its fulfilment model etc. He mentioned that the gastronomic tourism is similar to culinary tourism or as food tourism. Gastronomic tourism, it is a kind of tourism attraction, which is depended on three main components i.e. agriculture, culture and tourism. Agriculture usually offers resources such as food and beverages of a region, culture basically provides identity to some cuisines and tourism comprises of all the three components together and presents entire package to the tourist. He also discussed about the motives of tourist and how the gastronomic cuisines of Meghalaya can attract the tourists and about the peculiar aspect of Meghalayan cuisine. Meghalaya is known for its delicacies and food. Meghalaya comprises of 3 tribes, Khasi, Garu and Jantia known for their specific foods. Across various communities and cultures in Meghalaya, rice and pork form the staple diet of the people. Different tribal foods of Meghalaya include: Jadoh, Doh-khlieh, Nakhmam-bitchi, Pumaloi, Doh-Neiiong, etc.

Gastronomic tourism is dependent on perspective of consumer, producer prospective and destination development. By mapping all the three components we can develop gastronomic tourism in any region. Local sourcing is an important part of gastronomic tourism where whatever product we are preparing or selling as for tourist attraction we are expected to use the maximum extent of local resources, thereby helping the community to enhance the source of income. Food and drink/beverages events are quite common now days. Food based souvenir are also popular among the tourist such as jam, jelly, thus supporting the local people. Culinary tourism is basically expressing the culture of the region with the help of food. He discussed about the prime Gastronomy motivators which may be symbolic, obligatory, pleasure, extension, or contrast. They play a vital role in tourist decision making. The symbolic motivators are the persons who want to get authentic experience, learning and exploring local culture and status. Obligatory motivators are the people who consume food in order to fulfil their physical need and health concern, contrast motivators tries to experience different kind of food whenever they visit some places, extension motivators: generally take only food they used to have in their day to day life.

Mr. Ankit Sood discussed about the culinary tourism, where the focus is on food as an attraction for exploration and a destination for tourism. It includes a variety of formats and products – culinary trails, cooking classes, restaurants, farm

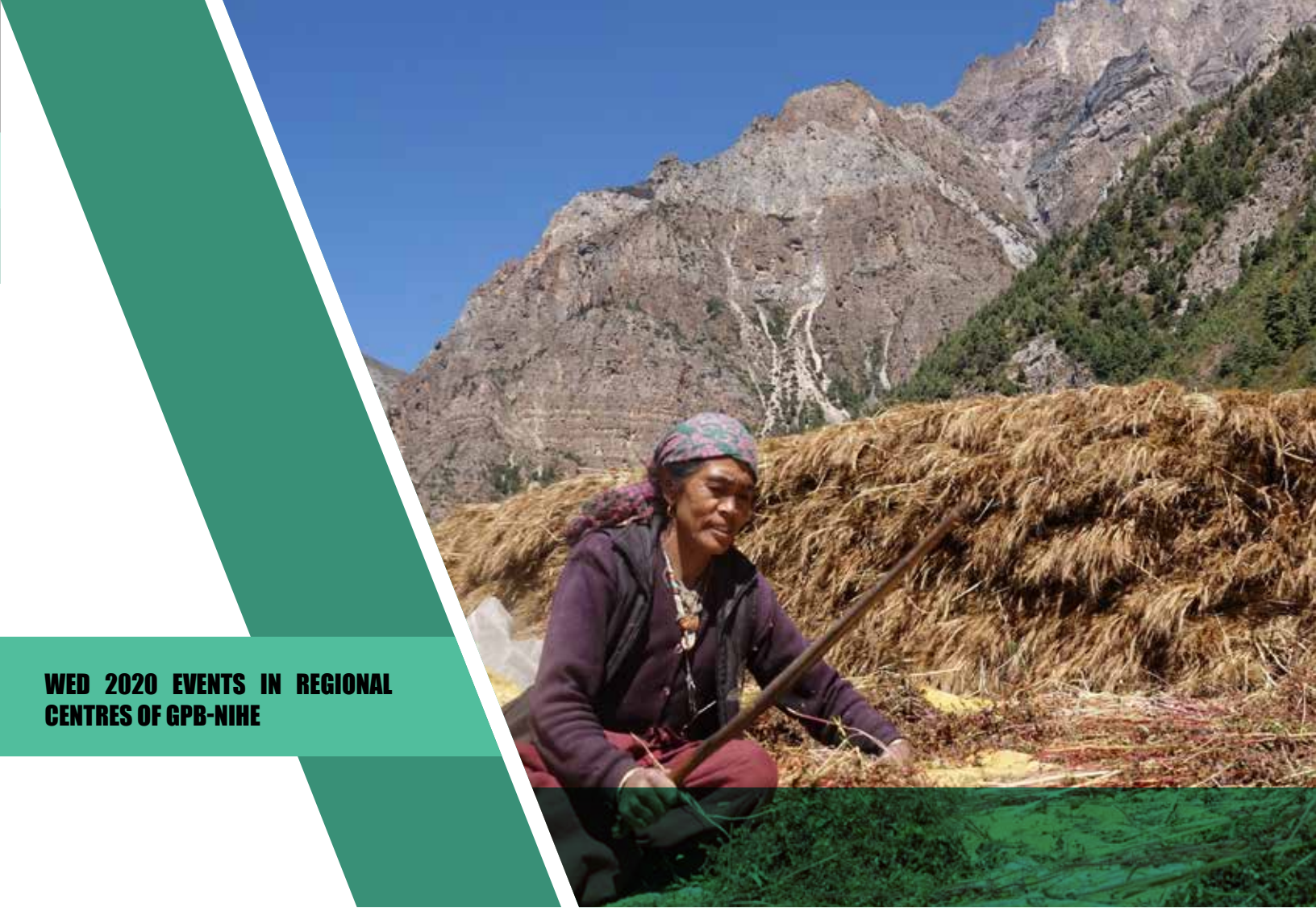
weekends, cookbooks, food guides, and new or adapted recipes, dishes, and even ingredients. While culinary tourism focuses on food products, gastro-tourism extends beyond what we eat. His motto is healthy living, Eat good, feel good and do good showed us a better way of living with our cultural values intact and promoting the health benefits of good food. He further briefly discussed the challenges in Culinary Tourism in Himachal Pradesh, by mentioning that:

- Embracing traditional foods and promoting it via tourism is the way forward
- Growing trends of Authenticity - Food becomes an important point to highlight traditional cultures and lifestyles
- Food is one of the most important experiences of holidaying- Cuisine has an impact in choosing holiday destinations
- Traditional Food not only combat harsh climatic conditions but also have high nutrition levels
- Traditional Cultivation forms a World Heritage (eg Dzongu Rice Cultivation, Sikkim)
- Culinary tourism is not only appealing to tourist, but also contributes to the social, economic and environmental development of a destination

While concluding the session, Dr. Utpal Kumar remarked on traditional foods, tourism potential, cultural variability, special and temporal distribution of traditional foods. He underlined the need of conserving traditional food art and its inclusion in eco-tourism. Cultural trails could benefit the locals and increase their income in Himalayan regions. He highlighted following points:

- Cultural importance of Traditional cuisines
- Linkages among livelihood, tourism and regional foods and linked
- Popularization of agro-biodiversity and its utilization among the local people
- Requirement of awareness among the locals for using traditional food over processed foods
- Nutritional aspects of the cuisines require promotion

Garhwal regional centre, Srinagar, Uttarakhand



WED 2020 EVENTS IN REGIONAL CENTRES OF GPB-NIHE

The objectives of the programme were to share ideas and experience among the institute employees on the crucial role of (i) natural ecosystems in the life of human being, and (ii) possible ways to maintain ecosystem and biodiversity. Garhwal regional centre head Sh. S. Tarafdar expressed his thinking on various anthropogenic as well and natural factors, which are responsible for dwindling environment and biodiversity at global scale. He also focused on food chain at different trophic level of various ecosystem and the consequences of species depletion on maintenance and sustainability of these natural ecosystem. Further, he emphasized on the importance of Gross Ecosystem Products (GEP) that the biodiversity is providing to human being in the form of different ecosystem services vital for sustenance. While nations are planning to rebuild the economic conditions affected by Covid-19, it should not be at the cost of overexploitation of natural resources he underlined.

Sikkim regional centre, Pangthang, Sikkim

The Sikkim Regional Centre (NERC) of G.B. Pant National Institute of Himalayan Environment (NIHE), pangthang, Sikkim celebrated the World Environment Day by organizing different events such as panel discussion, painting/drawing Competition among School students through online portal

and plantation at Rural Technology Centre (RTC). Prof G.K. Niroula Chhetri, Vice Chancellor Sikkim State University chaired the WED session and gave his talk on Himalayan environment and its sustainability under COVID-19 pandemic situation. He stressed on bio-cultural and traditional systems of the Himalaya which are being still practiced by the community however, such practices are essential and needs to be documented and links with livelihood. On this day and current pandemic situation, people should be more responsible towards nature and environment and there is a need to increase the awareness, Dr. Chhetri directed. Dr. D. K Agrawala, Scientist of Botanical Survey of India, Gangtok briefed about the Himalayan biodiversity and explained the importance of orchids in the Himalayan Ecosystem. Dr Rajesh Joshi, Head, Sikkim Regional Centre, discussed on the potential of "Vocal for Local" in the context of Sikkim Himalaya and explained its feasible attributes, like local agro biodiversity, ecotourism, and traditional bio-cultural practices.

North-East Regional Centre

The North-East Regional Centre (NERC) of G.B. Pant National Institute of Himalayan Environment (NIHE), Itanagar, Arunachal Pradesh celebrated the World Environment Day by organizing different events including webinar-cum-discussion, essay Writing competition (for Undergraduate students), painting/drawing Competition (for School students Class 6-10) and plantation at Rural Technology Centre (RTC) of NERC. The topics for discussion in the Webinar were (i) Current Environmental issues and solutions in Northeast India and (ii) Biodiversity conservation in COVID-19 pandemic situation. The resource persons who participated in the discussion were Dr. Awadesh Kumar, Associate Professor, NERIST Nirjuli (A.P.) and Dr. Ublari Shilla, Associate Professor, Union Christian College, Shillong (Meghalaya). Dr. Awadesh Kumar gave a brief presentation on the major environmental issues in NE India. He highlighted deforestation, flood, landslide, construction activities, water scarcity, encroachment, and mining as the major environmental issues in NE India. Dr. Ublari Shilla gave a brief talk on the importance of the floral diversity in biodiversity conservation and said that restoration of degraded lands through plantation activities would be one of the ways to conserve biodiversity. Key messages of the webinar were:

1. On environmental problems, participants agreed that developmental activities cannot be avoided since NE India is still in developing stage. Developmental policies may be framed in such a way as to ensure minimum destruction to the environment and conservation–oriented for conserving the rich biodiversity of NE India.

2. Reforestation or plantation in lands degraded by mining, construction activities, road cutting, etc degraded land would be one of the ways to restore natural environment and to conserve biodiversity.

3. Skill mapping of returnees to NE states due to COVID-19 pandemic is important to identify their skills, employment opportunities and entrepreneurship options in the field of poultry, piggeries farming, and value-addition of agri-horticultural products.

4. Agriculture policy may focus on developing integrated

farming system to reduce negative impact of monoculture cash crop plantations on the agro-biodiversity of the region and pressure on land resources. In this regard, agriculture department can collaborate with horticulture depts., research institutes, forest department and local farmers.

Himachal Pradesh Regional centre

World Environment Day (WED) was celebrated at G.B Pant National Institute of Himalayan Environment (GBP-NIHE), Himachal Regional Centre (HRC), Mohal - Kullu, Himachal Pradesh under the broad theme of Biodiversity 'Time for Nature'. Keeping in view current COVID-19 Pandemic scenario the centre had organized a webinar on the "Himalayan Biodiversity for Livelihood and Health Care in the context of COVID-19 Pandemic" with the following discussion points:

i. Status, issues, challenges, and opportunities of Himalayan Biodiversity

ii. Potential of Himalayan Biodiversity for livelihood development of Himalayan communities

iii. Opportunities of biodiversity based traditional health care system of Himalayan region

iv. Possibility to develop local products, marketing, local brands, and value chains in IHR

The panellist/subject experts from academic/research organizations, government agencies (i.e. national medicinal board, state biodiversity board, etc.), scientist, managers, planners, NGOs, pharmaceutical industries, farmers were invited for the webinar. The experts discussed about the huge potential of nature-based solutions such as ecotourism, horticulture, medicinal and aromatic plants, agriculture crops, wild edibles etc. for the economic development of Himalayan people.

Ladakh Regional Centre

World Environment Day (WED) was celebrated at G.B Pant National Institute of Himalayan Environment (GBP-NIHE), Ladakh Regional Centre, Leh, Ladakh in collaboration with Ladakh Ecological Development Group (LEDeG) at Leh. Competitive cultural events were organized on Solid waste management theme and Ms. Nilza Agmo from Delhi Public School, Leh was awarded a Bicycle as first prize. Mr.Sajid Sultan, Chief Wildlife warden, Ladakh and Dr. Suresh Rana, Scientist, LRC, GBP-NIHE, while deliberating on the theme of the day, highlighted the importance of nature in human life and ole of human in understanding the intricacies of nature for the maintenance of an ecological balance.

Year	Theme of World Environment day in Last 20 years
2000	The Environment Millennium – Time to Act
2001	Connect with the World Wide Web of Life
2002	Give Earth a Chance
2003	Water – Two Billion People are Dying for It!
2004	Wanted! Seas and Oceans – Dead or Alive?
2005	Green Cities – Plan for the Planet!
2006	Deserts and Desertification – Don't Desert Drylands!
2007	Melting Ice – a Hot Topic?
2008	Kick The Habit – Towards A Low Carbon Economy
2009	our Planet Needs You – Unite to Combat Climate Change
2010	Many Species. One Planet. One Future
2011	Forests: Nature at your Service
2012	Green Economy: Does it include you?
2013	Think. Eat. Save. Reduce Your Food print
2014	Raise Your Voice, Not the Sea Level
2015	Seven Billion Dreams. One Planet. Consume with Care.
2016	Join the Race to Make the World a Better Place.
2017	Connecting People to Nature – in the city and on the land, from the poles to the equator
2018	Beat Plastic Pollution
2019	Beat Air Pollution
2020	Biodiversity

ABOUT THE INSTITUTE

G.B. Pant National Institute of Himalayan Environment was established in 1988–89 as an Autonomous Institute of the Ministry of Environment Forest & Climate Change (MoEF&CC), Government of India. The Institute has been identified as focal agency to advance scientific knowledge, evolve integrated management strategies, demonstrate their efficacy for conservation of natural resources, and ensure environmentally sound management in the entire Indian Himalayan Region (IHR).

G B Pant National Institute of Himalayan Environment (NIHE)
(An Autonomous Institute of Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India), Kosi-Katarmal, Almora 263 643, Uttarakhand, INDIA
Web: http://gbpihed.gov.in | Phone: +91-5962-241015

Editorial Team
Dr (s).Vasudha Agnihotri, Vikram Negi
Mithilesh Singh, S.K.Ojha
Picture credit: Dr(s). Rajesh Joshi, Vikram Negi Mr. Pramod Joshi

For further details, please contact:
Dr. R.S.Rawal, Director (psdir@gbpihed.nic.in)
Er.Kireet Kumar, Head- CLWRM (kireet@gbpihed.nic.in)