Draft

PROCEEDINGS OF THE

Regional Workshop-cum-Exhibition on Yak Rearing in the Himalaya-Strengthening Yak networks in Transboundary Landscapes for Social-Ecological Resilience of the Highland Communities

(25-26 November 2020)

Khangchendzonga Landscape Conservation & Development Initiative (KLCDI)-India

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Background:

Among the mammalian species, Yak (*Poephagus grunniens*) is exceptionally adapted to the hostile high altitude environment of the Himalayan region. It is usually distributed between 2000 and 5000 m altitudes, across the Himalayan region of south Central Asia, the Tibetan plateau and Mongolia. This herd animal is considered as the cornerstone of life for the highland communities. Yak is the main source of livelihood for transhumant pastoralists, the unique cultural identity of yak-based herding communities, supports tourism and generates economy. It is the source of milk, meat, fibers, hide, and helps in fuel supplies and transportation of goods in the difficult hilly terrains of highlands. The Khangchendzonga Landscape, part of eastern Himalayan and having a spread in three countries i.e., Bhutan, India and Nepal, offers a uniquehabitat for transhumance pastoralism. However, in recent years, decline in interest among the young generations towards yak farming and number of families involved in Yak rearing is apparent as a socio-political and economic concern across the landscape. Further, reduced availability of labour, forage in the rangelandespecially during winter, increasing yak mortality, and limited access to the market for Yak products are major issues which affect Yak rearing and livelihood of the highland communities. Over the years, the challenges in Yak farming are continuously increasing due to changing scenario of socio-economic developments, policies and impacts of climate change. Among others, the socioeconomic challenges include increasingly restricted access to alpine meadows, partly due to the establishment of protected areas, and the expanding network of community forests at lower elevations, and restrictions on the movement of herds across borders for grazing that has been part of transhumance for centuries.

Hence, Yak herding families are shifting to alternative income sources in tourism sector, and collection of high-value non-timber forest products like Yarsagumba (*Ophiocordyceps sinensis*), and other earnings by way of out-migration. Policy constraints include the restriction of trans-border movement of animals disrupting centuries-old annual practice of yak herding across the borders. The imposed ban on livestock grazing in Khangchendzonga National Park and Singalila National Park in India has resulted in the sale of large numbers of livestock to Nepal. This coincided with the fact that yak population in

Nepal nearly doubling from 4,093 in 2009 to 7,565 in 2012, placing considerable pressure on the country's rangeland management (Ref?). Furthermore, there are technological limitation in the landscape compared to other yak herding areas in China and Mongolia, which have experienced significant technological advancements in terms of renewable energy (like solar and wind), and value-added yak product development, which is critically important to fill gaps in these inaccessible areas. Realizing this scenario and considering the importance of Yak as an unique highland entity, the Sikkim Regional Centre of G.B. Pant National Institute of Himalayan Environment (NIHE) under the Khangchendzonga Landscape Conservation and Development Initiative (KLCDI)-India programme with support of the International Centre for integrated Mountain Development (ICIMOD) participated in two important events on Yak in 2019:

i) Production of an Issue brief on Yak titled ***"Protecting a Himalayan icon: The need for transboundary cooperation to secure the future of yak in the Khangchendzonga Landscape"***. The brief highlighted issues and challenges being faced by yak herders in the landscape and priority policy recommendations were made.

ii) Contribution to the session on ***"Hindu Kush Himalayan yak network: Building partnerships for conservation and development of yak in the Third Pole"*** at the 7th International Conference on Sustainable Animal Agriculture for Developing countries, held at Pokhara, Nepal in November of 2019; ***The session was participated by yak experts from India, Nepal, Bhutan, Pakistan and China along with private sectors. Issues, challenges and opportunities with yak herding in the HKH region were further discussed and set of recommendations provided for urgent actions.***

In order to implement recommendations from the above events, and to start actions on the ground, the Sikkim Regional Centre of NIHE under the KLCDI-India programme, in collaboration with Department of Animal Husbandry and Veterinary Services, Government of Sikkim and ICIMOD organized a two days Regional Workshop-cum-Exhibition on ***"Yak Rearing in the Himalaya- Strengthening Yak Networks in Transboundary Landscapes for Social-Ecological Resilience of the Highland Communities"*** **during 25-26 November, 2020**. The event aimed to (i) identify and prioritized best practices on Yak rearing and share across the borders for livelihood promotion to highland communities in the Himalaya, and (ii) strengthen linkages between involved stakeholders, policy makers and diverse expert groups on Yak farming and enterprises and iii) prioritize and mainstream actions.

Key objectives:

1. Sharing innovative experiences and good practices on yak rearing (rangelands, fodder, nutrition, breeding, health, value chains) for actions across the Himalayan region.
2. Initiating a regional level dialogue among relevant departments, policy makers, civil society, private sectors, community institutions by developing stakeholder's network.
3. Prioritise and mainstream identified actions (short term, mid-term and long term) on yak rearing with the on-going stakeholder plans and programmes for better ownership and sustainability.
4. Showcasing of yak-based products for their wider outreach and dissemination and livelihood promotion to highland communities.

Expected outcomes:

i. A knowledge product on compilation of best practices (rangeland management, technologies for winter fodder, nutrition, breeding and health) for upscaling across the borders through regional cooperation.
ii. Established a functional yak network for national and regional platform (at HKH level) along with Institutional mechanisms.
iii. An action plan with priority actions considering short, medium and long terminterventions.
iv. Promoted Yak based entrepreneurship and livelihood of the highland communities through exhibition of the value-added products.

Day-I, 25 November 2020

Regional Webinar on Yak

Inaugural Session

Dr. R. Joshi, Head, GBPNIHE, SRC n his welcome address expressed his gratitude to all distinguished delegates and other participants present in the workshop. He highlighted the overall objectives of the Workshop-cum-Exhibition. t. He mentioned about past progress on yak related activities and outcomes in the form of issue briefs on protecting the Himalayan icon *i.e.* yak and policy recommendations etc. and pointed out some major issues and challenges on Yak rearing at present in high altitude areas, such as reduced availability of labour and forage during winter season, high mortality rate of yaks and limited market accessibility for yak products. In order to address these issues and to start action on ground the NIHE in collaboration with ICIMOD along with other partner institutes have organized this event with the main aims to identify and prioritize the best practices on yak rearing

and sharing across the border for livelihood promotion of highland communities in the Himalaya, strengthening network between involved stakeholders, policy makers, and diverse expert groups on yak farming as well as prioritized and mainstreaming the actions. He further mentioned that the aim of this two days program is i) to bring out knowledge product on best practices in terms of rangeland management and developing technologies for winter fodder, nutrition, breeding and health related issues on yaks, and ii) to establish functional network for regional and national platform along the institutional mechanism . He mentioned that action plans on short term mid-term and long term intervention would be discussed and that the ultimate aim of the exhibition is to promote yak based entrepreneurship and livelihood for highland communities through exhibition of value added products. He expressed his gratitude towards the partners from Ladakh, Uttarakhand, Arunachal, Nepal and Bhutan for their overwhelming support by sending their posters, photographs and video clips on yaks and yak products as showcase materials for the exhibition.

Dr. Nakul Chettri, Regional Programme Manager, Transboundary Landscapes, ICIMOD, talked about overview on transboundary landscape and mentioned that yak issue contribute to long term goals of the transboundary landscape programme of ICIMOD. To achieve the goal some targets have been set such as enhanced ecosystem services, reduced poverty, enhanced resilience (social as well as ecological resilience).

He also highlighted on 4 fundamental pathways identified:

i) Transboundary cooperation, ii) Innovations and livelihood in terms of socio-economic development perspective, iii) Knowledge generation in terms of science and science based decision making process, and iv) Influencing contribution to policies.

Dr. Chettri mentioned that Yak is cultural heritage and important source of income of marginalized communities in highlands. Traditional practices should be revived and repackaged in a way so that the yaks also get attention and provide good income to highlanders. He also mentioned that 60% of HKH landscape is rangeland but at present productivity has decreased due to several climatic factors. Moreover, there is restriction in exchange of genetic resources due to mobility constraint across the border, which should be addressed through policy support which can be achieved through dialogues among associated countries.Hence, the culture of yak rearing has been declining due to different factors.In order to revive this culture and to attract youth, ; product diversification and value addition through innovation is essential. Dr.

Nakul also shared that in the recent HKH Environment Ministers summit coordinated by ICIMOD, Enhanced ecosystem resilience is one of the Action that includes the most fragile and herding vulnerable yak herding communities. Such, Ministerial level agreement provides policy support fort three countries to work on the ground and to bring changes which are desired by the community and desirability of fragile ecosystem.

Dr. R.S. Rawal, Director, NIHE, Almora, in his inaugural remarks mentioned that Yak not only support the highland livelihood but is one of the major resilient species in highland. He told that we are looking for resilience ecosystem services in changing scenario of climate change. Hence, have to work on this to make our program more functional. He mentioned that movement of germplasm of this resilient species i.e. yak across the countries will help to sustain their population as yaks population is declining in the country as well as in neighbouring countries Nepal and Bhutan due to inbreeding problem. So this is the forum to discuss how this problem could be solved or facilitated in order to support the survival of this resilient species.

Discussion with partners from Ladakh, Sikkim, Arunachal, Nepal and Bhutan on this forum will support in providing inputs on the subject and will facilitate to make programs and policies more harmonious and further support in cause of yak conservation and development in the region, he added.

KEYNOTE ADDRESS

Sri.S. B. Subba, Secretary, AHLF&VS, Govt. of Sikkim) expressed his gratitude towards ICIMOD and G.B. Pant for organizing this workshop in the state of Sikkim. He thanked NRC on Yak, Dirang for extending its support during the catastrophic situation of 2019 when there was huge mortality of yaks in Sikkim. Mr. Subba mentioned that if this program on 'Yak Rearing in the Himalaya' is seriously pursued by all the stakeholders the objectives are attendable, however, there are many challenges, of them he illustrated a few, i.e. natural calamities as a result of climate change, shrinking of pasture lands due to policy restriction, lack of quality fodder, lack of interest among young generation in yak herding, lack of proper marketing of yak products etc. He further informed about some provisions for facilitating yak conservation in Sikkim, those are construction of hay godown for storing feed for yaks and constitution of dedicated rapid response team to assist the yak herders in time of their need. For long term and sustainable yak husbandry, he suggested few initiatives to be considered in this workshop i.e. propagation of large scale production and promotion of lesser known indigenous high altitude feed and fodder, yak migration road to be funded and

constructed, focus on R&D on shelf life of yak products such as cheese, butter etc. focus on providing backward and forward linkages and support for commercial viability, support for export of products like hard cheese within and outside India, branding of yak's organic cheese products in the niche markets, provisioning of milking cans for clean milk collection, hard cheese making machine, mini water storage tanks, solar lanterns etc.

Technical Session I

Sharing Good practices on Yak production for cross-sharing across KL member countries and potentials for mainstreaming in government programmes and projects

Dr. R. S. Rawal, Director, NIHE, chaired the session-I in coordination with the session moderator Dr. R. Joshi. All the panellists of the session were invited to deliver their talks on their respective topics.

Dr. Prithviraj Chakravarty, Director, ICAR-National Research Centre on Yak, Dhirang, Arunachal Pradesh, talked on '***Applied technologies for sustainable yak production (fodder-nutrition, reproductive biotechnology, Yak health and value addition of yak products)***'. He highlighted on mitigating crisis of feeds and fodder during winter season and discussed about CFB (complete feed block) technology' developed by ICAR-National Research Centre on Yak. Feed blocks are made out of straw. this feed block technology has been popularised among the yak herders of Arunachal and North Sikkim. The ICAR-National Research centre supplies these blocks to yak rearing places of Dirang and Tawang districts of Arunachal Pradesh, as well as to North Sikkim.

He also emphasized on development of pastures in highlands to overcome the fodder crisis during winter, and told about Salix plantation and nursery development for fodder propagation and preservation, as well as water conservation through water harvesting-*Jalkund*.

He highlighted the Ensiling technology developed by ICAR, Dirang, using plastics and A.I. (Artificial Insemination) technology which will be disseminated to other states as well as neighbouring countries. He mentioned about various other technologies such as multiple ovulation and embryo transfer (MOET) process, In-vitro fertilization (IVF) technology etc. which are in practice in ICAR-National Research Centre on Yak, Arunachal Pradesh for improving, multiplying and conserving this iconic species. He also suggested that instead of yaks, their semen can be exchanged among the countries for breeding purposes.

Talking about empowering farmers he briefed on yak products and value addition. Value added yak products like low fat paneer with wide acceptability and value added yak fibre prepared by blending with

natural fibre like jute to produce number of products. He also informed about some government programs on yaks and mentioned about one already submitted proposal on 'outreach program on conservation and improvement of yaks in Leh, Ladakh with Complete Feed Block and Artificial Insemination technologies with funding from ICAR-NRC on Yak, Dhirang. He again shared about another proposal which is under process i.e. 'collaborative program on conservation and improvement of yaks in Sikkim' with focus on promotion of CFB and A.I. technologies.

Dr. Banshi Sharma, Director General, Department of Livestock Services, Ministry of Agriculture and Livestock Development, Kathmandu, Nepal mentioned that yaks are facing Inbreeding problem. To overcome this situation, government of Nepal has imported yaks from Tibet and China. Since 2018 several regional events including transboundary festivals, capacity building for groups' cooperatives, yak networks, exposure visits were organised in KLCDI. As mutual cooperation, government of Bhutan also supported two yak breeding bulls to Nepal.

He also highlighted some major problems in yak husbandry in Nepal such as lack of knowledge of green pastures, lack of scientific and efficient yak breeding program to maintain the genetic diversity, no specific program to attract the farmers especially the youths in yak farming as they are interested to change their profession from yak farming to tourism, lack of infrastructure facility including roads and electricity and many other factors including closure of alpine pastures, limited investments in yak husbandry especially in the interface of climate change.

Highlighting the usefulness of yaks in Nepal he concluded that yak farming and rangeland management should be kept in high priority from the government side.Construction of foot trail, drinking water management, conservation and promotion of local forage species, recognizing of traditional knowledge and gender role in yak farming are to be important. Effective cross border cooperation between Nepal, India, Tibet and Bhutan in the area of research and management is needed in the context of global warming and climate change. Further, incentive mechanism for effective agro-ecotourism, product diversification and value addition, entrepreneurs insurance etc. are to be taken into consideration for the promotion of yak husbandry.

Mr. Towchu Rabgay, spoke on behalf of **Dr. Tashi Yangzome Dorji**, Director, Department of Livestock, Ministry of Agriculture and Forest, Bhutan, on **good practices on yak farming in Bhutan.** He mentioned that Bhutan is trying to improve the mountain livelihood, promote and preserve the mountain culture. He

emphasized on some important aspects, i.e. rangeland governance, livelihood and income generation, networking and genetic improvement. Equitable distribution of rangeland in Bhutan will help in proper management and reduce conflict in future.

He informed about Bhutan Government'sinitiative in supporting the yak herders with labour saving and eco-friendly equipments such as Cream separator and butter churner. For fodder he suggested oat pasture management which will sustain even in winter. . Regarding health issue he mentioned about gid disease of yaks which is common in Bhutan and the aim of the country is to eliminate the disease from the highlands through sensitization and systematic deworming of dogs which serve as intermediary host. He also shared about national dog population management program. as feral dogs' population control is vital.

He informed about Yak A.I. centre in western part of Bhutan which is under progress. For genetic improvement, Bhutan has established yak farm and initiated regional bull exchange program. For better transboundary and regional networking Bhutan has formed several yak cooperatives and formation of yak national yak federation is in good progress. national. He also talked about f Biogas, Solar equipments, highland school clubs, resource centres, festivals and yak shows, highland youths knowledge exchange program-quiz and posters, which are being carried out in the country.

Dr. Karma T. Bhutia, Additional Director, Department of Animal Husbandry, Livestock, Fisheries and Veterinary Services, North Sikkim, Sikkim, India, highlighted on status of yak husbandry in Sikkim and informed that in Sikkim yak herders are classified into three groups, i) primary herders (who look after their own yaks in rangeland), ii) secondary herders (those who have yaks but other people look after their yaks) and iii) tertiary herders (those who have yaks which are presented by the family, especially to daughters). Ultimate aim of this classification is to register all yak herders. There are overall 150 yak herders classified in Sikkim he mentioned.

Dr. Karma also informed about the formation of 'highland livestock development wing' in Sikkim comprising of 6 members team headed by Principal Director as chairman and another 12 member quick response team (QRT) team headed by veterinary officer for attending SOS calls from the herders. This team basically performs mobile veterinary health camps at the doorsteps of the herders. He further informed that in Sikkim most of the yaks herding areas have been made accessible through road connectivity and expressed his gratitude towards the government for prioritizing this sector. He further updated

that National Research Centre on Yak, Dhirang, Arunachal Pradesh is continuously assisting the state in feed and fodder sector. Moreover, he expressed his gratitude to the ICIMOD for giving opportunity to attend yak festivals in Nepal and Bhutan which was learning experience for yak herders and highland livestock development team as well. Dr. Karma in his remarks also mentioned that to address the issue of decreasing yak population, Sikkim government is undertaking birth control program on feral dogs through anti-rabies and animal health programs and on conservation of Tibetan mastiff dogs, as these dogs have herding instinct and helps in protecting the herds from the predators which in turn will help increasing the yak population. Hence, the team is spreading awareness on importance of Tibetan mastiff dogs among the yak herding families and encouraging them to take the help from these dogs to protect their herds. He also talked about introduction of Tibetan sheep and Angora rabbit to Sikkim with the intention of value addition to yak products by blending yak fibre with angora wool and Tibetan sheep wool as these blended wool products are in high demand. This step would certainly help in overall development of highlanders in future he anticipated. He also informed about soap produced from yaks' milk in the state of Sikkim which is on high demand.

Finally he concluded expressing his gratitude towards G.B. Pant and ICIMOD for providing this platform with the anticipation to promote and sharing of good practices among transboundary member countries.

Reflections on presentations

Dr. Mohammad Raza Abass, Director, Department of Animals, Sheep and Fisheries, UT, Ladakh, informed that the department will provide more funds and incentives to the yak herders of Ladakh and also told that the department is planning to set up data centre at Leh to share the information among yak herders.

He requested training on artificial insemination as well as supply of yak semen to Ladakh. A branch of yak research centre in Ladakh would be appreciated he mentioned.

Prof. Nehal Farooque, IGNOU, New Delhi, informed that pastoral communities of Uttarakhand (Darma, Byas and Chaudas valleys) at tri-junction of India, Nepal and Tibet have maintained good germplasm of yak. Till 1962 they used to bring yaks from Tibet for breeding with local cattle. He appreciated the yak research institute of Dirang for taking various initiatives for yak multiplication and conservation. He requested Dr. Rawal, Director, NIHE, for arrangement of yaks for breeding purpose in Darma, Byas and Chaudas valleys of

Uttarakhand. He further informed that yak herders of these valleys desired to keep yaks collectively rather than individually with panchayat for the purpose of breeding with local cattle. If yak research institute of Dirang and NIHE, could tie up with these local communities of Uttarakhand valleys and provide them yaks for breeding that would be of great help to them, he mentioned.

Dr. Thinlay N. Bhutia, Dy. Director, (SARAH), informed about unique program running in Sikkim i.e. 'Sikkim anti-rabies and animal health program' in which one of the core components is feral dogs control Program' which plays an important role in yak aspect. This program has been initiated during 2006-07 with the main intention to reduce the feral dogs' population in high altitude areas. He highlighted on three important negative factors impacting on highland livestock including yaks and other indigenous wildlife i) predation, ii) competition or scarcity of foods, ii) disease transmission from dogs.

He mentioned army camps in high altitude border areas require proper garbage management. In particular, food wastes in their camps invite these feral dogs. It is therefore, important to include management of army as well as civilians who have their pet dogs in high altitude to support dog population control strategy. . Otherwise there will be significant negative impact on high altitude indigenous livestock and wildlife.

He appreciated the work done on yaks by Bhutan and Arunachal and expressed his gratitude to NRC on Yak, Dhirang, Arunachal Pradesh for its support in their difficult time during 2009 and told that Sikkim is looking forward for technology transfer, i.e. installation of feed plant in the state of Sikkim with the help of NRC on Yak, Dhirang.

Dr. Dinamoni Medhi, Sr. Scientist, ICAR-NRC on Yak, suggested that technologies developed by NRC on yaks may be shared and implemented in other yak rearing regions across the KL including Nepal and Bhutan. Similarly, technology on value addition on yak products should be shared among the countries. Dr. Medhi also suggested that it would be economical and viable to share yak semen instead of yak bulls across the countries. He mentioned that oats pasture management system as yaks fodder in Bhutan and feral dogs control program of Sikkim areappreciable and the same may beshared with other yak rearing countries and implemented throughout KL.Dr. Medhi stressed on importance of cultural conversion and networking in order to exchange knowledge among yak herders.

Dr. Tashi Dorji, Programme Coordinator, Khangchendzonga Landscape, ICIMOD, summarised the session I under three

categories, i) Science ii); Policy, and ii) Practices. Connecting the dots is the main essence of transboundary program and this webinar has connected the partners from three countries. NRC for Dirang is showing a pathway on yak research he mentioned. In terms of policy support, he appreciatedhighland development wing and feral dogs control programs of Sikkim.

As compared with other livestock species it is very minimal in terms of policy and practices on yaks, in this regard suggested putting extra support and effort for highlighting the importance of this animal species for which more investment is required.

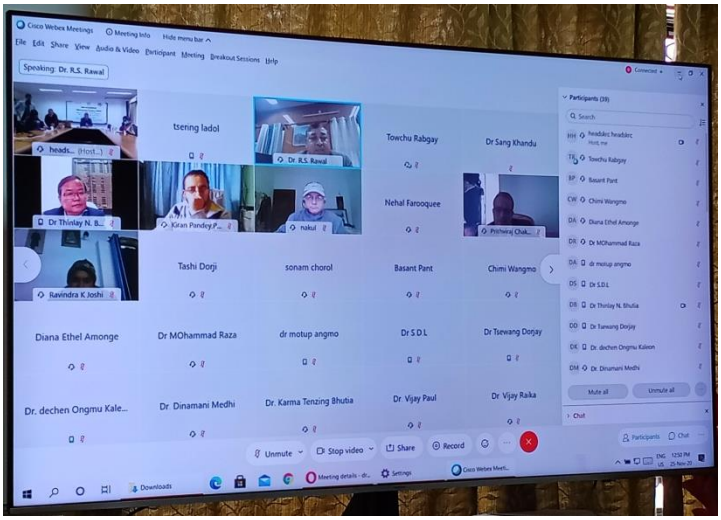
Under science category he talked about applied science technology addressing the current need of feed and nutrition e.g. complete feed blocks. Development in terms of value chain, cultural ecosystem services of highland is very crucial which should be discussed further. Dr. Tashi emphasized on rangeland governance, pasture development, labours saving technology and devices. He also mentioned that energy and water are crucial part in highland ecosystem it should be addressed as well. He further emphasized on working more and investing on value adding, branding and market linkages, without which this effort would be incomplete. Branding of yaks products need more attention which should be with the main focus so that the community would be benefitted. Talking about applied biotechnology on reproduction he told that there is need for genetic characterization to really access the genetic uniqueness of yaks in different pockets of the landscape.

He concluded with the following 3 key massages:

i) Yaks and rangelands are part of highland ecosystem services and rangeland is not only the habitat of yaks but is the part of biodiversity so

Inauguration of exhibition of Yak based products by Shri S.B. Subba, Secretary, AH&VS, Govt. of Sikkim

Shri S.B. Subba, during exhibition of yak based products at Chungthnag, North Sikkim



Trans border knowledge sharing during regional webinar

Highlanders of KL-India during the exhibition of Yak based products at Chungthang, North Sikkim

holistic and integrated approach is very important to be considered.

ii) Partnership is very crucial, so different stakeholders from field to the policy makers and this partnership needs to be strengthened through such platforms.

iii) Transboundary cooperation across the borders. Value of Transboundary cooperation cannot be over emphasized. Through this cooperation and collective efforts we can shorten the gap of reaching the technology extension services to the fields.

Concluding remarks

Dr. R.S. Rawal, Director, NIHE, Almora**,** in his remarks said that high altitude regions require special consideration and focus; hence holistic landscape approach needs to be promoted for high altitude regions where yak should emerge as one of the major components. Highlighting the point mentioned by Dr. Tashi, ICIMOD, on partnership he informed that GBP-NIHE has been given responsibility by Niti Aayog to act as a central agency as data repository on different knowledge existing in the Himalaya. In that context, institute has initiated one major program with ICIMOD i.e. developing Himalayan Knowledge Networking in HKN with three representatives coordinating for three transboundary landscapes initiative. Dr. Lodhi from Arunachal Pradesh (HI-LIFE initiative) Dr. Rajesh Joshi from Sikkim (Khangchendzonga landscape, India part) and Dr. Vikram Singh Negi from Almora (Kailash landscape) and Dr. Subhrat Sharma from Ladakh. He requested all the coordinators of transboundary landscapes to join hands and work together to develop one major knowledge network on yak in the Himalayan region which will be the part of HKN.

Technical Session II

Initiating a regional level dialogue among relevant departments, policy makers, civil society, private sectors, community institutions by developing stakeholder's network

Dr. Tashi Dorji, Programme Coordinator, Khangchendzonga Landscape, ICIMOD, talked on 'The Hindu Kush Himalaya Yak Network' and mentioned that HKH is considered 3rd pole and yaks its iconic species and this species also needs global attention like other animal species. He narrated some implications of yaks, such as means of livelihood to marginalized communities and helping in preserving rich tradition and culture of highlands etc. It is essential to make plea to all the stakeholders to advocate and uphold at various platforms., He reported that 60%

area of HKH is rangeland. Yaks play an important role to make use of these rangelands with over 32 major ethnic groups from 10 countries e engaged in yak farming . He also noted that here is no good estimation of number of herders, so there should be good inventory of yak herders at HKH level. ICIMOD is privileged to work on this transboundary landscape having yak as an important and common denominator. He stressed on promotion of yak networking in which all stakeholders should work together to address the common challenges and issues in yak husbandry, some of these issues are transboundary in nature hence networking will provide good entry point to address these issues and challenges which are currently being faced by yak herders community. It will also serve as a platform for multi-stakeholder dialogues. Community based organizations should be promoted and empowered so that they can raise their voice for increased investments. He recommended for formation of networks at local, national and regional level.

He cited some examples of good and functional networks across the globe i.e of Southern America on its key species (alpaca and llama), Sub-Saharan region's Camel (camel network) and most active network he cited about is 'Reindeers Association of Arctic Circle in which many member countries work together in terms of sustaining reindeer husbandry in the arctic region, and this network system is worthy of adoption in HKH region for yaks, he emphasized. In order to achieve this, first of all we have to start from local and national level following certain norms guided by cooperative or other national acts. He requested each countries to expediate mobilising yak herders Association, Cooperatives and National level Yak Federation. Further, these national yak Federations can join hands to form HKH level Yak Network that can provide important platform for the yak herders to seek global attention.

. Dr. Tashi in his way forward mentioned that need for drafting network statutes and bylaws through discussions and to take it forward because without governance and mechanism it is not possible to move ahead., In this regard many things can be adopted from already existing template of 'Association of world reindeer herders' of Arctic region, he said.

Panel Discussion

Dr. Tsewang Dorjay, Technical officer to Director, Animal, Sheep and Fisheries Department, Ladakh, mentioned that there is no proper network of yak herders in India, hence this is of prime importance to have connectivity of all the yak rearing regions of India and abroad so that we can collaborate with yak stakeholders. He informed about recently formed yak herders association in

Ladakh. Although Ladakh have maximum population of yaks in India, there is no yak research centre. Therefore, he emphasized on having one yak research centre in Ladakh. Due to growing of tourism yak husbandry is rapidly declining in Ladakh hence there is urgent need to revive this yak husbandry practices by providing benefits to yak husbandry community. To address this, value addition of yak products is very important.In this context he mentioned about the role of his organization,i.e. taking initiative through skill development programs for self help groups on yak fibre products, training on yak cheese making and finding ways for branding and marketing of these products, so that the yak herders of Ladakh will be benefitted ..

Mr. Ram Chandra Pudasaini, Senior Livestock Development Officer, Yak Genetic Resource Centre, Syangboche, Solukhumbu, Nepal**,** mentioned about some issues on yak husbandry in Nepal including forage shortage during winter, declining the trend of yak farming due to tourism and out migration etc. He appreciated and thanked G.B. Pant Institute (NIHE) and ICIMOD for organizing this event and expressed his full support as network partner and mentioned that it will provide good platform to promote yak farming and conservation.

Dr. Kiran Pandey, Livestock Development Officer, Dept. of Livestock Services, Nepal, told that, for the sustainable development of yaks as well as families involved in yak profession, agro-tourism is to be linked with the yak. Nepal fullly support with the proposal of forming HKH Network, he said.

Dr. D P Pradhan, Additional Director, AHLF&VS Department, Sikkim, India**,** reflecting the points placed by Dr. Tashi, on consultation and drafting of yak network, Dr. Pradhan informed that it has already been initiated in the state of Sikkim. Network mobilization in local level has been pursued among the yak herders, stakeholders and line departments. He further informed that state government has initiated funding provision since last year especially for winter season. He also suggested that there should be proper conservation of genepool in ICAR, Dirang to conserve the yak population.

Mr. Towchu Rabgay, Chief, Department of Livestock, Ministry of Agriculture and Forest, Thimphu, Bhutan, updated about yak network in Bhutan and told that, out of the total 20 districts in Bhutan, 10 are with highlands and 7 districts are with yak cooperatives. He informed that Bhutan is in the process of forming yak federation in this December. Mr Towchu told that all countries should come together to work in collaboration in order to give voice to the yak herders of the entire globe.

Dr. Vijay Paul, Principal Scientist, ICAR-NRC on Yak, Arunachal Pradesh, India, told that in India there is no strong network of yak herders, hence few years back ICAR, Dirang has started collaboration with Animal Husbandry department, linking this department with the yak farmers. To make yak husbandry sustainable and profitable and to promote in all the regions across HKH, first we should have real data on yak headers' number which should be with the Animal Husbandry department and Krishi Vigyan Kendra. Other related departments like tourism department, forest department, handicrafts, as well as NGO's should also be linked through common platform at the regional level and further to national level. As a part of research, it should be linked with Yak Research Centre, Dirang. The knowledge generated by the centre will be disseminated to the respective departments, through which it will reach to the real stakeholders. He emphasized on establishing international level yak research station or farms with detailed information or system for the yak rearing including conservation and value addition of its products. These international station should be linked with each other and good technologies are to be shared. Through these stations good technologies should be percolated to regional stations and finally to the farmers for promoting yak husbandry which is supporting the livelihood of the highland communities.

Concluding remarks

Dr. Nakul Chettri, Programme Manager, ICIMOD, NEPAL, in his concluding remarks highlighted the following four important points from the session for the sustainable yak farming:

1. Network gives the voice in local, national and global level hence it is needed.
2. Yak herding culture is deteriorating slowly, because it is not economically viable, therefore some innovations and new thinking is needed for which, R&D and demonstration giving different views and avenues to attract the younger generation.
3. To start initiative of yak herders association from individual country level, in this context he cited some examples of such initiative from Ladakh, Khombu, etc. and emphasized on linking them to reach to the regional level.
4. Networking should not be confined among governing agencies who are trying to preserve this culture. In fact, it should reach to the ground level to make herders aware of this and they should be proactive in terms of being a part of this network for the effective conservation of this yak herding culture.

Technical Session III

Identifying Priority Actions for promoting sustainable Yak production (Short-term, Mid-term and Long-term)

Dr. S. Sharma chaired the session III and coordinated with the session moderator Er. M.S. Lodhi.

Prof. Nehal Farooque, IGNOU, talked about ***'Priority Actions for promoting sustainable Yak production'***. He said there has been profound change in the pastoral grazing due to development of range of infrastructure facility, employment, education, marketing, commercialisation of economy. He also mentioned about disruption of Trans Himalayan trade network which were very important part of traditional pastoral system. He stated that, in the past there was no forage shortage in rangeland but at present it has been a big issue which is because of over grazing It is also due to increase in population of other livestock in rangeland and decrease in area due to border issues. He said about fuelwood shortage in rangeland where yak dung has become main source of cooking energy, which is labour intensive. Hence he suggested tapping up of solar energy in highland areas,.

Prof. Farooque told that it is also important to improve quality and quantity of yak's milk. Hence, high quality yak breeds are needed which are also resistant to number of diseases, and can carry more loads during migration.

He further emphasized on requirement of successors of yak herding communities as the young generations are not interested to take up yak herding profession. Therefore, it is essential to encourage the young generations.

For value addition of yak milk products, he suggested to tie up with Amul Company so that the yak rearers get better profit. He also emphasized on value addition of yak fibres for making garments etc.

Panel discussion

Dr. Twsewang Dorjay, Department of Animal Husbandry, Ladakh**,** mentioned that in order to encourage the young generation in yak farming, skill development programs and training programs play an important role and informed that the Department of Animal Husbandry, Ladakh is providing such trainings to self help groups, unemployed youths in value addition of yak products.

Dr. Tsering Ladol, Veterinary Assistant Surgeon; Dr. MotupAngmo, Yak Breeding Farm, Dept.of Animal Husbandry, Leh)**,** mentioned about the wild ass that compete with yaks in grazing as a result there is shortage of fodder for yaks in the region.

Mr. Ram Chandra Pudasaini, Nepal, in his remarks stated that, to overcome the

challenges in yak farming it is vital to organize all the yak farmers into group or cooperatives and to deliver capacity building programs, training programs on management of yaks, value addition of yak products and linking the same with tourism. He further emphasized on pasture development, focus on rangeland with indigenous species, development of yak research centre, marketing coordination and cooperation.

Dr. D. P. Pradhan, Sikkim**,** in his remarks told that with the initiation of ICIMOD, program on exposure visit to other countries have encouraged the young generations of Sikkim in yak herding profession which was diminishing in the state. Nutritional support for yaks from ICAR, Dirang can make yak husbandry more sustainable. In breeding aspect, selection of good germplasm is most important. In this context he talked about ITK of Lachen, North Sikkim where unfit yaks for breeding are slaughtered for meat in a particular season *i.e.* before *Losoong* festival which is a best practice in the state of Sikkim for germplasm selection, he added. Talking about energy, he mentioned that beside solar power, wind power can also be utilized; as the velocity of wind is tremendous in highlands so the same may be tapped in order to generate energy, hence, he recommended developing this technology to fulfil the energy requirement of highlanders.

Dr. Vijay Raika, Bhutan, emphasized on conservation of indigenous yak species for better breed and encouraged exchange program on such germplasm. He informed that Bhutan has initiated yak semen processing centre and conserving own germplasm under highland development program as short term plan. In long term plan the country wants close collaboration with ICIMOD and other relevant stakeholders to exchange germplasm with other countries to have better breed. Besides this, he stressed on product diversification, branding and marketing. Dr. Raika said that all these interventions are needed in order to encourage highlanders to continue the culture of yak farming. He further mentioned that disease profile of yaks developed by Bhutan under highland development program will be shared with other regions, as well as standard guideline on judging quality of yaks for incentivising yak herders with good breeds.

Dr. Prithviraj Chakravarty, ICAR, Arunachal Pradesh, stated that technological interventions like complete feed block, A.I. technology etc. are must which should directly reach to the farmers for the sustainability. From scientific point of view, we need to explore bio-molecule which will be changing the concept of farming.

With the intervention of yak research centre in Arunachal, there is qualitative and quantitative increase in yak population in the state, this technology should be amplified to other states as well. He told that the ICAR Dirang is processing for the same and told about proposal submission to work in collaboration with state departments and other organization in Leh, Ladakh and Sikkim, through which yak and yak herders will be enriched.

Er. Lodhi, added that yaks of Arunachal have poor milk production hence, he recommended enhancing milk production of these yaks through technological intervention.

Concluding remarks

Dr. Subrat Sharma, Head, GBPNIHE-LRC (Ladakh), in his concluding remarks requested all the participants to contribute by sending action points to the organizers of this event. He further mentioned that traditional wisdom should be brought for the use of modern techniques in terms of improvement of yak breeding. He emphasized on thorough understanding of total yak genepool across the landscape to improve the breeding of yaks and making them more productive in different ways. Developing just knowledge network within local, regional and national level will not be effective unless there is lesson learning from each other. He recommended that Himalayan knowledge network can be used initially to develop yak knowledge platform which can be started with our own resources such as experts, veterinarian, ecosystem managers, villagers and village level yak association.

Dr. Karma T. Bhutia - Delivered vote of thanks and concluded the forum.

Day-II, 26 November 2020

Exhibition of Yak based products

Inaugural Session

Dr. Rajesh Joshi, Head, GBPNIHE, SRCheartily welcomed all the representatives present in the exhibition and briefed about the activities carried out by the GB Pant National Institute of Himalayan Environment. Dr. Joshi also shared the key objectives of the event while highlighting the work undertaken in Himalayan region. He then briefed about webinar of 25th November 2020, organized by GBPNIHE, SRC Pangthang, under KLCDI project which was aimed at conservation of natural resources and emphasized on the need of development and informed that presently theinstitute is carrying out the activity on yak, supported by ICIMOD. While discussing about webinar held he briefed on the usefulness of yak husbandry for sustainable livelihood of highlanders. He

also expressed the necessity of organizing workshop in North Sikkim for meeting and interacting with the yak herders of Lachen and Lachung who could not join the webinar held on 25th November at Pangthang. He ensured that we will develop network, and exchange best practices among the farmers, and further informed that, a WhatsApp group of yak herders and researchers from across the region will be created. He mentioned that before launching any program we need to prioritize the activities and provide policy feedback to the government. Dr. Joshi expressed his gratitude towards all the representatives and collaborators for extending their support.He informed the community that GBPNIHE in association with the Department of AHLF&VS will be supporting Solar Lanterns along with jute bags to highland yak herders.

Dr. Karma T. Bhutia, Additional Director, Department of Animal Husbandry, Livestock, Fisheries and Veterinary Services, North Sikkim as guest of honour highlighted on the webinar held on 25th November and talked aboutexhibition on yak products. Dr. Karma informed about the total yak population in Sikkim and talked about harsh life of yak herders in snowy highlands and told that these herders are playing an important role in saving yaks. He mentioned about categorization of yak herders into 3 groups in Sikkim; primary (farmer who remains with yak), secondary (reared through keeping care taker) and tertiary herders (handover yak to third party for care).He appreciated the collaborative work between GBPNIHE and Department of AHLF&VS.Dr. Karmasaid that in future this yak species may vanish not only from Sikkim but from the entire globe, hence he emphasized on conservation of Himalayan yak species. In this context, he alerted the local inhabitants and reminded about the various government supports given so far to the yak herding community of Sikkim to facilitate the yak farming in the state and urged to take benefits from new approachable roads. He furtherinsisted the local youths to take benefit of various programmes on promotion and conservation of yak husbandry, exposure visits of youths, yak festivals etc. conducted by GBPNIHE periodically where exchange of best practices take place.He further informed about the exact number of herders present at Lachung valley and said thatyak is tamed not only for income generation in the region but also for protecting environment as well.

He again emphasized on taking benefits from yak tourism and also to link yak centre with tourism, soap making from yaks' milk and stressed on giving priority for yak herders, and talked for incentives. Dr. Karma in his remarks complimentedNational Research Centre on Yak, Dhirang, AP for providing Complete Feed Blocks (CFB) for the yaks of Sikkim. AHLF&VS department is working on providing Identity cards to the

herders, and identifying beneficiaries to channelize support extensions, he added. Besides, he informedabout providing scholarships to the children of herders (as education incentives). While concluding he urged the community to take advantage of this workshop and support provided by various agencies in collaboration.

Shri Kunthup Lachenpa, *Pipon* of Lachen: While addressing the workshop gathering ShriLachenpa expressed his sincere gratitude for the kind of support and initiatives extended by the Department of Animal Husbandry during earlier natural calamities. He remarked as yak is an important source of livelihood, and requested the Government of Sikkim and NIHE for advancing yak tourism and forming a Board for Highlanders' Community. He requested for introducing and upgrading the modern technology of cheese (churpi) processing. While concluding he also requested the Government for issuing of Identity cards to the herders.

Shri S. B. Subba, Secretary, AHLF&VS Department, as chief guest of the event remarked on the purpose of arranging the workshop to improve the economy of yak farming. As yak is the symbol of ancestral profession, we need provide continuity, , he reiterated. He thanked GBPNIHE and emphasized on creating international forum for promoting high yielding yak variety.He also expressed his gratitude on having yak breed in Sikkim, the icon of the state. He congratulated the progressive herders for their initiatives and encouraged for continuing the same. He asked to integrate production, value addition, marketing, environment, ecosystem, biodiversity, and informed about the release of sum of Rupees fifty lakhs as compensation along with construction of godown during the time of natural calamities. He was excited for possibility of cross border cooperation on yak farming with neighbouring countries. Heappealed the community for motivating younger generation to continue with yak farming. He also said product marketing if done in groups or cooperatives will fetch more prices. Mechanisation machine is also required for greater production and assured the community that he will discuss with the officials in the department in this context. Shri Subba, then requested yak herders to provide short as well as long term inputs for the solution. Organizing of yak fair/mela, and other exposure visits of herders were also highlighted. He also informed about the fact that government is providing one time support but the farmers need to practice continuously. He furtherurgedthe community to take it seriously and reminded grabbing of opportunity provided by GBPNIHE in facilitating the use of modern techniques in yak husbandry. He informed about the introduction and importance of *Bhyanglung* and *Pashmina* goats in Sikkim. He appreciated the knowledge based work of

Dzumsa and said that for further improvements his department in consultation with Government of Sikkim is committed to provide all sorts of support to the yak herders.

Inauguration of poster presentation

Various posters printed on yak rearing subsistence livelihood and emerging challenges in KL, Complete Feed Block: Alternate feed for highland livestock, warble infestation and gid diseases, yak production, assisted reproduction technology in yak, etc. were displayed; a numbers of posters were received from Ladakh, Uttarakhand, Arunachal Pradesh for the display. Poster presentation was moderated by Dr. Aseesh Pandey, Programme Manager, KLCDI India programme. Apart from the posters, booklets, fliers, brochures, pamphlets, manuals, etc. were also presented/kept for display during the exhibition. *Len Tha* (a rope made from yak hair used in fastening calf), *bodilicious* (yak milk soap) were also put in the display by the AHLF&VS Department, Government of Sikkim.

Farmers' Interaction session

Initially herders were asked about the number of yak possessed by each of the twenty herders present during the workshop. This was followed by farmers' interaction where they provided some valuable feedbacks and suggestions apart from the ongoing issues and challenges in yak rearing sector.

Inputs from yak herders:

- Removal of feral dogs (predator) from high altitudes with the help of veterinary doctors (Shri Khedup Lachungpa)
- Need a special curd churning machine
- Storage centre/godown for ration and feed during winter season (short term)- (GokeuLachenpa)
- Continuing of yak shelter at Muguthang and Laser valley (Shri Gokeu Lachenpa)

Inputs from AHLF&VS, Govt. of Sikkim

- Registration of domestic dogs
- Responsible pet ownership
- In fertilization/operation of pet dogs
- Stooping selling of Tibetan mastiff dog at local areas
- Not bringing dog from outside
- Not allowing using frozen meats (already banned)
- Putting of red clothes at the boundary of yaksheds
- Using fire with tobacco smoke
- Use of Solar Lantern, sound or music
- Providing of incentives of Rs.5000/ to herders (is a demand)
- Perspectives of insurance for the children of yak herders
- Mechanization of traditional yak rearing practices for reflecting in tourism
- Providing tent to the herders

- Development of grasslands
- Accessing of Government schemes in harmonization with the Sikkim Forest Department
- Propagation of quality and palatable grass species in private lands through barbed fencing (Dr. Karma)
- Private land holding is not allowed for carrying out plantation works (Shri S.B. Subba)

Inputs from GBPNIHE, SRC

- Prior to grassland management carrying capacity of the site must be studied (Dr. Aseesh Pandey)

PROGRAMME DETAIL

SN	Program	Resource person
Day 1, 25 November 2020 (Online)		
Inaugural Session	**Welcome address and about the workshop** (10:30-10:35)	**Dr. R. Joshi** (Head, SRC)
	Brief on Transboundary Landscape Program (10:35-10:45)	**Dr. Nakul Chettri** (KLCDI Program Manager, ICIMOD, Nepal)
	Inaugural Address (10:45-10:55)	**Dr. R. S. Rawal** (Director, NIHE)
	Keynote Address (10:55-11:05)	**Shri S. B. Subba** (Secretary, AHLF&VS, Govt. of Sikkim)
Session I	**Objective 1: Sharing Good practices on Yak production for cross-sharing across KL member countries and potentials for mainstreaming in government programmes and projects** **(Time: 55 Minutes; 11.05 -12.00 Hrs)** **Chair: Dr. R. S. Rawal** **Moderator: Dr. R. Joshi** **Overview presentation (10 Minutes): Applied technologies for sustainable yak production (fodder-nutrition, reproductive biotechnology, yak health and value addition of yak products)** Dr. Prithviraj Chakravarty, Director, ICAR-National Research Centre on Yak, Dhirang, Arunachael Pradesh, India **Presentations from Khangchendzonga Landscape** • Dr. Banshi Sharma, Director General, Department of Livestock Services, Ministry of Agriculture and Livestock Development, Kathmandu, Nepal • Dr. Tashi Yangzome Dorji, Director, Department of Livestock, Ministry of Agriculture and Forest, Bhutan. • Dr. Karma T. Bhutia, Additional Director, Department of Animal Husbandry, Livestock, Fisheries and Veterinary Services, North Sikkim, Sikkim, India **Reflections on the presentations (Total 15 Minutes)** • **Ladakh** (Dr. Tsering Ladol, Veterinary Assistant Surgeon; Dr. Motup Angmo, Yak Breeding Farm, Dept. of Animal Husbandry, Leh) • **Uttarakhand** (Prof. Nehal Farooque, IGNOU) • **Sikkim** (Dr. S.D. Kazi, Principal Director, AHLF&VS, Department, Sikkim) • **Arunachal Pradesh (**Dr. Dinamoni Medhi, Sr. Scientist, ICAR-NRC on Yak) **Concluding remarks (Session Chair)**	
Session II	**Objective 2: Initiating a regional level dialogue among relevant departments, policy makers, civil society, private sectors, community institutions by developing stakeholder's network** **(Time: 45 Minutes; 12.00 -12.45 Hrs)** **Chair: Dr. Nakul Chettri** **Moderator: Dr. K. S. Gaira** **Overview Presentation: The Hindu Kush Himalaya Yak Network** Dr. Tashi Dorji, Programme Coordinator, Khangchendzonga Landscape, ICIMOD, Nepal **Panel Discussion** • Animal Husbandry Department, Ladakh, India • Mr. Ram Chandra Pudasaini, Senior Livestock Development Officer, Yak Genetic, Resource Center, Syangboche, Solukhumbu, Nepal • Dr. Karma T. Bhutia, Additional Director, AHLF&VS Department, Sikkim, India • Mr. Towchu Rabgay, Chief, Department of Livestock, Ministry of Agriculture and Forest, Thimphu, Bhutan • Dr. Vijay Paul, Principal Scientist, ICAR-NRC on Yak, Arunachal Pradesh, India **Concluding remarks (Session Chair)**	

Session III	**Objective 3: Identifying Priority Actions for promoting sustainable Yak production (Short-term, Mid-term and Long-term)** **(Time: 45 Minutes;12.45 – 13.30 Hrs)** **Chair: Dr. S. Sharma** **Moderator: Er. M.S. Lodhi** **Overview Presentation : Priority Actions for promoting sustainable Yak production** • Prof. Nehal Farooque, IGNOU **Panel Discussion (Total: 30 Minutes)** • **Ladakh** (Shri Skarma Namdak, Councillor, Korzok Constituency, Ladakh; Dr. Mohammad Raza Abass, Director, Animal/Sheep Husbandry & Fisheries Department, Ladakh) • **Uttarakhand (TBC)** • **Nepal** (Mr. Ram Chandra Pudasaini, Dr Kiran Pandey, Dr. Tashi Dorji) • **Sikkim** (Dr. Dichen O. Kaleon, Dr. K. S. Gaira, Dr. Rajesh Joshi) • **Bhutan** (Mr. Towchu Rabgay, Mr. Kinley Rinchen, Dr. Vijay Raika) • **Arunachal Pradesh** (Er. MS Lodhi, Dr. Vijay Paul, Dr. Prithviraj Chakravarty) **Concluding remarks (Session Chair)**
Vote of thanks (13:30-13:35 Hrs) Dr. Karma T. Bhutia	
Day 2, 26 November 2020 (Offline: Chungthang, North Sikkim)	
Inaugural Session	**Welcome address** **Dr. R. Joshi,** *Regional Head, GBPNIHE-SRC*
	About the exhibition **Dr. Karma T. Bhutia,** *Additional Director, AHLF&VS, Govt. of Sikkim*
	Address by Chief Guest **Shri S. B. Subba,** *Secretary, AHLF&VS, Govt. of Sikkim*
Exhibition	**Exhibition & Community interaction (11:05-14:00 Hrs)** **Coordination:** *Dr. Sonam Dikki Lepcha, Veterinary Officer, AHLF&VS, Govt. of Sikkim*
	• **Inauguration of the exhibition** *(by Chief Guest)* • **Showcasing of Yak rearing & promotion activities** *(Moderation: Dr. A. Pandey)* • **Exhibition of Yak based livelihood products** *(Moderation: Dr. S. Chhetri)* • **Interaction with highland communities** *(Moderation: Dr. Karma T. Bhutia, & Dr. K.S. Gaira)* • **Distribution of support materials** *(Dr. Karma T. Bhutia, Dr Dechen Bhutia & Dr. R. Joshi)*
	Vote of thanks **Dr. K.S. Gaira,** *Investigator, KLCDI-India*