NRNA-ICC 2nd Knowledge Sharing Conference

"Sharing Knowledge, Experience, Skills, and Values to help improve Science & Technology, Entrepreneurship, Policy, and Practice in Nepal."

September 5-6th, 2020

http://bigyabhela.com

Conference Summary/ White Paper

DRAFT-SUBJECT TO CHANGE

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1. Expert Committee to the Knowledge Conference

Dr. Laxmi Pathak, Canada, Coordinator
Dr. Amod K. Pokhrel, USA, Special Collaborator
Scientist Mr. Narayan Ghimire, Canada, Deputy Coordinator

1.1 Session Chairs to the Conference

Attrony Mr. Dilli Bhatta, Esq. USA, Session Chair: COVID-19 and its Impact on the Economy
Dr. Shyam Thapa, USA, Session Chair: Public health and Medicine
Dr. Manoj Karkee, USA, Session Chair: Innovation, Entrepreneurship, and Technology and Knowledge Sharing
Dr. Krishna Hari Gautam, Canada, Session Chair: Entrepreneurship Development in Agriculture and Allied Sector
Er. Kedar Shrestha, P.Eng. Canada, Session Chair: Engineering, Infrastructure Development, and Public Safety
Ms. Parwati Pandey, Critical Care Registered Nurse, Canada, Session Chair: Exchange of Knowledge and Skills in Nursing Practice
Mr. Sahaj Man Shrestha, USA, Session Chair: Energy, Environment, Science & Technology
Dr. Hari Gurung, Canada, Session Chair: Education, Social Empowerment, and Equitable Development

1.3 Advisors to the Conference

Dr. Ambika Adhikari, USA
Dr. Rudra Aryal, USA
Dr. Rajan Pant, USA
Dr. Batu Sharma, USA
Mr. Naba Raj Gurung, Canada
Dr. Basu Sharma, Canada
Dr. Yadav Pandit, USA
Dr. Rajan Rijal, USA
Dr. Tara Sigdel, USA

2. Conference Program

2.1. Conference at a Glance

Event Times are in Eastern Time Zone: Attendee/Audience Zoom Meeting Links

Friday Sept 4th - Opening Ceremony

8:00 PM - 10:00 PM EST (Event #1) : Inauguration Ceremony
Zoom Link https://bit.ly/3jw1MpX PW: 2020

Saturday Sept 5th- Regional Conference

Zoom Hall 1 Zoom : https://bit.ly/3juGnNP PW: 2020	**Zoom Hall 2** Zoom: https://bit.ly/2QwVM3A PW: 2020	**Zoom Hall 3** Zoom: https://bit.ly/31Ct5Zm PW: 2020	**Zoom Hall 4** https://bit.ly/2YZMzVY PW: 2020
9:00 AM - 12:15 PM (Event #2) Continuation of Citizenships, Property & Political Rights of NRNs Chair: Shankar Khadka	09:00 AM - 10:45 AM (Event #8) Nepali Language & Literature Mod: Gopi Krishna Kafle	8:30 AM - 9:45 AM (Event #18) Making Infrastructure Rewarding Mod: Surya (Sal) Lamsal	
12:30 PM -2:45 PM (Event #3) NRNA ICC Projects Chair: Hem Raj Sharma	11:00 AM - 12:00 PM (Event # 9) International Trade & Investment Mod: Chiranjibi Ghimire	10:00 AM - 12:00 PM (Event #19) Women's Voice Mod: Uma Karki Thapa	
3:00 PM - 4:00 PM (Event #4) Diaspora Media Mod: Kiran Marhatta	12:15 PM - 1:15 PM (Event # 10) Education & Health During and After COVID-19 Mod: Pitambar Bhattarai	12:15 AM - 1:15 PM (Event # 20) Gender Based Violence, Mental Health During Pandemic Chair: Bishnu Maya Pariyar	
	1:30 PM - 2:15 :PM (Event #11) NCC Canada & US Activities Mod: Chiranjibi Ghimire	1:30 AM - 2:30 PM (Event #21) The Impact of COVID-19 on the US Immigration System Mod: Krishna KC	
7:30 PM to 8:30 PM (Event #5) Cinema and Culture Mod: Purna Baraili	2:30 PM - 3:30 PM (Event #12) Bylaws Mod: Rabin Bajracharya		
	3:45 PM - 4:45 PM (Event #13) Cultural Shows Chair: Trishna Sharma kaphle		
10:40 PM-12:50 AM (Event #6) Covid 19 Impact In Economy Chair: Dilli Bhatta	5:00 PM - 6:30 PM (Event #14) Blood Transfusion Chair: Dipak Gautam		
	7:30 PM - 9:30 PM (Event #15) Youth & 2nd Generation Chair: Bimala Sapkota		9:15 PM - 12:15 AM (Event #24) Agriculture & Forestry Chair: Krishna Gautam

Sept 6th Sunday- Knowledge Conference

Zoom Hall 1 Zoom : https://bit.ly/32CXSEK PW: 2020	**Zoom Hall 2** Zoom: https://bit.ly/3jziNPI PW: 2020	**Zoom Hall 3** Zoom : https://bit.ly/3lDx2VB PW 2020	**Zoom Hall 4** Zoom: https://bit.ly/3luJqar PW: 2020
10:00 AM -01:00 PM (Event #7) Education & Social Empowerment Chair:: Hari Gurung	7:15 AM-10:15 AM(Event#16) Knowledge & Skills In Nursing Practice Chair: Parwati Pandey	12:15 AM -3:15 AM(Midnight) (Event #22) Energy and Environment , Science & Technology Chair: Sahaj Shrestha	10:30 AM - 12:45 PM (Event #25) Public Health & Medicine Chair: Shyam Thapa
	10:30AM -1:15 PM(Event #17) Innovation, Entrepreneurship & Technology Chair: Manoj Karkee	8:40 AM - 11:40 AM (Event #23) Engineering, Infrastructure Dev & Public Safety Chair: Kedar Shrestha	

2.2. Full Conference Program

Session	Name of Panelist	Contact / Email /Tel	Presentation / Talk Title
COVID-19: Impact on the Economy	Chair: Dilli Bhatta		Session Moderated by TBD
	Dr. Bishnu Raj Upreti		Distinguished guest speaker: Scope and Opportunities for collaboration between Nepali Diaspora and Policy Research Institute (PRI)
	Mr. Bhaskar Raj Rajkarnikar		COVID -19 Impact in Business / Media in Nepal - An Experience Sharing
	Ms. Sagun Bista, Ms. Dibya Karki		COVID -19 Impact in Nepal - A case study
	Professor Dr. Bashu Sharma		Covid-19 and FDI Regimes: Convergence or Divergence?
	Prof. Dr. Pushkar Bajracharya		COVID -19 and its impact on Economy in Nepal
	Dr. Laxmi Pathak		Panel
	Dr. Amod Pokhrel		Panel
	Scientist Narayan Ghimire		Panel
	Dr. Rudra Arial		Advisor

Session	Name of Panelist	Contact / Email /Tel	Presentation / Talk Title
Energy, Environment, Science & Technology	Chair Sahaj Man Shrestha		Session Moderated by TBD
	Dr. Sunil Babu Shrestha		The Directions and Priorities of Current and Future Research in NAST and the Opportunity for the Diaspora to Engage in and Collaborate on Nepal-Based Research Works.
	Grishma R. Dahal		Cost-benefit analysis of replacing LPG stoves with Induction stoves in rural households of Kavre District Nepal
	Deepak Neupane		Head start on STEM (Computer Science and Robotics) education for young generation in Nepal
	Rakesh Chandra Prajapati		Satellite Technology Capacity Building and Launching of a Pico-Satellite Built-in Nepal
	Jeevan Regmi		Scientific Evaluation of Air Pollution Over two big cities in Nepal
	Khem N Poudyal		Scientific Evaluation of Air Pollution Over two big cities in Nepal
	Dr. Amod Pokhrel		Scientific Evaluation of Air Pollution Over two big cities in Nepal
	Dr. Rudra Aryal		Scientific Evaluation of Air Pollution Over two big cities in Nepal
	Dr. Laxmi Pathak		Panel
	Scientist Narayan Ghimire		Panel
	Dr. Rudra Aryal		Advisor
	Dr. Tara Sigdel		Advisor

Session	Name of Panelist	Contact / Email /Tel	Presentation / Talk Title
Engineering, Infrastructure Development, and Public Safety	Chair: Kedar Shrestha		Session Moderated by TBD
	Mr. Ujwal Dhakal		Hygrothermal performance of hempcrete for Ontario (Canada) buildings
	Er. Sangita Rana		Achieving Energy Optimization through Real-Time Operations Monitoring Tool
	Chet Nath Pokhrel P. Eng.		Safety Focused Engineering and Infrastructure Development/Construction
	Er. Satish Tripathi		HOW TO EAT A BIG CAKE: Journey towards Smart City
	Dr. Bet Man Bhandari		Household Water Treatment Technology Solutions for Marginalized Communities in Nepal
	Kedar Shrestha P.Eng.		Public-Private Partnerships and Public Safety in Infrastructure Development
	Er. Kesab Sharma, DG		Transport Infrastructure Development for Prosperous Nepal: “Status, Issues and Challenges”.

Session	Name of Panelist	Contact / Email /Tel	Presentation / Talk Title
Knowledge and Skills in Nursing Practice	Chair: Ms. Parwati Pandey		Session Moderated by Mr. Lilanath Pandey
	Ms. Roshani Laxmi Tuitui		Maintaining Nursing Competence: A Roadmap to Enhanced Patient Safety
	Dr. Bibha Gautam		Maintaining Nursing Competence: A Roadmap to Enhanced Patient Safety
	Ms. Manju Sangraula		Effective Communication in Nursing Practice
	Mr. Ramesh Subba		Effective Communication in Nursing Practice
	Ms. Durga Deuja		Shaping Scope of Practice to enhance Professional Autonomy in Nursing
	Mr. Lilanath Pandey		Shaping Scope of Practice to enhance Professional Autonomy in Nursing
	Ms. Radhika Aryal		Protecting Nurses during COVID 19 Pandemic

Session	Name of Panelist	Contact / Email /Tel	Presentation / Talk Title
Innovation, Entrepreneurship, Knowledge and Technology Sharing	Chair: Manoj Karkee		Chair
	Co-Chair, Sagar Kafle		Co-Chair
	Prof. Dr. Puspa Raj Kandel		Expectations of National Planning Commission from Nepali diaspora residing Americas
	Dr. Suresh Kumar Dhungel		Role of NRNs for Improving the Ecosystem for Innovation and Entrepreneurship in Nepal
	Scientist Narayan Ghimire		**नेपालको संवृद्धिका लागि एरोमेटिक र मेडिसिनल मूल्यका रैथाने वनस्पति र जीवाणुको उधमिकरण**
	Sunita Gautam		Development of diagnostic kits for different diseases including COVID-19
	Dhilung Kirat		Fighting Advanced Cybersecurity Threats
	Er. Shankar Upretey		Zero To Million : How to scale digital solutions for Nepali Market

Session	Name of Panelist	Contact / Email /Tel	Presentation / Talk Title
Education, Social Empowerment, and Equitable Development	Chair : Dr. Hari Gurung		Chair
	Dr. Hari P. Lamsal		Education, Social Empowerment and Equitable Development in Nepal
	Mr. Dilli R. Subedi		Learning Crisis in Public Schools in Nepal
	Dr. Tirtha B. Thapa		Building Primary and Secondary School System for the 21st Century Human Resource Needs in Nepal
	Dr. Lok Bhattarai		Opportunity is massive, Nepal need entrepreneurial movement: perspective from higher education lens
	Dr. Laxmi Pathak		Curriculum Design, Policies, Practices, and Reforms
	Dr. Yadav P. Joshi		Opportunities and Challenges of Distance Teaching/Learning in Higher Education: An Experience of Nepal Open University
	Dr. Amrit Thapa		Reexamining Higher Education and Economic Development in Nepal
	Miss Bijou Gurung		Next Generation Panel
	Dr. Laxmi Pathak		Panel
	Dr. Amod Pokhrel		Panel
	Scientist Narayan Ghimire		Panel

Session	Name of Panelist	Contact / Email /Tel	Presentation / Talk Title
Public Health & Medicine	Chair: Dr. Shyam Thapa		Chair
	Dr. Bhagawan Koirala		Preparing Public Health and Medical Professionals for the 21st century Nepal
	Dr. Ashok Devkota		Development and Implementation of a Mental Health Project in Western Nepal: Challenges and Successes
	Dr. Biraj M. Karmacharya		Developing Quality Human Resource in Public Health in Nepal: The Experience of Kathmandu University
	Dr. Shankar Man Rai		Burn Care, Treatment and Rehabilitation during the Pandemic in Nepal
	Ms. Manaswi Sangraula		Group-based Psychosocial Support to Improve Psychosocial Well-being and Functioning of Adults affected by Humanitarian Crises in Nepal
	Dr. Kulesh B. Thapa		Mobilizing Ambulance Services during the COVID-19 Pandemic in the Kathmandu Valley: Challenges & Solutions
	Krishna Bhandari		Panel
	Dr. Laxmi Pathak		Panel
	Dr. Amod Pokhrel		Panel
	Scientist Narayan Ghimire		Panel
	Tara Sigdel		Advisor

Session	Name of Panelist	Contact / Email /Tel	Presentation / Talk Title
Entrepreneurship Development in Agriculture and Allied Sector	Chair: Krishna Gautam		Session Moderated by TBD
	Dr. Bishwa Nath Oli		Distinguished Speaker: Policy and Priorities of Forests and Environment Sector
	Drs Bishnu Gautam		IoT Enabled Smart Village as a Means of Re-tooling Nepal Towards Society 5.0
	Bharat Pokhrel		IoT Enabled Smart Village as a Means of Re-tooling Nepal Towards Society 5.0
	Bhagawan Rokaha		IoT Enabled Smart Village as a Means of Re-tooling Nepal Towards Society 5.0
	Mr Sandesh Thapa		Accessing the Himalayan Herbs Traded in the Streets of Itahari by Sherpa community of Taplejung, Nepal
	Professor Dr. Keshav Bhattarai		Climatic Variables affecting the Scientific forest management in Nepal
	Dr. Purna Kandel		Bilateral AgriFood and associated trading between Canada and Nepal
	Dr. Tulsi Dharel		Bilateral AgriFood and associated trading between Canada and Nepal
	Dr. Drona Rasali		NAPA First Book- Principles and Practices of Food Security: Sustainable, Sufficient and Safe Food for Healthy Living in Nepal
	Dr. Niranjan Aryal		Cannabis as an Economic crop: Prospect and Possible Use in Nepalese Context

3. Executive Summary

Diaspora can play a vital role in addressing Nepal's many remaining development challenges. More than financial contributions of remittances and investments, their knowledge, skills, and values can contribute to greater ways to build the foundations of an equitable and prosperous nation. There are about half a million highly skilled and best-educated Nepali diaspora communities in the Americas. If effectively managed and harnessed, their skill, knowledge, and experience earned overseas can be useful for Nepal.

Building upon the success of the 1st (2018) conference in San Francisco, USA, the Non-Resident Nepali Association International Coordination Council (NRNA-ICC) Americas organized the 2nd NRN Knowledge Sharing Convention on 04-06 September 2020 in Toronto, Canada. The convention's objective was to provide a multi-disciplinary forum for networking and share knowledge and skills between researchers, policy makers, practitioners, and non-academic actors around some of Nepal's challenges. The conference centered on sharing applied diaspora knowledge while identifying required suitable and applicable tools, methodology, and concepts. The convention was divided into eight sessions:

1. COVID-19 Impact in Economy
2. Public Health and Medicine
3. Innovation, Entrepreneurship, Technology, and Knowledge Sharing
4. Agriculture, Forestry, and Related Areas
5. Engineering, Infrastructure Development, and Public Safety
6. Knowledge and Skills in Nursing Practice
7. Energy, Environment, Science & Technology
8. Education, Social Empowerment, and Equitable Development, and included oral presentations, and a panel discussion

Fifty abstracts were accepted for discussions, including keynote talks and oral presentations. Each presentation emphasized transferable skills, knowledge, and values as a new piece of take-home information/message for the targeted audiences. This interaction helped to understand the priorities in different sectors. In the current and post COVID-19 pandemic context, the convention also identified new tools and techniques for practical knowledge sharing among all stakeholders.

The conference presenters and attendees were Innovators, Scientific Communities, Academicians, high-level officials from the Government of Nepal, including the Ministry of Education, National Planning Commission, Nepal Academy of Science and Technology, Universities, Research Centers, International Organizations, Private Sectors, Industries, Startups and Knowledge Incubators. Many participants from different countries and diverse sectors also participated by zoom and on the web—Facebook live.

The convention observed that some of the ideas and approaches discussed require further research, but many could be implemented immediately. The program could be implemented through the Government, non-government, or private sector. Some programs could also be implemented through NRN Foundation. The convention also acknowledged that Nepal's existing policies might need revision, and many different new policies may require addressing the challenges brought by the pandemic. However, there are ample opportunities for diaspora and NRNA to bring their knowledge, skills, and experiences for Nepal's benefit to deal with post-COVID-19 pandemic challenges. The convention concluded with a call for collaboration as the key to "Prosperous Nepal and Happy Nepali."

4. Session Summary

4.1. COVID-19 and its Impact on the Economy

Chair: Lawyer Mr. Dilli Bhatta

Overview

Four oral presentations were given in this session. Prof. Pushkar Bajrachary's abstract thoroughly focused on the economy of Nepal. Prof. Basu Sharma presented on how COVID19 has impacted foreign direct investment (FDI) globally. Bishnu Uprety, Ph.D., highlighted the opportunities for diaspora and NRNA to bring their knowledge, skills, and experiences for Nepal's benefit to deal with post-Corona pandemic challenges. Mr. Bhaskar Raj Karnikar spoke on the pandemic opportunities and how NRNA can get involved with that. Finally, Sagun Bista presented the survey they conducted a few months ago concerning migrant workers and businesses during COVID 19.

Impact of COVID 19 on Nepalese Economy

The Covid 19 has impacted the Nepali economy as it has impacted the global economy. If the lockdown is extended beyond July of 2020, the GDP of Nepal is projected to be negative from 8 to 16% in the year 2077/78 (Nepali calendar). Economic opportunities in Nepal are limited and remittance generated from unskilled workers is not sustainable. Farming and agricultural work has also been in decline. Thus, Nepal should focus on manufacturing and on its subsectors to generate larger employment that will directly enhance the National economy, increase GDP, and remain sustainable.

Short-term lockdown will not affect this area immensely in the manufacturing sector, but an extended lockdown will impact this year and next year as well. Production, supply, transportation, employment, returning workers from India, and export are expected to decline with a greater impact on the national economy. Similarly, domestic and international tourists have declined, and an extended lockdown will have severe impact in 2021 as well. However, tourism industry will rebound quickly once transportation and international flights resume.

The short-term implication of lockdown will be marginal only though it may take some time to recover, it is expected to do so quickly. In the medium-term case, the impact will be serious and will take two quarters to one year for recovery. The longer-term lockdown will have colossal implication with the recovery taking one to two year. But many may collapse, and hence serious attention is required to keep them alive. Hence, depending on the period of lockdown, the government must extend feasible support to these as suggested. The costs of full wage support for one month at census wage rate will be Rs 13.48 billion and Rs 17.90 billion at minimum wages. Similarly, full interest support for one month will amount to Rs 11.17 billion with Rs 7.54 for big industries and Rs 3.68 billion for SMEs.
Recommendations:

- Defer payments on loans and interests; waive certain taxes and fees; establish a better coordination between the local, state, and central governments; and provide other necessary supports.
- To overcome from the situation, time bound support may be extended for a year or two.
- Utility price concessions may be given for limited period.
- In the big and medium industries, most of the labor are from outside. Initiatives should be taken by the industrialists and the government to skill the local labor befitting to the industrial requirements.
- Productivity improvement drives should be continuously launched if needed in cooperation with appropriate agencies like APO.
- Wage increase or determination should take into account: need, inflation and productivity effects.

Covid-19 and FDI Regimes: Convergence or Divergence?

The pandemic has affected every aspect of human life, business, and society at large. global FDI flow may fall by 40 percent in 2020-21. The fall is predicted to be more severe in developing countries. The challenges caused by Covid-19 pandemic have critical effects on many fronts including institutions such as investment promotion agencies (IPAs) and economic development organizations (EDOs), supply-chain arrangements, international trade and for other entities including globalization, role of the state, and employees. How the pandemic has upended key aspects of established FDI regimes and forced governments to address the challenges in a uniform way across nations, and thereby providing some support to the convergence hypothesis.

Mr. Bhaskar Raj Karnikar, Chamber of Commerce, Nepal

1. Covid 19, a threat and an opportunity
2. Effects of Covid 19 on global and local economy
3. Impact of Covid 19 in employment and remittance
4. Covid 19 is an opportunity for innovation, possibilities, independency in domestic production
5. Role of NRNA to uplift the current situation

Scope and Opportunities for collaboration between Nepali Diaspora and Policy Research Institute (PRI)

Many existing policies in Nepal may need revision and many different new policies may require addressing the challenges brought by the pandemic. There are great opportunities for diaspora and NRNA to bring their knowledge, skills and experiences for the benefit of Nepal to deal with post-Corona pandemic challenges and the Policy Research Institute can provide important space for that by collaborating in mutually agreed areas.

Socio- economic impact of COVID-19 on Migrant workers and Micro, Small and Medium Enterprises of Nepal.

A recent survey in certain districts show that people involved in formal or informal jobs were highly affected by job loss during the Pandemic. There were Return Migrant Workers (RMW) present in every local government who showed interest to stay back if business/job environment is favorable. Findings indicate that RMWs are seeking skill and finance options to recover from this situation followed by job linkage, market linkage and marketing knowledge.

1. Increase synergy and partnership with Local Governments and local NGOs/ CSOs to optimize resources, for better coordination and efficient and effective delivery.
2. The support to Returned Migrant Worker, MSMEs can be divided phase-wise into
    a. Relief: Focusing mostly on psychosocial counseling, cash or in-kind support and paycheck protection program.
    b. Recovery: Knowledge enhancement of LGs, MSMEs and CSOs, providing access to finance, cash or in-kind support for self- employment programs, job search support, connection with formal economy, implementing government protocol for COVID epidemic and in restarting businesses post lockdown
    c. Resilience: Building resilience through economic empowerment especially that of youth, women and marginalized community by supporting them in meeting new demands, expanding supply chains, development of a working relationship with financial institutions and open lines of credit, tailored insurance facilities and working on enhancing digital economy and supporting policy environment

4.2 Public Health and Medicine

Chair: Dr. Shyam Thapa

Overview

In the session, Public Health & Medicine, five talk presentations were made. There represented diverse topics. Each is unique and important in its own right. If there is one common thread that binds all these presentations together it is that each of the projects discussed here has benefited greatly from knowledge exchange and skill development between Nepal and the West. This is probably a different scenario than what was feasible even just two decades ago. Each of the projects has tried to identify what worked and what didn't in the process of knowledge and skill adaptation, contextualization, and implementation. Another common theme that runs through all the five projects is the impact that the ongoing COVID-19 pandemic has had on the workings of each project. As emphasized in these presentations, the pandemic has affected all sectors represented here, from the educational institution to the burn care/treatment facility.

The projects discussed here, and lessons shared clearly point to the potential for creating more synergies and achieving more through increased collaboration among the government, private, and corporate sectors in each area. The Nepali diaspora, represented by NRNA, remains a catalytic force in this collective mission.

Mental Health Project Supported by Health Foundation Nepal (HFN)

Health Foundation Nepal (HFN), a non-profit organization registered both in both New York and Dang, focuses on mental health care as a major area of focus. Its collaborative project in Nepal shows that integration of mental health in primary health care and use of midlevel health

manpower is a viable and sustainable care delivery model to improve access to mental healthcare. In doing so, revision of existing and development of new policy and guidelines, capacity building and strengthening of existing health infrastructure and system needs to be done. Strong collaboration and partnership with expert in Nepal, government and local organizations is needed to design and implement mental health programs that are scalable and viable in long term. Promotion and leverage of Telehealth can play important role to fulfill need for trained human resource and provide back up support.

A New Master of Science in Public Health program at Kathmandu University

Kathmandu University has launched, since Sep 2019, a Master of Science in Public Health degree program (MSPH). Since the inception of the program was a culmination of several years of consultation with Nepalese and foreign experts, including a team of Nepalese diaspora. The program continues to grow from the support of various academic programs and experts, including NRNs. This program is expected to be a platform for the Nepalese public health professionals worldwide who aspire to contribute towards advancing public health education, research and service in Nepal.

Burn Care and Rehabilitation during the COVID-19 Pandemic in Nepal

Nepal Cleft & Burn Center, Kirtipur Hospital has been the sole burn center with dedicated burn ICU and dedicated operating rooms for the care of the burn patients in the whole Nepal. NCNC has been able to bring together some well-trained plastic surgeons. Covid-19 pandemic has posed additional challenges to the care and treatment of burn patients. Multi-prong solutions are needed to address prevention, improvement in the early treatment with fluid resuscitation to treatment at the burn center by a well-trained multidisciplinary team with allocation of resources for treatment of poor burn patients. Collaboration among many agencies including burn centers, government and non-governmental organization, philanthropists and individuals are warranted. The NRNA, representing Nepali diaspora, remains a great resource for NCBC.

Group-based Psychosocial Support to Improve Psychosocial Well-being and Functioning of Adults affected by Humanitarian Crises in Nepal

Psychological programs that are brief, acceptable, effective and can be delivered by people without a mental health background are especially necessary in low- and middle- income countries, where mental health systems are unable to cope with the high level of psychosocial needs. In a randomized controlled trial, participants in the experimental arm were offered five sessions of Group PM+ and participants in the control arm received enhanced usual care (EUC).

The results showed that the intervention and trial procedures were acceptable to participants, family members, program staff and the communities and participants found the intervention to be beneficial. A definitive randomized controlled trial is recommended for larger scale implementation and to determine the effectiveness of the intervention in Nepal.

Mobilizing Ambulance Services during the COVID-19 Pandemic in the Kathmandu Valley

The Nepal Ambulance Service (NAS) has been working in close collaboration with the GON's COVID-19 Crisis Management Committee (CCMC). During the pandemic period, NAS faced four major challenges for which solutions were improvised and implemented, and these areas were:

knowledge acquisition and implementation, personal protective equipment (PPE), logistics and stigma. National and international collaboration and assistance in the area of gathering evidence-informed and evidence-based experience proved to be critical and catalytic. At the same time, our experience also makes it clear that the development of knowledge and skills warrants contextualization and adaptation. Social stigma, induced largely by fear and anxiety, can and does happen to medical technicians and personnel, the management needs to remain prepared to deal with this aspect as well.

4.3 Exchange of Knowledge and Skills in Nursing Practice

Chair: Ms. Parwati Pandey

Overview

Four relevant issues are selected related to nursing profession that are thought to transfer and/or gain knowledge and skills in Nursing practices in North American and Nepalese context.

Maintaining Nursing Competence: A Roadmap to Enhanced Patient Safety

Professional competency is a key element in the provision of nursing care. The American Nurses Association defines competency as an expected and measurable level of nursing performance that integrates knowledge, skills, and judgment. Competency improves quality of care, increases patient satisfaction, and promotes nursing as a profession. Due to increasing medical incidents globally, the government, media, and public have focused their attentions on clinicians' competency exerting pressure on professionals to demonstrate competency to perform professional duties. Lack of competency in nurses can raise questions about nurses' effectiveness as members of a prominent profession. Further, low competency may lead to job dissatisfaction, attrition, and poor patient outcomes. Job dissatisfaction ultimately decreases nurses' dedication to care, increases errors, thereby compromising patient safety. Nonetheless, continuing competence encourages nurses to demonstrate new knowledge and skills to apply nursing principles in practice, assumes a culture that holds nurses accountable for lifelong learning, and supports focused improvements in practice. As a means to safeguard patient safety, continuing nursing education activities are increasingly becoming a requisite for nurses to maintain licensure in many countries. At the backdrop of multitude of problems facing Nepali nursing today—sub-optimal education, low wage compensation, limited career opportunities, limited in-service educational opportunities, hostile working conditions, lack of social benefits, and unstable socio-political environments—nurses are forced to leave the profession or provide low quality care. This presentation is to discuss policy level strategies to ensure nurses' professional competence and outline the recommendations for mandating continuing education at the time of re-licensure.

Effective Communication in Nursing Practice

Communication by nurses with their patients is an important aspect of overall health care in every healthcare setting. Their communication with the patients can create an environment of confidence and hope for patients during a difficult time. There are many benefits of effective communication such as an immediate understanding of a patient's condition and needs, understanding the emotional state of patients, understanding the social determinants of health, tracking changes in care, and identifying specialized needs. When a nurse can understand those elements of individual patients, the nurse is an advocate for the patients and can help navigate complex healthcare systems. We can compare effective communication cross-culturally to better learn from a range of nursing practices. In our presentation, we aim to compare and contrast communication methods and experiences in Nepal to the United States.

Shaping Scope of Practice to enhance Professional Autonomy in Nursing

Nursing is an autonomous profession in which the individual assumes sole responsibility and accountability of how they act within the scope of practice. Nursing practice scope is expanding historically, typically from supporting roles in health care to make independent decision to treat patient as advanced/nurse practitioners; like family physicians do; in the developed countries like UK, USA, Canada, and Australia. For any profession regulatory bodies, standards and guidelines are main tools to shape the scope of practice. Based on the standard and guidelines; specific protocol, policy and procedures needs to be developed and implemented in different scopes of nursing practice, makes uniformity in the nursing practice.

The history of nursing regulatory body, Nepal Nursing Council, is <25 yrs old, established in 1996 and is trying to work efficiently standardising nursing scope and practice. Although it has main role to standardise nursing scope and practice, because of lack of political commitment and instability in the country, could not focussed in it's role and more time is allocated in other works like accreditation and monitoring of indefinite number of nursing schools. The nursing profession and practices not respected by other health professionals and general public and advancement in nursing is very far even though there are a lot of nurses with higher degree including PHD degree in Nepal. The lesson learned from some developed countries in relation to shaping scope and advancement of nursing practice would be shared in the presentation as an example to broaden scope of nursing and strengthen autonomy as well.

Protecting Nurses during COVID 19 Pandemic

While the entire world population stays home to prevent the transmission of Corona Virus Diseases -19 (COVID-19), health professionals rush to do their job, saving people despite the risk of acquiring the same. With the versatility of working areas from community to acute care settings, nurses have been tirelessly working to mitigate the newest pandemic worldwide with resilience around the clock. This puts them in extreme mental and physical pressure who need support from the authorities, public and of course colleagues. It is known fact that many health professionals have got the COVID-19 infection while serving people, many have even lost their lives. Losing nurses will critically affect the already strained health care system. Its good news that some countries have been able to flatten the curve and control the number of people infected with COVID, some countries are still on the wave of COVID numbers everyday. Unfortunately, Nepal falls under the second category.

With the surge of infected population, adequate provision of PPE and training of donning and doffing is the very first movement to protect not only nurses' lives, but of the entire population whose life is dependent on effective nursing care in this critical situation. Besides, there are other measures that can be done by nurses at the individual level like techniques of clustering nursing tasks, strictly following the protocols of infection control and more. This paper will also describe in detail about the measures to be considered to control infection at institutional level including clinical settings and, at national level provision comprising of adequate testing, travel restriction and more to save general community as well as front line workers, more importantly nurses. The recommendations are based on recently published papers as well as the experience of the authors in the real-time management.

4.4 Entrepreneurship Development in Agriculture and Allied Sector

Chair: Dr. Krishna Hari Gautam

This session focused mainly on the green sector related to plants and plant products- crops, trees, herbs, and the environment.

Bilateral AgriFood and associated trading between Canada and Nepal

Kandel and Dharel have put their efforts on promoting the trade, especially of agriculture and forestry products, with Canada

NAPA First Book- Principles and Practices of Food Security: Sustainable, Sufficient and Safe Food for Healthy Living in Nepal

Six scientists/ researchers (Rasali et al.) under the umbrella of NAPA (Nepalese Agricultural Professionals in the Americas) unitedly took the initiative to prepare a Nepalese farming guide. This is an effective approach to share knowledge with the farmers in Nepal and NRN's exemplary work.

Sixteen NRN professionals, including two women working elsewhere (Canada, USA, Japan, Australia, and Nepal), have put their efforts and shared their experiences in this session.

IoT Enabled Smart Village as a Means of Re-tooling Nepal Towards Society 5.0.

Gautam et al explored innovative idea and program by applying a smart village concept, to address some of the important contemporary issues and challenges, such as migration, unemployment, shortage of labor, land degradation, and many other social issues and challenges faced by the majority of remote villages in Nepal.

Cannabis as an Economic crop: Prospect and Possible Use in Nepalese Context

Dr. Aryal focused his study on Cannabis as an Economic crop and explored prospect and possible Use in the Nepalese Context.

Accessing the Himalayan Herbs Traded in the Streets of Itahari by Sherpa community of Taplejung, Nepal

Thapa and Thapa focused their study on medicinal plants and their importance in community health, employment, and income. They pointed out the urgency of plant conservation and management. Furthermore, they indicated the observation of ethnomedicinal knowledge transferred from the older generation.

Climatic Variables affecting the Scientific forest management in Nepal

Dr. Keshav Bhattarai elaborated on the role and importance of climatic variables such as temperature, CO2 concentration, and rainfall patterns for gross primary production (GPP) and net primary production (NPP). Understanding the science of GPP and NPP contributes to the production of wood, herbs, and other plant products.

4.5 Innovation, Entrepreneurship, and Technology and Knowledge Sharing

Chair: Dr. Manoj Karkee

Overview

Innovation and its effective utilization through entrepreneurial activities is the backbone of sustainable development of any countries. All the developed countries around the world have been benefited heavily by their long-standing and strong culture, infrastructure, human resources, and investment on innovation and entrepreneurship, which has then resulted in expanded economic activities and novel technological solutions supporting overall advancement of all walks of lives and livelihoods. A large number of non-resident Nepalese have lived and experienced this environment in North America and many other parts of the world where innovation and entrepreneurship are integral part of the communities. On the other hand, there is a large number of experts working tirelessly in Nepal to seed this culture utilizing their knowledge and experience rooted in the Nepali context and often enriched by the education and work experience they have acquired in the countries with strong innovation culture. This session, at its core, attempts to bring the experience and expertise from both ends of the spectrum and facilitate the sharing of insights, ideas, knowledge, and technologies that can be instrumental in institutionalize and strengthen the entrepreneurial culture, infrastructure and resources in Nepal that can make long lasting positive impact on the overall development and advancement of Nepali society. To achieve this goal, we have been privileged to have six outstanding presenters speaking with us in this session: three each from Nepal and North America. Our session will be started with a distinguished address by Prof. Dr. Puspa Raj Kandel, Vice Chairman, National Planning Commission, Nepal. Vice Chairman Dr. Kandel will lay out a foundation for the overall discussion in this session with insightful and thought-provoking ideas on what Nepali Diaspora can do in strengthening the short- and long-term developmental plans, policies and implementation frameworks of the country. The distinguished address will be followed by the Keynote speech of the session delivered by Dr. Suresh Kumar Dhungel, Senior Scientist, Nepal Academy of Science and Technology. Dr.

Dhungel will share his observations, reflections and perspectives on the status of research and innovation in Nepali context. He will then identify various areas where Nepali community from around the world could contribute in fostering the ecosystem of research, innovation and entrepreneurship.

Remaining four insightful presentations can broadly be categories into; i) health and wellbeing; and ii) Information Technology. First, Scientist Mr. Narayan Ghimire, Toronto, Canada will present a novel idea on how valuable natural resources (e.g. medicinal plans) available in Nepal could be developed into commercially successful products with high economic values so that the country can maximize the benefits from her resources. Following Mr. Ghimire, Dr. Sunita Gautam (with her co-authors) will present another innovative effort in Nepal developing test kits for various diseases including Keratinine, measles and dengue. Highly timely in the current situation, the presentation will also focus on their latest efforts on developing diagnostic kits for COVID-19. Talks on IT-related topics include the summary on innovative tools and techniques being developed at IBM by Dr. Dhilung Kirat for mitigating threats all of us are facing everyday while using internet and connected infrastructures such as home security systems. Finally, Founder and CEO of Hamro Patro, Mr. Shankar Uprety will present his experience on developing one of the most successful Mobile-App-based enterprises in Nepali context. His insights on what it takes to be a successful entrepreneur in this digital age would be encouraging to all innovators and entrepreneurs here in Americas, back in Nepal and around the world. These presentations covered a spectrum of innovation, and various stages of entrepreneurship and commercial adoption including some of the fundamental approaches in cybersecurity space to active efforts on developing commercial enterprise around aromatic and medicinal plants of Nepal, and final stage testing of COVID-19 test kits being developed by Shikhar Biotech pvt. Ltd. to a commercially successful mobile-App Hamro patro, which is being used by millions of Nepalis around the world. We believe, with these excellent presentations, this session will be highly engaging and educational to audience of wide range of interests and experiences living both in Nepal and around the world.

4.6 Engineering, Infrastructure Development, and Public Safety

Chair: Er. Kedar Shrestha

Overview

Engineering, Infrastructure Development and Public Safety includes six talk presentations. The topics cover diverse areas of civil engineering including building material, public safety, water supply, smart city, and low-cost water treatment device. We believe the “NRNA-ICC 2nd Knowledge Sharing Conference” will bring exchange of experience, skills, and values between developed nations and Nepal.

Public-Private Partnerships and Public Safety in Infrastructure Development

Development of public infrastructures through Public-Private Partnership models have shown to be more efficient in recent projects such as the Highway 407 East Phase 2 project in Ontario, Canada compared to traditional models. Public safety can be achieved in any infrastructure construction when the designers follow proper standards and codes during the design phase and when stringent quality control and quality assurance processes are implemented during the construction phase. Nepal and other developing countries should regularly revise the existing engineering standards and codes to prioritize public safety.

Hygrothermal performance of hempcrete for Ontario (Canada) buildings

Hempcrete is a bio-aggregate building material consisting of hemp shiv, lime binder, and water with properties including low thermal conductivity, moisture buffering capacity, and a low carbon footprint. Testing different ratios of Hempcrete composition for faced-sealed walls and walls cladded with a vented rain screen system showed that rain screen wall system is more suited for Canadian climate conditions.

Achieving Energy Optimization through Real-Time Operations Monitoring Tool

Tarrant Regional Water District is a water supplier aiming to optimize and assess the performance of water pumps in real-time over the long-term using the thermodynamic method. This allows operators to adjust the parameters of the pump valves to achieve optimal energy per pump train and minimize the use of electricity.

Safety Focused Engineering and Infrastructure Development/Construction

Nepal is a developing country with high potential in infrastructure development. Nepal's government should learn and continuously follow the industry-specific engineering standards using efficient methods throughout various stages of development as practiced in developed nations. Engineering designs should incorporate and public safety and enhance the quality of work.

HOW TO EAT A BIG CAKE: Journey towards Smart City

The next-generation development model is being adopted by various developed countries and is considered to be smart in terms of planning, operation, and investment in infrastructure development. The development of smart infrastructures incorporates various planning tools (i.e. project prioritization and project management, and real-time project monitoring), which can be adopted by Nepal.

Household Water Treatment Technology Solutions for Marginalized Communities in Nepal

Nepal is a country with abundant freshwater; however, sustainable distribution of safe drinking water, sanitation, and waste management systems have yet to be fully implemented. Biosand

filter technology is a low-cost household water treatment device that has shown potential in improving the accessibility of clean water for the poor in Nepal.

4.7 Energy, Environment, Science & Technology

Chair: Mr. Sahaj Man Shrestha

Overview

Five presentations, including a keynote presentation by Dr. Sunil Babu Shrestha, were made.

Activities of NAST and prospects for collaboration with Nepali Diaspora

There are four most important priorities for NAST at present. These include, Result Oriented Research (ROR), Public-Private-Partnership (PPP), Science Diplomacy, Smart NAST.

NAST is also planning to expand its activities to all the seven provinces of the country by establishing centers of excellence for Research of Development on different disciplines of S&T based on the priority of the province itself. In partnership with local and provincial governments, the Nepali diaspora can connect with Nepal and share knowledge, experiences, skills, and other resources.

Satellite Technology Capacity Building and Launching of a Pico-Satellite Built-in Nepal

Space technologies can address some of the most pressing global and local challenges. A PocketQube is a pico-satellite suitable for university students to get hands-on experience in satellite technology, capacity development program, and small startup companies, like ORION Space, to work on space R & D projects. One-unit size of a PocketQube is 5 cm cube and weighs less than 250 grams. SanoSat-1 (Nepal-PQ1) is a PocketQube designed by Nepalese students and engineers using commercial off-the-shelf components. The project was started at the beginning of 2017 after the students from different universities and colleges from Nepal completed building a pico-satellite model called CanSat. ORION Space promotes space education and satellite technology to our young minds by organizing workshops and training in Nepal. The cost of the launch of a satellite is proportional to the mass of the satellite. ORION Space's top priority has been to develop a satellite in Nepal by the Nepali engineers and launch into space.

Cost-benefit analysis of replacing LPG stoves with induction stoves in rural households of Kavre district Nepal

Nepal imports nearly 260,000 tons of Liquified Petroleum Gas (LPG) and other fossil fuels annually from India. This fuel dependency is one of the main reasons for Nepal's trade deficit with India.

The Government of Nepal has envisioned to install 20,000 MW of electricity in fifteen years. There is an opportunity to replace LPG with electricity-based cooking.

The research findings suggest that about two-thirds of households would not benefit economically from adopting electric induction stoves if there is no subsidy on the electricity. The amount of subsidy would depend on baseline electricity consumption and the LPG usage of the households.

Scientific Evaluation of Air Pollution Over two big cities in Nepal

Particulate matters (PM) directly and indirectly affect climatology. Exposure to smaller PM also significantly affect human health. A study of air pollution in Kathmandu and Pokhara was conducted using an air pollution monitor, with two particulate matter sensors, Cimel Sun Photometer as a part of Aerosol Robotic Network (AERONET), and satellite images to capture biomass burnings. A comparison of air pollution data showed that the PM concentration slightly reduced from the end of March in the study area, suggesting the impact of COVID-19 lockdown. The primary air pollution over these cities was associated with anthropogenic sources-- emission from the vehicle and roadside dust. A further investigation of transboundary air pollution over these cities will also be computed simple air parcel trajectories using the NOAA HYSPLIT trajectory model, supporting identifying different aerosol types other than local pollution. The present findings strongly recommend intense scientific research and advanced air quality knowledge to determine and implement effective air-quality policy in Nepal.

Head Start on STEM (Computer Science and Robotics) Education for Young Generation in Nepal

With the right pedagogy and early start, many of Nepal's future generation can be brought into and trained to be professionals in the technology sector.

Nepal is fortunate to have a young population. This could be its most significant resource to uplift the economy. One of the significant developments in Nepal's private sector in the last 20 years has been the establishment of private schools across Nepal.

With the right curriculum and pedagogy, these schools could graduate students who are well trained in technology to elevate Nepal's economy and export technical know-how worldwide.

This can be achieved by introducing STEM (ROBOTICS and Computer Science) education during the formative middle school years. However, STEM programs taught to middle and high school students have to be age-appropriate, enjoyable and motivating.

Carnegie Mellon University teaches Robotics and Computer science to millions of students in the US. This program has been recently introduced in South East Asian countries to great success. Implementation of this program in Nepal could significantly impact technology development in the young generation in Nepal.

4.8 Education, Social Empowerment, and Equitable Development

Chair: Dr. Hari Gurung

Overview

Education is *sine qua non* for any social and economic advancement and development of any entity. Although it is quite a task to do justice to this session by coming up with fitting papers in a very short period of time, the seven abstracts received for the papers are significant and befitting the session. The seven presentations cover a breadth of the Nepali education sector. While the keynote presentation gives an overview of education and social development sector in Nepal, the other presentations discusses the right to free quality education, the public and the private education sub-sectors, the primary/secondary and higher education, conventional and non-conventional mode of learning, economic development vis-à-vis higher education, and the curriculum dimensions to enhance the Nepali education system, its public access and relevance in the 21st century Nepal.

Education, Social Empowerment, and Equitable Development in Nepal

This paper rightfully identifies that education leads to individual and social empowerment and is considered an engine to growth and development. Analogous to empowerment, development includes development of both an individual and social domain which experts consider it to be both a process and end product. The paper discusses social empowerment and development in the context of Nepal and the importance of equity to bring the desired changes in the individual and social domains.

This paper provides a brief status of education and social development in the country with the help of selected indicators. It attempts to uncover the prevailing disparities and inequity in the education and development as a whole with a view to explore the ways of improvement. Why Nepal missed the development opportunities are also discussed in the paper. At the end, some options are provided for further proceedings.

Learning Crisis in Public Schools in Nepal

The paper discusses the issues of public schools in light of the right to free and compulsory education with due equity and equality as enshrined in the Nepalese Constitution and quality education as indicated in the agenda of UN Sustainable Development Goals (SDGs) and the Nepal education sector plan SSDP. However, the paper discusses that quality education and learning in Nepali public schools is still a far-fetched dream and the existence of a serious learning crisis in the public school as a key barrier to an equitable development and prosperity of the country in the long run.

The paper discusses the multidimensional and cross-cutting challenges faced by public school system in relation to student learning crisis and its link to the nation's equitable development. The paper dwells around the questions that 'how a campaign of no child should be left behind basic level should be initiated?' and forwards some helpful policy recommendations for policy makers and practitioners.

Building Primary and Secondary School System for the 21st Century Human Resource Needs in Nepal

The paper highlights the urgency to improve the school education system with a focus on student empowerment to be skillful, knowledgeable, and eminent future leaders. It urges the government not to be conservative, invest more funds, acknowledge the contribution of the private sector, initiate curriculum amendment by involving practitioners to make education innovative. Similarly, it urges teachers to be committed to making the teaching profession respectable, the learning process interesting, open the ground to let students' question and provide the opportunity for experiential learning without any discrimination. And, it identifies parents' involvement in children learning and school operation as essential. The paper discusses the challenges and limitations and remodeling of the education system in Nepal to enable students gain transferrable skills to practice in their life to become critical thinker, analytical and problem solvers to meet 21st-century human resource needs.

Opportunity is massive, Nepal need entrepreneurial movement: perspective from higher education lens

The paper discusses different aspects of higher education and their relation to entrepreneurship development with particular emphasis on its relations to the opportunities in Nepal. The paper is based upon literature focus on experiences of smaller/emerging economies in Asia and, significantly, upon the author's own professional experiences, both, in academia and practice with insights from European/Canadian higher education landscape.

The practice primarily comes from the author's professional engagement in the development, tourism and agricultural sectors in Nepal. Additionally, the author's research experience in Canada on "business-academia partnership" for the ICE committee provides a number of key learning in entrepreneurship with particular emphasis on developed economy. Thus, drawing from a mix of academic and applied professional experiences the authors presents a list of recommendation as a 'take-home message' that is relevant for the socio-economic development in Nepal in general and 'entrepreneurship opportunities' in particular where higher education has a central role to play.

Curriculum Design, Policies, Practices, and Reforms

Education and its curricula are key to social and economic development of a country. The institution of the federal system in Nepal after the promulgation of the constitution in 2015 has ensured a certain a degree of autonomy to local governments in various areas, inclusive of the education sector.

Within the rapidly changing socio-political context, this paper makes a critical review of the National Curriculum Design (2019) and its implications to provincial and municipal levels, examines the national/provincial policies in education, and explores potential educational practices with reference to federal, provincial, and municipal school boards.

The paper highlights the need and practice of autonomy in developing place-based curriculum by local schools and school boards and concludes with a few recommendations for future research and reforms in the field.

Opportunities and Challenges of Distance Teaching/Learning in Higher Education: An Experience of Nepal Open University

Distance learning is an important non-conventional education innovation that has become an indispensable component of the mainstream educational system across the globe. Nepal Open University (NOU) is the pioneer in distance teaching and learning in Nepal which, currently, offers five undergraduate and ten graduate degree programs with an approximate enrolment of 1,200 students. Students have benefitted from the opportunity of virtual learning at their own pace and enabled faculties to teach virtually from any corner of the world and benefitted their academic and professional career enhancement.

However, despite the telecommunication technology breakthroughs, distance learning pales in terms of the live classroom interaction between learners and teachers. It is not able to replicate the active engagement and enthusiasm generated in the face-to-face interactions. This paper discusses the opportunities and challenges of distance teaching/learning in higher education of NOU. Despite the several challenges, like in any other developing countries, distance learning in Nepal has apparent scope and advantages, inclusive of the possibility of collaboration internationally. The shift in the traditional distance education system of higher education from text to web has brought several advancements and opportunities in teaching and learning systems which demands a paradigm shift in academia and the Nepal education sector.

Reexamining Higher Education and Economic Development in Nepal

Economics of education clearly indicates a positive association between human capital and economic development of a country. This study investigates the role of higher education in the context of economic development in Nepal. This investigation becomes of further import given the undergone changes in the Nepalese education and political systems in the past few decades. With increasing attention to higher education, this paper explores its connection to the country's economic development and identifies and discusses the mismatches, issues, challenges and opportunities in higher education and economic development of Nepal.

5. Recommendations and Next Steps

To be followed.

6. Background & Rationale

Sharing knowledge and experience more effectively can help solve complex problems. In these uncertain economic times, the exchange of knowledge, skills, and expertise (practicality) could be a reasonable basis of collaboration to solve complex problems. However, such a partnership requires close interactions and relationships between experts, problem solvers, and society. Diasporans and organizations like NRNA-ICC can play an essential role in facilitating and strengthening such interactions and networks. By bringing expert communities closer together, they can also help bridge the knowledge and skill gaps and pave the way for future collaborations.

7. Objectives

The NRNA-ICC's second knowledge-sharing conference's goal was to bring together a great diversity of people and key stakeholders from the Americas and Nepal and exchange knowledge, experience, skills, and opportunities to strengthen the science and technology, human resources, entrepreneurship, policies, and practices in both regions. The second objective was to build meaningful relationships between scholars, professionals, institutions, industry practitioners, entrepreneurs, problem-solvers, and the for-profit and not-for-profit sectors in Nepal and the Americas. And the third objective was to pave the way for future collaborations to solve some of our most challenging problems in Science and Technology, Health and Medicine, Education, Economy, and Equitable Development (including gender-equitable development), Engineering, Infrastructure Development, Public Safety, and Energy, and the Environment.

8. Abstracts

8.1. COVID-19 and its Impact on the Economy

Abstract 1-01 –Scope and Opportunities for collaboration between Nepali Diaspora and Policy Research Institute (PRI)

Bishnu Raj Upreti, PhD
Policy Research Institute

Corona Virus pandemics has become most serious crisis after the Second World War. Still it is extremely difficult to predict the impacts. In one side, it has completely altered the normal modus operandi everywhere from global economy to education, health, tourism to daily life of individuals and well exposed the limitations of market. In other side, it has also well exposed the inequality persisted in the world. We have observed many unexpected events: private health system became almost invisible and dysfunctional across the world and public health system almost collapse, education system seriously affected, global intergovernmental and multinational organizations became ineffective or face existential crisis, workforce and labour relations ruined.

Now the world has encountered unprecedented risks and incalculable challenges. Combination of these two factors (risks and challenges) could create total disaster in humanity. The main challenge for academics & researchers, professionals, planners & policy makers, political decision makers, private sector leaders, thinkers and pragmatists is how to appropriately deal with this situation.

Now, academics, researchers, planners and policy makers have started debating on ‘post-pandemic world order’ or ‘post pandemic new normal’. However, alternate view is that it will logical to talk about ‘post-pandemic world disorder’ or ‘post pandemic new abnormal’ with the speculation

that there will be abnormalities and manipulations from the powerful in the situation of gap created from broken down of the old system and lack of establishment of new system.
Even though the combined effects of risks and challenges place the world into extremely complicated situation, every nation and individuals now have to move ahead by exploring resilient ways and means, building on experiences gained from living with the pandemics for so many months, utilizing the inner hope and aspiration of human being.

We have also observed some of positive aspects of COVID19 such as family bonding and care of seniors, we-feeling in community, use of indigenous knowledge and experiences, behavioral change in consumption, efficient use of resources, etc. These could be point of departure for minimizing 'post-pandemic world disorder' or 'post pandemic new abnormal' and moving ahead.
In this context, each and every country, organizations and individuals have to collectively think and act in different way to address the complications arises from the combined effects of risks and challenges posed by pandemic.

The Government of Nepal has to deal with this complex situation discussed above and contribution of all actors is necessary. Many existing policies may need revision and many different new policies may require addressing the challenges brought by pandemic. In this context, role of the Policy Research institute (PRI) will be prominent as it is established to provide evidences from research to the government to effectively implement policies. Currently, PRI is developing strategy to harness the best and useful knowledge available and Nepali diaspora and the members of Non-Resident Nepali Association (NRNA) are one of the important depositories of knowledge, skills and experiences required for the nation. In this paper I am presenting some of the possible areas of collaboration between diaspora and PRI in the following section:

a) Using diaspora knowledge and skills in research, review and analysis of mutually agreed areas,
b) Sharing research findings of diaspora to PRI
c) Scholars spending sabbatical at PRI to conduct study in the mutually agreed topics,
d) Participate in policy dialogues, workshops and symposiums organize by PRI and vice versa
e) Contribute to the flagship annual publication of *Nepalese Journal of Public Policy* and other knowledge products and or engage in reviewing the research papers.
f) Contribute to PRI's aim of developing global networks to share and cross fertilize ideas, expand knowledge-base and keep itself abreast of cutting-edge innovation on policy research.
g) Other areas of mutual interests.

In conclusion, there is great opportunities for diaspora and NRNA to bring their knowledge, skills and experiences for the benefit of Nepal to deal with post-Corona pandemic challenges and PRI can provide important space for that by collaborating in mutually agreed areas.

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Abstract 1-02 - Covid-19 and FDI Regimes: Convergence or Divergence?

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Canada

As of August 20, 2020, the Covid-19 pandemic infected over 22.5 million and killed over 790,000 people around the world. The pandemic has affected every aspect of human life, business, and society at large. The purpose of this paper is to examine the pandemic's effect on foreign direct investment (FDI) regimes. According to an UNCTAD estimate, global FDI flow may fall by 40 percent in 2020-21. The fall is predicted to be more severe in developing countries. The fear of disruption in supply chain, concern with likely takeover by large transnational corporations and state-owned enterprises to take advantage of weakened economic situation of many companies in many countries, and depleting stock of medical equipment, among others, have been looming large. Consequently, governments of many countries have revised guidelines for FDI screening (e.g., Australia, Canada, France, Italy, Spain) so as to protect companies and critical assets that are of strategic importance such as security, medical products and protective equipment. These challenges caused by Covid-19 pandemic have critical effects on many fronts including institutions such as investment promotion agencies (IPAs) and economic development organizations (EDOs), supply-chain arrangements, international trade and for other entities including globalization, role of the state, and employees. The paper examines how the pandemic has upended key aspects of established FDI regimes and forced governments to address the challenges in a uniform way across nations, and thereby providing some support to the convergence hypothesis.

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Abstract 1-03 - Socio-economic Impact of COVID-19 Pandemic on Migrant Workers and MSMEs

Conducted by CECI Nepal and Dolma Consulting
Ms. Sagun Bista, Gender and Social Development Specialist

CECI Nepal and Dolma Consulting have identified the key challenges and opportunities faced by Micro, Small & Medium Enterprises (MSMEs) and returned migrant workers (RMW) due to COVID-19 pandemic in a rapid assessment conducted between 28 April-12 May 2020. 102 migrant workers and 150 SMEs from Province 3,4, 5 and 6 of Nepal and 18 Local governments (LG; Rural/Municipalities, metropolitan) from 8 districts were surveyed. It was found that people involved in formal or informal jobs were highly affected by job loss. There were RMW present in every local government who showed interest to stay back if business/ job environment is favorable. Findings indicate that RMWs are seeking skill and finance options to recover from this situation followed by job linkage, market linkage and marketing knowledge. Likewise, we recommend following considerations:

3. Increase synergy and partnership with Local Governments and local NGOs/ CSOs to optimize resources, for better coordination and efficient and effective delivery.
4. The support to Returned Migrant Worker MSMEs can be divided phase-wise into
    d. Relief: Focusing mostly on psychosocial counseling, cash or in-kind support and paycheck protection program.
    e. Recovery: Knowledge enhancement of LGs, MSMEs and CSOs, providing access to finance, cash or in-kind support for self- employment programs, job search support, connection with formal economy, implementing government protocol for COVID epidemic and in restarting businesses post lockdown
    f. Resilience: Building resilience through economic empowerment especially that of youth, women and marginalized community by supporting them in meeting new demands, expanding supply chains, development of a working relationship with financial institutions and open lines of credit, tailored insurance facilities and working on enhancing digital economy and supporting policy environment

Keywords: COVID-19 Nepal, MSME, Migrant workers,

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Abstract 1-04 - Impact of COVID 19 on Nepalese Economy

Professor. Pushkar Bajracharya

Background:

The world is currently under the threat of coronavirus (COVID-19) pandemics, which was first noticed in Wuhan city of China in December 2019 and then spreading to all over the world proving to be highly contagious. This infectious disease, which is caused by a newly discovered virus, is more severe to aged people and those having chronic medical problems like cardiovascular diseases, diabetes, chronic respiratory diseases and cancer. But the effect in seen albeit at varied degree in all segments of people. COVID-19 has evolved as global concern for humanitarian as there is exponential spread of this virus around the world. IMF, the World Bank and ADB and other global agencies have forecasted severe recession as is also proved by initial reports for the first two quarters particularly those of Britain, France and India.

The early impact assessment of Nepal also highlights of adverse effect due to COVID-19. ADB's Asian Development Outlook, 2020 predicts Nepal's growth rate of only 5.3 percent in 2020 due to uneven monsoon and COVID-19's outbreak. But the World Bank (2020) predicts of harsher effect of COVID-19 as the revised forecast of the bank estimates Nepal's 2020 economic growth to be around 1.5 to 2.8 percent which is substantially less than the Bank's last October estimate of 6.4 percent. However, the Nepali government organizations, like National Planning Commission and Central Bureau of Statistics, argue that the impact of lockdown on economy won't be as severe as the World Bank's prediction. According to them, there is loss of 1.34 percent in GDP due to last one month's lockdown so if the situation goes well there will economic growth rate of 5 to 5.5 percent in 2020. These government organizations consider that there is adverse

impact of COVID-19 on tourism, hotel and restaurant whereas construction and industrial productions are halted only due to lockdown and there is no significant impact of lockdown in agriculture, trade, electricity and water supply. It is to be noted that sector wise impact analysis of World Bank (2020) is not different than what these government organizations are saying. The government is incurring high expenses in COVID-19 cure for which it has to divert significant portion of its usual expenses because there is no strong revenue base to bear the expenditure hike.

1. COVID impact in Nepal: An Assessment

The unprecedented scenario posed by COVID 19 globally as well as in Nepal is enormous in the sense that even during the wars such scenario were not noted. In the absence of data and figures not yet available, yet the situation is grim and in case the lock down has to be extended, further effects may be unfolding. The GDP is estimated to grow by around 2.1% if the lockdown persists to (Mid-May) and longer term will induce recessionary trend. Lockdown up to Mid-July, the growth may come down to -4.5% about only and if extended to longer term, the GDP may be in recessionary trend contracting the economy of 2077/78 by by-8.0% to -16 percent.

As economic opportunities in Nepal are limited, more so for uneducated and unskilled people, a large-scale migration is taking place for foreign employment. No doubt the remittances that they send home has reduced poverty rates in Nepal and has provided a much-needed source of foreign reserve besides promoting other development activities. However, foreign employment is not and cannot be a sustainable and long-term solution for the unemployment problem in Nepal. A mass exodus of youths in their prime has led to shortage of workers in rural areas to cultivate otherwise fertile land causing agricultural activities to decline. Some industries have also experienced labor shortage. The consequence is that our economy will suffer—in fact many sectors already have. Therefore, opportunities and jobs should be created at home in Nepal itself for sustainable development. Job creation has to come from manufacturing which can employ workers in large scale as it has high employment elasticity. Nepal's focus on manufacturing sector, therefore, should be on subsectors or products that can generate larger employment opportunities.

Manufacturing Sector

- The short term lockdown is not expected to affect strongly though revival is expected to take about three months and economic activities will replenish but four months lockdown is expected to slow down for 6 to 8 months but a longer period lockdown will seriously affect not only this year but next year’s activities as well.
- SMEs also will be affected by the short supply of raw materials though their substantial proportion is supplied from within the country. The restriction in movement and market supplies mean they are going to be affected. But they are operating with limited resources and means even now and supplying to limited markets.
- The current utilization of capacity is reported as opined by Key informants are, 40-50% in food and related products, complete close down of the cement industry, 15-20% in the pharmaceutical sector and about 80% in the IT sector. The last sector is estimated to grow in the backdrop, but market limitation is reported to have curbed various activities meaning production will be seriously affected.

- In Nepal too, though for essential items, the transportation is allowed in totality there is a sharp drop. Imports have substantially declined meaning transportation and allied services also would decline. The longer-term closure may lead to severe jeopardy in the survival of these sectors even.
- In Nepal, the immediate impact on employment is expected to be staggering. The most affected would be daily wage earners estimated to number around 500,000 including carriers, construction workers, skilled, semi-skilled andunskilled workers, petty businesses. The industrial workers are estimated to be mostly out, 70% in big and medium industries and about half in small and cottage industries are estimated to be out of jobs and have returned to their homes. Most of the micro operators are operating to the extent of the availability of market with domestic or local labour but the medium-term lockdown will significantly reduce the level of operations due to limitation of market and inputs as well as transportation difficulties.
- Similarly, two to five hundred thousand workers are estimated to have come back from India and a large number is reported to be at the borders waiting to enter the country.
- In the manufacturing sector, therefore, as opined by the industry leaders, 60 to 70 percent are out of job and the rest are operating 60 to 80% only. In the small and cottage sector, 50% are estimated to be operating wile out of some 600,000 micro operators some 80% are reported to be operating. In the medium-term lockdown, the level of operation will reduce by 70-80 percent in big and medium enterprises, 60-70 percent in small and cottage industries and 40-50 percent in micro operators. In the longer term lockdown, over 90% of big and medium industries will close down, 70-80 percent small and cottage industries will close down and among micro operators, 50-70 percent will close down meaning the overall economy itself will come to a standstill.
- With the short-term lockdown, the backward linkage will continue to operate and will have only minimum effects. The issue of storing and working capital investment, however, will emerge. Since the recovery with this is estimated to be quick, the overall implication will be limited. In the medium-term lockdown, as argued on an average, 70-80 percent industries will close, the recovery will also take time and backward linkages also will be severely affected. In the longer-term lockdown, more than 80 percent industries will close down and all backward activities also will be directly and proportionately affected as per the opinion of industrialists.
- Three types of forward linkages will be affected: higher level processing activities, marketing and exports. Marketing and consumption will reduce by 20-30 percent with short term lockdown, 30-50% in medium term lockdown and even up to 60% in longer term lockdown. Exports will fall by Rs 6-7 billion per month with shorter term lockdown, though these activities are still viable but will be affected by effect on the domestic production ability and waning purchasing power in the importing countries due to the pandemic, by Rs 8 to 9 billion per month in case of medium term lockdown and these will almost completely stop in case of longer term lockdown meaning the exports of 2020/21 will come down by around 50 percent.

Market and Consumption

- Multinational development organizations like ADB, the World Bank and IMF predict that economic growth will be at lower side which will decrease income level and increase poverty globally. As the Government of Nepal doesn't have enough resource to protect people with huge social assistance, consumption will decrease as people will have to manage with whatever they have or limited supplies available. Limited income as argued will also lead to decline in ability to consume reducing the consumption as well as the market. The vicious cycle will affect the manufacturing as well.
- There is huge labor cut in gulf countries which adversely affect remittance inflow of Nepal. The decrease in remittance will also affect consumption**.** It is estimated, that even before the lockdown, remittances during the first eight months have come down by 36.6% amounting to Rs 592 billion compared to the corresponding period of the last month as per the report of Nepal Rastra Bank.
- Substantial reduction in consumption is estimated of automobiles, petroleum products, construction materials, hotel and restaurant services, transport services and other luxurious and comfort articles. Even the demand for textile and apparels will reduce. Surprisingly, even the demand for pharmaceutical products are estimated to have come down sharply that has emerged as an enigma. Imports in short term lockdown is estimated to be at the level of Rs 1300 billion (the imports of first 8 months has reached Rs 972 billion) or about 9 % less than in 2018/19 and Rs 1240 billion or 14% less than in the earlier period. Longer term lockdown will reduce the imports of 2020/21 by 30%. Even in food and basic items, consumption of meat, milk and even vegetables are expected to go down due to limited demand and restrictions in the market. In the longer-term lockdown, consumption, thus, is expected to decline by30-50 percent.

2. Tourism

Tourist flow is expected to be only 600,000 in one-month lockdown, 500,000 in two month lockdown (may lose the autumn season also) and to less than 300,000 if flights start at September. Even in 2021, there will be severe decline due to longer term lockdown. The revival will take time and even in case of normality, the arrivals are going to be around or less 600,000. Domestic tourism has also virtually stopped though will gradually revive in a short term once the normality returns. Normality, however, will ensure that basic tourism will recover soon with proper efforts due to the strengths of the products of Nepal as is experienced after the conflict.

3. Gender perspective

Employment generation is an important perspective in the manufacturing sector. The gender composition is pyramidal in nature with the females dominating in the micro sector, females in a significant proportion in the small sector and relatively low in the big/medium industries. The distribution of employment by gender as per the economic census (2018) number 377,678 (74%) male and 132,845 (26%) female. In the larger industries mainly three factors explain the domination of male in employment structure, most of the labour in the larger industries are migrant labour force and males dominate in the migrant labour force, secondly, the skill available of the kind is limited to females and thirdly the working hours which are generally much longer as

industries generally operate in three shifts. However, it would also indicate that there is obvious gender bias as micro and small operators are paid generally less than the minimum wages and secondly the growth and development opportunities are limited. For example, only about a fifth of the micro-enterprises are estimated to graduate to small scale level. The implication is expected to be similar though in reemployment females may find it a little tougher.

4. Poverty situation

Nepal is one of the least developed countries with severe poverty. In terms of income poverty, that does not measure overall poverty in the country as discussed earlier, about 18.6 percent people are poor. Though in relative terms, poverty may have been reduced, the absolute number of poor people has been rising as the population has grown faster than the economy's capacity to generate additional income. Over nine million are now below the poverty line, most of them in rural areas, which, however, is a source of poverty to urban region as more and more people are migrating to urban and semi urban regions in search of economic opportunities. Many basic services are still undeveloped, with a large segment of population deprived of even bare necessities of life.

The challenges in Nepal are not exacerbated by income poverty alone. Large disparities however appear still in social indicators when comparing the various geographic regions and socio-economic groups. In term of other social indicators too, despite recording impressive growth during recent times, Nepal lags behind other South Asian country. Hence, there is no doubt that poverty and employment creation, despite efforts of many decades, continues to be our bane and required serious and purposeful addressing to reverse the situation.

The vicious circle of poverty can be broken only with higher level of employment generation through greater investment and growth. The manufacturing with high employment elasticity may be a very useful means to curb poverty. In the backdrop that most of the industries are closed and a large segment of employees are out of work, it is expected to exacerbate poverty. In the present situation, though precise figures are not available, various news reports and others indicate that three to four hundred thousand workers are out of job in the industrial sector and some 500,000 daily wage earners are estimated to be out of work, 90% of them are estimated to go below the poverty line. Hence the short term lockout is estimated to have only marginal implication only on poverty with the poverty reaching around 20 percent but if the closure extends to mid-July, some 720,000 households (90% of 800,000) is estimated to go below the poverty line meaning from an estimated 1.1 million households below the poverty line it may go to some 1.8 million households or 30 percent of the total population of the people will be poor. In case of longer closure, poverty is estimated to grow to 35% to 40%. These are aggregate implications and the impact of closure in the manufacturing sector only will be proportionately small.

5. Impact on financial institutions, transport, logistics and other services

Manufacturing sector is directly and indirectly related to various services sector and accordingly will have implications too. Table . reveals that more than 32 percent of transactions of the BFIs are with the manufacturing sector particularly in the loan portfolio meaning that any impact on the manufacturing sector will have proportionate impact on the performance of BFIs also. Closure

means substantially reduced activities and it will affect in two ways, the borrowings will be reduced and repayments both of the principal and the interest will be affected. BFIs are expected to be less affected sector at the early periods but both medium and the longer-term closure will have direct and substantial impact in the performance and the activities of the BFI sector. Similarly, transport sector will also be substantially affected. The current movement limited to supply of essential inputs and the products have substantially reduced the transportation activities that makes a sizeable employment redundant and will reduce economic activities and will ultimately reduce value addition. Overall, thus, while the effect of short closure will be minimum and should be recoverable with small efforts, the effects of medium- and longer-term closure will have substantive impact leading to reduction in GDP, severe rise in unemployment. In case the closure takes place for a longer period, recovery will take at least two years.

6. Conclusion

The pandemic is going to have catasthropic effect on the industries that in the last two decades show declining performance. The growth in demand pushed by higher demand contributed by increase in population, income and remittances have mostly been met by imports. The export prospect of industrial outputs that grw in the eighties and the nineties waned due to higher costs of output, reduction in competitiveness, and inability to take advantage of the opening up of the market in consonance with membership of WTO and other regional bodies. The pandemic that led to total closure or substantial reduction in capacity utilization is going to further seriously dent the financial health of the industries. The short-term implication will be marginal only though it may take some time to recover, it is expected to do so quickly. In the medium-term case, the impact will be serious and will take two quarters to one year for recovery. The longer-term lockdown will have colossal implication with the recovery taking one to two year. But many may collapse, and hence serious attention is required to keep them alive. Hence, depending on the period of lockdown, the government must extend feasible support to these as suggested. The costs of full wage support for one month at census wage rate will be Rs 13.48 billion and Rs 17.90 billion at minimum wages. Similarly, full interest support for one month will amount to Rs 11.17 billion with Rs 7.54 for big industries and Rs 3.68 billion for SMEs.

7. Recommendations

Following recommendations are provided to come out from the pandemic.
The wage and other support are going to be very demanding and hence may not be feasible. The most important pressures the industries are facing are in the financial front in terms of loan repayment and interest burden particularly when their economic activities are at a standstill. Therefore, following suggestions are provided,

- Defer payments of loan and interest for one quarter in case of short-term lockdown, two quarters in case of medium term lockdown and one year in case of longer term lockdown. This will require coordination with Nepal Rastra Bank and the financial institutions. The deferral of payments may require supporting to banks. In the perspective of the crisis, the financial institutions should be asked to shed their dues and NRB should provide guidelines and support measures with due negotiations. The priority should be accorded very high

- Interest support measures are going to be highly essential and extended to all scales of industries, big, medium, small, cottage and micro in progressive manner meaning more to the smallest scale and so on. The amount should be decided based on discussions with Ministry of Finance and the government. The small and micro sector have mostly borrowed from cooperatives and other informal sector and their interest costs are much higher. They must with priority be supported. But cautions must be extended about misuse of support that may emanate particularly in these sectors. The priority is very high as this has already started having serious implications on industries as reported by the industrialists and they argue the situation is going to severely worse by Mid-July. Even some emergency support may be needed.
- Feasible support in utility payment also should be made in consultation with Nepal Electricity Authority, Water authorities, Telecom agencies etc.
- Transit of inputs as well as finished products should be facilitated if needed by negotiating with destination countries and transit countries (India and China).
- Coordination is also required among the central, provincial and local governments in all these respects.
- Tax incentives may not be needed as they are generally subject to activity utilisation level.
- Property and land or fixed charges/taxes should be waived for one year in case of short and medium lockdown and for two years in case of longer lockdown.. The priority should be very high to enable to assure recovery.

Revival Strategies:

- Industries could be gradually allowed for operation by issuing operating guidelines that should include at least the health status of the workers, operating environment, iassuing guidelines and generating awareness about do's and don't's.
- Public procurement of essential and basic commodities also should be started for distribution or selling through fair price authenticated centers.
- Market should be gradually opened more particularly in no risk (or very less vulnerable areas) and zoning if necessary, may be initiated.
- A stimulus package must be brought out. Industries may be granted easy loans for cheaper interest rates for example 6 percent for larger industries, 4 percent for SMEs and 2 percent for micro operators. The risk will be collection difficulties and hence measures must be defined beforehand in case collection becomes difficult like raising like government dues, registration cancellation etc. Misuse of funds also need to be protected as thses resources may go to people with political or other interests.. This probably is the most required for reviving the economy.

General Strategies

- To overcome from the situation, time bound support may be extended say for one year or two year.
- Utility price concessions may be given for limited period.
- In the big ansd medium industries, most of the labour are from outside. Initiatives should be taken by the industrialists and the government to skill the local labour befitting to the industrial requirements.
- Productivity improvement drives should be continuously launched if needed in cooperation with appropriate agencies like APO.

- Wage increase or determination should take into account: need, inflation and productivity effects.

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Abstract 1-05 – Effects of Covid 19 on Global and Local economy

Mr. Bhaskar Raj Karnikar,
Chamber of Commerce, Nepal

Mr. Karnikar intends to highlight on the followings:

1. Covid 19, an Opportunity and Threat
2. Effects of Covid 19 on Global and Local economy
3. Impact of Covid 19 in employment and remittance
4. Covid 19 is an opportunity for innovation, possibilities, independency in domestic production
5. Role of NRNA to uplift the current situation

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8.2. Public Health and Medicine

Abstract 2-01 - Development and Implementation of a Mental Health Project in Western Nepal: Challenges and Successes

Ashok Devkota (MD), Shreedhar Poudel (MD, MPH), Madan Bhatta (MPH)
Health Foundation Nepal

Background
Health Foundation Nepal (HFN) is a non-profit organization based in New York, US and is also registered in Dang, Nepal. It operates in Chitwan and Dang and has support office in Kathmandu. HFN US provides financial and technical support to Nepal team. Mental health care is one of the major focus areas in addition to nutrition, digital literacy and health, maternal and child health and non-communicable diseases.

The Project
Our team of experts consists of medical and public health professionals who provide technical and expert consultation services to government bodies like health ministry and municipalities to build program and policy framework, in addition to providing technical support to local government and organizations to design and implement health programs. Recently we supported Ministry of Health to prepare tele mental health guidelines. HFN is one of the participants in mental health sub cluster meeting that is organized every month by Epidemiology and Disease Control Division in Nepal to provides technical inputs to strengthen mental health programs in Nepal. Currently, HFN along with other partners provide technical assistance to Government of Nepal in revising national mental health strategy.

Mental health experts from US and Nepal collaborated to design and implement integrated mental health rehabilitation model to provide community based mental health care service through rural health centers. HFN has established a psychiatric care and rehabilitation center with the capacity to serve 10 people with serious mental illness in Dang district. This rehabilitation center is run in collaboration with the municipal government and a local partner Movement for Inspiration (MOFIN) which provides administrative support. Local government supports us in identification of people with mental illness in the community and provides reimbursement to the care we provide.

In addition to the institution based mental health rehabilitation and care, we support delivery of integrated basic mental health care services through government run rural primary health centers and community health workers. More than 680 pregnant and postpartum mothers have benefited this year through our community based mental health services program. In recent past, we organized training on psychosocial counseling to community workers, and training on basic psychiatric care to health center staffs to support integrated mental healthcare programs. Experts from US and Nepal developed these training modules and visited local sites to provide training and support. We continue to provide support and telehealth service from Kathmandu and US.

Implementation Challenges and Successes

Initially many experts in US joined us in our projects with huge enthusiasm, but this slowly waned off when we found major hurdles due to lack of unclear policy, poor mental health infrastructure and system. Like any other specialty, mental health experts in US are very specialized in their field and they work together with different support teams. In absence of such health system and support team we were not able to best utilize their expertise. Establishment of mental health rehabilitation center, integration of mental health project with primary health care, delivery of mental health care at community level and use of telehealth are innovative approach we have adopted in Nepal. Mental Health policy and legislative framework are not strong and updated which are huge barrier in implementing these innovative programs. Building policy framework, designing and implementing mental health projects, and navigating government bureaucracy and process takes lot of time and effort. So, we have established strong partnership and collaboration with experts from Nepal and local organizations.

Availability of mental health manpower is another challenge in program implementation. Although we have trained midlevel health manpower, we need experts to support and back them up. Telehealth was very useful to fulfill this need, but limited availability and usage of technology was a barrier to scalability. In addition, stigma associated with mental health and acceptance of care are huge barriers that need to be overcome to effectively implement mental healthcare programs at community level. So, any projects designed by US expert team is rigorously evaluated by experts from Kathmandu and local team and designed to fit national and local context. There is initiative to integrate mental health to existing primary health care network at national level, but existing infrastructure and human resource are very limited. It would be very challenging to add any new program to the existing system unless the capacity and efficiency is significantly boosted.

Decentralization and strengthening of local government bodies has increased enthusiasm, interest, and ownership at local level. Local government and hospitals have realized that there is a great need for mental health service and have reached out to us to establish and run mental health care model that we have adopted in their districts too. We have already signed memorandum of understanding to extend the services to Rapti Provincial Hospital and 20 health centers under a Tulsipur sub-metropolitan city to provide technical backup and support to establish and run mental health programs.

Conclusion

Integration of mental health in primary health care and use of midlevel health manpower is a viable and sustainable care delivery model to improve access to mental healthcare. In doing so, revision of existing and development of new policy and guidelines, capacity building and strengthening of existing health infrastructure and system needs to be done. Strong collaboration and partnership with expert in Nepal, government and local organizations is needed to design and implement mental health programs that are scalable and viable in long term. Promotion and leverage of Telehealth can play important role to fulfill need for trained human resource and provide back up support.

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Abstract 2-02 - Developing Quality Human Resource in Public Health in Nepal: The Experience of Kathmandu University

Biraj Karmacharya (MBBS, PhD)

In September 2019, Kathmandu University School of Medical Sciences (KUSMS) launched a Master of Science in Public Health degree program (MSPH). The program has two specialized tracks: Epidemiology and Global Health. The program aims to be a center of excellence in public health training, research, and practice. The program is expected to produce competent public health graduates with advanced knowledge and practical skills to design and implement strategic public health solutions at national and global levels; conduct public health research; and train people in their respective fields of expertise. The program is innovative in the context of Nepal in its extensive focus in research, provision of a range of elective courses that focus on contemporary issues, and the possibility of embedding modular courses. It is a two-and-a-half-year program including six months of thesis work and six months of internship. The first cohort comprises of 6 female and 4 male students, selected through a competitive examination.

The program aims to leverage the extensive collaboration of KUSMS with well-regarded international public health institutions, and also a wide range of collaborative research projects currently underway. It also builds upon the long-standing community-based health care program of the institution and harnesses the extensive engagement with local, provincial and central level governmental and other stakeholders. Although the COVID-19 scenario has impacted the program, mainly in terms of field-based courses, we have attempted to utilize this crisis as a hands-on training in public health.

The establishment of this program, the process of consultation, and the eventual design and implementation will be an example for other institutions aiming to initiate similar programs in Nepal. The inception of the program was a culmination of several years of consultation with Nepalese and foreign experts, including a team of Nepalese diaspora. The program continues to grow from the support of various academic programs and experts, including NRNs. We aim to be a platform for the Nepalese public health professionals worldwide who dream of contributing in advancing public health education, research and service in Nepal.

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Abstract 2-03 - Burn Care and Rehabilitation during the Pandemic in Nepal

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Background
In Nepal, thousands of people sustain burn injuries, some fatal, every year. Yet the treatment, care and rehabilitation of burn patients are not well organized. The Nepal Cleft and Burn Center (NCBC), managed through the Public Health Concern Trust-Nepal (PHCTN), is the sole burn center with dedicated burn ICU and dedicated operating rooms for the care of these unfortunate patients in the whole country of Nepal. NCNC has been able to bring together some well-trained plastic surgeons.

The number of patients admitted at NCBC for the care of acute burn injury has been increasing every year (628 cases in 2019). The number has increased because more patients are being referred to the Center. In 2018, patients came from 71 out of 75 districts of Nepal. The center also has the largest number of plastic surgeons and plastic surgery residents in the country.

As in most low- and middle-income countries, the outcome of acute burn care in Nepal is very poor. There are many reasons for this e.g., late arrival of burn patients in the treatment center, poor economic conditions of patients and very expensive burn treatment, lack of proper physical infrastructure for taking care of acute burn patients, lack of trained human resource and lack of access to proper technologies which are mostly too expensive for poor and middle income countries.

Burn Care During the Covid-19 Pandemic
During the Covid-19 pandemic that started in January 2020, the transfer of burn patients from outside of the Kathmandu Valley has been more difficult than before. Prior to the lockdowns, more than 90% of the acute burn patients admitted to NCBC were from outside districts. Lack of knowledge about corona infection and its prevention among the health care providers was the main reason for the panic which subsided slowly over a couple of months during which there were few corona positive people in the country. When the number of coronavirus infected patients started to rise, there has been another wave of fear, uncertainty among the care givers. More children under the age of 16 years were admitted with burn injuries during the corona pandemic (40 % vs 28%) compared to the year before.

During corona pandemic, many patients with minimal inhalation injuries who we were able to survive in the past in the burn center succumbed to the burn injury. The average proportion of the total body surface area affected by burn among the patients who died due to burn injuries was much lower during the covid-19 pandemic compared to the year before (20% vs 40%). Due to corona pandemic, collection of cadaveric skin has been stopped leading to complete lack of allografts in the only skin bank of the country at the burn center.
To learn from other burn centers both in the country and outside, a webinar was organized every other week where burn care providers from several countries. Eight such webinars have already been organized, and the lessons learned is being synthesized.

Way Forward
Immediate burn care determines the overall outcome like in all traumas. This fact has been internalized by NCBC facility. Lack of proper rehydration with fluid resuscitation in major burns also contributes to poor outcome. Research in the use of oral rehydration solution for fluid resuscitation in major burns is under discussion and development in collaboration with an

international organization. Similarly, action research on prevention of burn injury especially during winter when half of the burn admissions occur is also in discussion with an international burn organization.

Delayed presentation of burn cases to the burn center has led to many patients infected with multidrug organisms. Keeping these infected patients with non-infected patients in the same open ward had led to spread of infection. Development of proper burn facility with burn ICU, operating rooms, provision of segregation of infected and non-infected patients in separate wards or rooms, training of burn critical care specialists will be a worthwhile investment if the burn out come has to be improved.

Conclusion

Covid-19 pandemic has posed additional challenges to the care and treatment of burn patients. Multi-prong solutions are needed to address the prevention, improvement in the early treatment with fluid resuscitation to treatment at the burn center by a well-trained multidisciplinary team with allocation of resources for treatment of poor burn patients. Collaboration among many agencies including burn centers, government and non-governmental organization, philanthropists and individuals are warranted. The NRNA, representing Nepali diaspora, remains a great resource for NCBC. Technical and financial assistance from all is heartily welcome.

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Abstract 2-04 -Group-based Psychosocial Support to Improve Psychosocial Well-being and Functioning of Adults affected by Humanitarian Crises in Nepal

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On behalf of the research team]

Psychological programs that are brief, acceptable, effective and can be delivered by people without a mental health background are especially necessary in low- and middle- income countries, where mental health systems are unable to cope with the high level of psychosocial needs. Problem Management Plus (PM+) is a 5-session intervention designed for those with general distress and facing adversity. In a randomized controlled trial, participants in the experimental arm were offered five sessions of Group PM+ and participants in the control arm received enhanced usual care (EUC). The results showed that the intervention and trial procedures were acceptable to participants, family members, program staff and the communities and participants found the intervention to be beneficial. A definitive randomized controlled trial is recommended for larger scale implementation and to determine the effectiveness of the intervention in Nepal.

Reference for full paper:
Sangraula M, Turner EL, Luitel NP, et al. Feasibility of Group Problem Management Plus (PM+) to improve mental health and functioning of adults in earthquake-affected communities in Nepal. *Epidemiology and Psychiatric Sciences* 2020;29.

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Abstract 2-05 -Mobilizing Ambulance Services during the COVID-19 Pandemic in the Kathmandu Valley: Challenges & Solutions

Kulesh B. Thapa (MD, DCH)

Since COVID-19 (C-19) pandemic surfaced in Kathmandu, the Nepal Ambulance Service (NAS) has been at the forefront of transferring and carrying passengers. NAS has also been working in close collaboration with the GON's C-19 Crisis Management Committee (CCMC). This presentation discusses some of the main challenges faced and solutions identified in the midst of the ongoing pandemic situation in Kathmandu.

Nepal Ambulance Service

The Nepal Ambulance Service (NAS) is operated through a non-governmental organization that has been providing emergency services for the last 10 years in the Kathmandu Valley and some other cities. The NAS is the only emergency medical service (EMS) of its kind currently in existence in Nepal; and to date it has undertaken more than 50,000 emergency transfers.
NAS currently has 10 ambulances, 35 emergency medical technicians (EMTs), and a central dispatch centre. Some of the vehicles were donated by the local and international organizations (including the International Medical Corps) and individual philanthropists.

NAS has received technical assistance from the Stanford Emergency Medicine International (in the USA) and Patan Academy of Health Sciences (in Nepal). With their support, NAS was able to design and organize EMT training courses. Similarly, NAS has received support from Regio 144 (in Switzerland) in enhancing the skills and quality running of the management and operational procedures.

Challenges Faced & Solutions Identified

The first area of challenge was *knowledge acquisition and implementation*. Like much of the world, NAS did not have C-19-specific protocol. The first stumbling block we encountered was evidence-based knowledge regarding the novel virus. Even the simple knowledge of what type of disinfectant to use became a huge issue. As we went about learning more about the virus, we focused on prioritizing the safety of our own staff, our equipment, and the passengers whom we would be transporting during the crisis.

The solution for this problem came about after attending various online meetings with the experts from Wuhan, discussing this issue in meetings with our government specialists, and getting long-distance expert opinions from various experts from all over the world who were working in this field. Following this, we developed a practical protocol for Nepal. We used this protocol for raising awareness among the staff, and repeatedly and continuously disseminated information through various mediums like classes, trainings, meetings, notices and virtual groups.

The second main area of challenge related to *personal protective equipment* (PPE). While we had the basic knowledge and skills of wearing of basic PPE like gowns, gloves, eye protection and boots, wearing the full PPE and doffing had never been part of our training programs in the past. We soon realized that a one-time training given by the Government to a few of the staff was neither effective nor properly understood. We needed to have every member of our staff trained and confident for the transferring of the patients, and at the same time, also maintain the safety of NAS staff.

By way of identifying a practical yet effective solution, we came up with a simple and easy-to-use 'check-list' that could be implemented in day-to-day life, and then trained and retrained the staff using this simple checklist. We also emphasized proper medical waste management. We also selected the more interested and skilled participants as instructors for the training of the other frontline field staff.

The third main area of challenge related to *logistics*. More specifically, the unavailability of PPE and other logistics hit our organization hard, a challenge also experience in much of the outside world. We identified a 'central supply and dispensing system,' and based on the number cases we had, we calculated the amount of PPE and disinfection that would be averagely required. Further, we asked the EMTs to fill out the requisition form and dispatched the materials from a central logistics supply room. The central supply was also replenished by the Ministry of Health and Population, external donor partners, and local concerned citizens. Similarly, we also needed to approach various organizations and people for food and other supplies as well, as we had to repeatedly contact various sources for all these materials. This issue was all the more challenging as NAS was carrying the C-19 cases free of cost. At times, NAS had to purchase some of the supplies that were either not adequate or not available from the philanthropists.

The fourth and final area of concern related to *stigma* associated with being the frontline health workers during the pandemic. Many staff were not allowed into their rented apartments, and sometimes were also not allowed to enter the locality that they were living in. The stigma-related avoidance and being practically thrown out of one's own apartment was stress to say the least that also affected the functioning and morale of the other NAS staff. This warranted time and efforts of the NAS officials to make sure that the staff remained supportive of each other and stand together. Further, with the support and intervention of the local government, NAS was able to accommodate some of the displaced staff and also find space for keeping all of the C-19 designated ambulances. All the EMTs and ambulance pilots (drivers) were stationed there so as not to have the problem of facing their landlords or the locals. Food and all other necessary materials were provided by NAS logistic coordinator. For some time, lunch was donated by various restaurants and organizations who had lent a helping hand for the initial phase of lockdown.

Conclusion

Based on NAS engagement during the ongoing C-19 crisis, national and international collaboration and assistance in the area of gathering evidence-informed and evidence-based experience have proven to be critical and catalytic. At the same time, our experience also makes it clear that the development of knowledge and skills warrants contextualization and adaptation. This process is important to ensure that the application of a particular intervention is effective and efficient. Our experience also shows that social stigma, induced largely by fear and anxiety, can and does happen to medical technicians and personnel. Management needs to be prepared to deal with this potential threat so that the services continue functioning smoothly.

Dr. Kulesh B. Thapa is Medical Director, Nepal Ambulance Service, Kathmandu.

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8.3 Exchange of Knowledge and Skills in Nursing Practice

Abstract 3-01 -Maintaining Nursing Competence: A Roadmap to Enhanced Patient Safety

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Professional competency is a fundamental concept in nursing with a direct relationship with quality improvement of patient care. Competency is the application of knowledge and the interpersonal, decision-making, and psychomotor skills expected for nurses within the context of public health, welfare, and safety. The American Nurses Association defines competency as an expected and measurable level of nursing performance that integrates knowledge, skills, abilities, and judgment, based on established scientific knowledge and expectations for nursing practice. Nursing competency has been extensively addressed in the literature in terms of safety and quality of nursing care worldwide. Competency leads to improved quality of patient care and increased patient satisfaction, helps promote nursing as a profession, and improves nursing education and clinical practice.

Due to increasing prevalence of medical incidents around the world—and within Nepal—the government, media, and the public have become concerned about the quality of clinical care and have focused their attentions on clinicians' competency. This exerts pressure on professionals—including nurses—to demonstrate that they are clinically competent to perform their professional duties. In light of this, lack of attention to professional competency in nurses can cause problems for organizations and raise questions about nurses' effectiveness as members of a prominent profession. Further, nurses' low competency may lead to undesirable consequences, including nurses' job dissatisfaction, attrition, and poor patient outcomes. Nurses' job dissatisfaction ultimately decreases their dedication to care, increases errors, thereby compromising patient safety.

Nonetheless, continuing professional competence encourages nurses to demonstrate new knowledge and skills to safely apply sound nursing principles in practice. It also assumes a culture that holds nurses accountable for lifelong learning and supports focused improvements in nursing practice. As a means to safeguard patient safety, in many countries, continuing nursing education (CNE) activities are increasingly becoming a requisite for nurses to maintain licensure. Lately, globalization, technological advancement, shifting disease patterns, ever-changing population demographics, high consumerism and increasing public awareness about diseases, have challenged the healthcare arena to ensure relevant services are provided. Moreover, considering

that nurses are the largest group of health care professionals, they are required to participate in CNE to develop skills and competencies, and to remain current in their practice to meet a rigorous professional mandate. The ICN Code of Ethics for Nurses advocated that nurses carry personal responsibility and accountability for nursing practice, therefore for maintaining competence by continual learning.

At the backdrop of multitude of problems facing Nepali nursing profession today—sub-optimal education, low wage compensation, limited career opportunities, limited on the job educational opportunities, unfavorable working conditions, lack of social and/or retirement benefits, and unstable socio-political environments—nurses are forced to leave the profession, migrate to more developed countries or to provide low quality patient care. Therefore, the objective of this presentation is to highlight the following:

1. Challenges of nursing profession in Nepal.
2. Policy level strategies for ensuring nurses' professional competence for enhanced patient safety.
3. Key recommendations for requiring proof of continuing education at the time of re-licensure.
4. Logistics of mandating CNE for individual nurses, healthcare agencies and regulating bodies.

Keywords: Professional competence, patient safety, continuing nursing education

Abstract 3-02 -Effective Communication in Nursing Practice

Manju Sangraula and Ramesh Subba

Communication can be defined as a transaction and creation of a message in which physical space, cultural and social values, and psychological conditions can play an important role. Communication by nurses with their patients is an important aspect of overall health care in every healthcare setting. Nurses are one of the most frequent healthcare professionals who are in close contact with their patients in hospitals and other healthcare settings. Nurses are also the bridge to connect doctors and other health professionals with individual patients.

Nurses are the professionals who are the first responders of any patients in the hospitals and healthcare settings. Their communication with the patients can be expected to create an environment of confidence and a hope inside patients' feelings. When individual patients have some level of confidence with the health professionals and healthcare settings, other steps of treatment can be smooth. Effective communication between nurse and patient is essential for successful outcome of patients. Nurses should demonstrate their courtesy, kindness and sincerity while communicating and serving their patients. Nurses should show a holistic approach of communication that can help build confidence in the patients and their visitors. Good communication can show not only an ability of nursing care but also build up a confidence of the patients.

We can visualize many benefits of effective communication such as an immediate understanding of a patient's condition and needs, understanding the emotional state of patients, understanding the social determinants of health, tracking changes in care, and identifying specialized needs. When a nurse can understand those elements of individual patients, the nurse is an advocate for the patients. We can compare effective communication cross-culturally to better learn from a range of nursing practices.

Experience in USA: When a nurse meets the patient for the first time, she/he should build good rapport so that the patient can experience a therapeutic relationship. A nurse is expected to give a brief introduction of herself and show courtesy and kindness towards the patient. Confidentiality, including privacy of the patients, is important to build a good relationship. It is most important how the message is delivered to the patient. Frankness and honesty are important behavior during conversation with the patients so that the patients do not feel suspicions, doubts and misunderstandings. The communication by the nurse should be soothing and therapeutic since the patients have come to the hospital to seek help. Patients may be emotional, stressed out, angered, and irritated but the nurse should be non-judgmental, and use motivational interviewing skills. The nurse should deal with the psychosocial environment and should be a good listener when the patients talk about their culture, values, traditions and other aspects of social understanding.

Experience from Nepal: Nursesface many challenges in Nepal, especially since there are more than 100 social and ethnic groups in the country who all may have different viewpoints and access towards healthcare. Given the resources and available manpower of nursing in Nepal, it is more important to strengthen communication skills so that the patients can feel hopeful and cared by good hands. Well-equipped nurses with knowledge, practice and attitude are important aspects for a trustworthy working environment. Diverse culture, traditions, values and beliefs are within every human being and nurses should be ready to handle those factors with their holistic approach of nursing practice.

Keywords: Effective communication, patients, motivational interviewing, psychosocial, nursing.

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Abstract 3-03 -Protecting Nurses during COVID-19 Pandemic

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World Health Organization (WHO) has titled the year 2020 as the year of nurses and midwives with the theme “Nurses: a voice to lead, Nursing the world to heath”. Coincidently, since the beginning of the year, the world has been facing an immense challenge in health care service with new Corona Virus Disease (COVID 19), which is declared as a pandemic by WHO. With nearly 20 million in numbers, nurses cover more than half the share of the entire health workforce worldwide (Debra Jackson, 2020) . As frontline workers, nurses have been involved in pandemic management with versatile roles from case management and contact tracing in the community, swab collection to direct involvement in treating the patients.

While nurses have received high attention by the public for what they have been offering in a worldwide crisis, they have endangered themselves by getting exposed to such virulent disease; some even have lost their lives because of the inaccessibility of appropriate personnel protective equipment (Catton, 2020). To work in such an unprecedented illness with no definite epidemiological information, nurses need courageous moral support, specific guidelines, and resilience to work on the front lines (Turale, 2020). Most of the time, nurses are obligated to focus on their professional values and ethics in the pandemic despite personal and family needs who work often being separated from their loved ones. (Turale, 2020). Like everybody else, it is not uncommon for nurse fellows to get horrified of the indefinite future of their family members as they may take the virus to their loved ones, their colleagues, and of course of their patients (Debra Jackson, 2020).

The versatility of nursing scope of practice leads nurses to provide care to the public in various platforms, including community, outpatients as well as acute care settings, which puts them at the risk of acquiring the virus during COVID 19 outbreak. This will critically affect the health care system, which is already strained by a shortage of nursing resources. The more the infected population, the more the demand of nurses. Therefore, the health care service would be significantly challenged if nurses are left unsupported for their safety and well being. It is very crucial to safeguard this essential workforce with clear infection control protocols and adequate and personal protective equipment consistently in the clinical setting (Choi, 2020). With appropriate support, nurses will play a pivotal role in ending the COVID 19 pandemic.

In this paper, we will describe in detail how nurses/health care workers can remain healthy and be prevented from contracting the disease COVID 19 at an individual level, institutional level and national level.

Keywords: Nurses, Infection control, responsibility, protection

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Abstract 3-04 -Shaping Scope of Practice to enhance Professional Autonomy in Nursing

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With the increased effects of globalization, a lot of Nepalese nurses are working in different countries in the world, most dominantly in four English speaking countries; USA, UK, Australia and Canada. As an autonomous profession, they are licensed and follow the guidelines and code of conducts of the regulatory body of the jurisdiction they are licensed, in their practice.

The overall objective of this report is to find out the factors that are important for professional autonomy in nursing from the context of different countries and sharing/transferring the learned nursing knowledge, attitudes and practice to enhance developing policy, protocol and guidelines; enhance autonomy in nursing practice.

Nursing is an autonomous profession in which the individual assumes sole responsibility and accountability of how they act within the scope of practice. Four major scopes of nursing practice identified as: clinical practice, administration, education and research [1, 2]. Professional autonomy means having the authority to make decisions and the freedom to act in accordance with one's professional knowledge outlined by scope of practice[3, 4].

Nurses should use standardized languages in everyday practices as it reflects a mastery over their own work thus contributes autonomy[5]. The development of professionalism in nursing is an ongoing process; based on multi-dimensional concept; cognitive, attitudinal and psychomotor skills[6].

Recognizing vital role Nurses and midwives play in providing health services, World Health Assembly has designated 2020 the International Year of the Nurse and the Midwife. According to

State of the World's Nursing Report – 2020, nurses constitutes >3/4 (76.8%) of health care workers in Nepal[7].

Nepal Nursing Council code of ethics has outlined 4 basic principles for nurses and midwifes[8]. At the same time nurses were expected to follow physician orders which negatively impacted their nursing practice and the quality of care[9].

Nursing is the largest health profession in North America (87%) in direct care in different settings[10, 11]. As of Jan 2020, the nursing profession is recognised as the most honest and trusted profession in America for the 18th year in a row[12].

Nurses' role in primary care has recently received substantial scrutiny, appropriately trained nurse practitioners can produce as high-quality care as primary care doctors and achieve as good health outcomes for patients[13].

A presentation will be done focussed on regulatory bodies and if they have practice guideline compatible with nurses learning and countries' law they've been practising, the problems and examples from countries doing better on that and could be applied to problematic countries.

*Key words***: S***cope of Nursing. Nursing practice, profession, autonomy, professional autonomy*.

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8.4 Entrepreneurship Development in Agriculture and Allied Sector

Abstract 4-01 - Bilateral AgriFood and associated trading between Canada and Nepal

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Canada and Nepal enjoy mutual business between two countries. Most of Nepalese products imported in Canada are duty free but Nepal levies Canadian products as third countries products tariffs. The direct business between two countries is around 170 million (90 percent Canadian export and 10 percent Nepalese import) per year (StatCan, 2019). Moreover, we have assumed there is at least two-fold re-export of Canadian products from Singapore, India and Dubai. The business is mainly in three sectors AgriFood, Machinery and Aviation from Canada. From Nepal Botanicals, AgriFood, Tea and garments are major imports.

Recently there is systematic effort taking place to enhance business relationship through Embassy of Nepal Canada, Canadian High Commissions, New Delhi, India, institution link between business to business. In direct investment in Nepal AgriFood, food processing, energy and infrastructure are preferred area. Nepal can supply bounty of its pristine biological and herbal natural products to Canada. In this paper, we will discuss the opportunities (Market, freight, banking, products) and challenges (Shipping, quality control and standards) of bilateral relationship between Canada and Nepal with broader implications on global trade in AgriFood.

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Abstract 4-02 - NAPA First Book- Principles and Practices of Food Security: Sustainable, Sufficient and Safe Food for Healthy Living in Nepal

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Association of Nepalese Agricultural Professionals in Americas (NAPA)

The sustainability, sufficiency, safety, and affordability of healthy foods, rights to access them, and making choices for healthy eating are essential aspects of food security in the 21st century, constituting the critical components of a complex food system in Nepal. Underpinning these principles, the Association of Nepalese Agricultural Professionals of Americas (NAPA) has published its first book, **Principles and Practices of Food Security: Sustainable, Sufficient and Safe Food for Healthy Living in Nepal**. The 424-page book, launched on August 1, 2020, contains eighteen chapters, including one comprehensive introductory chapter that sets the stage for the scope of this book. The remaining 17 chapters are divided into four broad sections: i) general and socio-economic issues of food security; ii) sustainable agricultural production for food security; iii) food safety regulations, healthy eating, and climate change impacts; and iv) technologies of specialty. Book chapters have been written by 49 authors and co-authors, who are working for numerous years in areas relevant to food security across the globe. The book is expected to be an excellent resource for everyone with some stake in agricultural and allied disciplines. It is also expected to serve as a food-security compendium for planners, policymakers, decision-makers, implementers, and field-level professionals engaged in governmental, non-governmental, and private-sector organizations. Moreover, farmers; private industries engaged in agricultural and allied sciences; food industries, retailers, and suppliers; faculty and students of food security, food systems, and allied disciplines; and civic leaders, intellectuals, and the society at large will be tremendously benefitted from this book. Further details about the book can be obtained from NAPA's website (http://napaamericas.org/foodsecuritybook.php).

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Abstract 4-03 - IoT Enabled Smart Village as a Means of Re-tooling Nepal Towards Society 5.0

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For the last few years, smart city concept has received a special attention and became most popular among elected officials, city planners and policy makers around the globe, especially in the least and/or under-developed nations. It is considered as an effective way to enhance the quality of life and achieve sustainable economic development of the urban population. Smart city

concept has become the most dominated agenda in many national pride projects around the world including in the United States, European Union, Japan, India and Nepal. However, very little attention is given to enhance the development of villages and improve the quality of life of their residents through preservation of local knowledge with innovative technologies. In this study, we focused our research in order to address various social challenges, and enhance the quality of life and economic development of remote villages by using internet of things (IoT) enabled solution that synergizes the modern technology with local knowledge. We named this strategy a smart village solution, a means of Re-tooling Nepal towards the Society 5.0, a concept originally envisioned in Japan. This approach integrates traditional values and local knowledge that villages have been practicing centuries with the cutting-edge technologies. For instance, we introduced *Amako Jato*, a tool developed in our previous research in which IoT and AI (Artificial Intelligence) are used to enhance efficiency of traditional stone grinder in a remote village of Nepal. In this paper, we re-defined the vision and concept of Society 5.0 in terms of Nepalese socio-economic context. In this paper, we devised a conceptual framework in order to optimize the available finite local resources that can enhance and materialize the concept of Society 5.0, especially targeting remote villages in order to establish a smart village in Nepal. The IoT enabled traditional local knowledge-based tools play an important role to enhance economic activities and improve livelihoods of local communities. We believed the success of the smart village model relies on its potential to enhance economic development and improve the livelihoods of those who reside in the villages. We deduced a hypothesis that by applying such a smart village concept, we can address some of the important contemporary issues and challenges, such as migration, unemployment, shortage of labor, land degradation, and many other social issues and challenges faced by the majority of remote villages in Nepal.

Keywords: IoT, Artificial Intelligence, Smart Village, Stone Grinder, Aamako Jato

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Abstract 4-04 - Cannabis as an Economic crop: Prospect and Possible Use in Nepalese Context

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Human consumption of cannabis in various forms for medical and recreational purposes can be traced back to before-the-common era. During this time, human selection of specific cannabis strain has greatly altered the characteristics of the plant. Despite the long history of domestication and selective breeding, the evolutionary aspects and underlying genetics has not been adequately understood. Due to increased legalization of cannabis in western countries including several states in the USA, the plant has attracted researchers and industrialists. Studies on the medicinal values of cannabinoids, terpenoids and other secondary metabolites in the cannabis plant may yield great utility to human society.

The review of the history, science, medicinal uses, and socio-economic aspects of cannabis plant provided the insight into its relationship with human since the beginning of civilization. In context of Nepal, the plant has got a long religious, medicinal and recreational relation with the society. Cannabis was one of the major sources of revenue collection for the government of Nepal before its illegalization in 1983. The plant was a very reliable income source for Nepalese farmers in the hills and plains of Nepal. With the illegalization of the plant, Nepal had to face decrease in national economy which left many Nepalese in poverty.

With the global focus on the cannabis plant, and Nepal's desire for exponential growth in the economy, Cannabis plants should be considered for the re-legalization. Saying that, there is a lot of assessments required to be done before the legalization. Testing laboratories, scientific manpower, regulated market, and public awareness are some of the challenges that needs to be addressed. If legalized and regulated, Cannabis plant can boost the Nepalese economy and bring back the prosperity to Nepalese people.

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Abstract 4-05 - Accessing the Himalayan Herbs Traded in the Streets of Itahari by Sherpa community of Taplejung, Nepal

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Sherpa community are the oldest ethnic groups of Himalayas and chiefly known for their ability to climb mountains and their knowledge on medicinal plants found in the high Himalayas. The main objective of this study was to document the medicinal plants available for trade-in Itahari. The study reported 40 species of medicinal plants belonging to 34 families from an interview with twelve herbal traders. The habit of the medicinal plant recorded were herbs (53%), trees (20%), shrubs (13%), vines (8%), fungus (5%), and lichen (3%). Herbal medicines were mostly found for curing minor diseases like cuts, wounds to major diseases like jaundice, typhoid, and also cancer. The knowledge of ethnomedicinal plants has been preserved from ancestors to ancestors, is still in existence and are also spreading towards their younger generations. Furthermore, more researches should be done to access the medicinal plants traded across the country and also their conservation strategy followed by the ethnic community during the collection of medicinal plants.

Keywords: Cross-cultural Traditions; Ethnomedicinal Plants; Lichen; Sherpa; Zimbu.

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Abstract 4-06 - Climatic Variables affecting the Scientific forest management in Nepal

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Sustainable scientific forest management requires the knowledge of climatic variables such as temperature, CO_2 concentration, and rainfall patters (hereinafter referred to as TCR) how these factors impact on plant growth and overall gross primary production (GPP) and net primary production (NPP). The government of Nepal aims to develop scientific forest management (SciFM) as one of the signature programs to end the fiasco of annually importing $91 million US Dollar (USD) equivalent timer products while a large volume of timber has been decaying in different forests of Nepal. This paper presents some theoretical debates how SciFM is possible with the observations of TCR, and how Nepal can maximize the forestry products by utilizing the knowledge of TCR.

Elevated temperature: Although different plant species respond to temperature differently, at least 5^0 C (41^0 F temperature is needed for any plant to remain photosynthetically stable. It generally remains optimal between 20^0 and 35^0 C. An increase in temperature has substantial effects on photosynthesis, respiration, soil nutrients, and plant physiological activities. *Ceteris paribus*, when water is available, the increase in temperature will have a positive impact on plant growth and development, especially, in low temperature regions. As the temperature rises, photosynthesis will initially be positive, but will slow down as the temperature reaches an optimum level. If the temperature increases too high, the rate of respiration may exceed the rate of photosynthesis, making the process of carbon assimilation negative. An increase in temperature beyond the tolerance limit will decrease the gross GPP and NPP. In such instances, plants may eventually die, and those dead plants become a source for CO_2 instead of remaining as a sink for CO_2, which then contributes to more greenhouse gas (GHG) emissions in the atmosphere. Similarly, if the level of CO_2 concentration increases on plants, a decrease in temperature between the ranges of 10^0 – 14^0 C will make NPP negative. This is the right time to harvest trees to minimize NPP.

Elevated CO_2: As CO_2 level increases, plant productivity increases, but responses vary based on plant species and age. When the amount of CO_2 increases, plants efficiently consume the available nutrients and water, and the rate of photosynthesis increases. That means trees growing in a site with poor site quality consume less CO_2 because of the lack of nutrients. This results into a lower GPP. Elevated CO_2 may increase the rates of photosynthesis leading to the increase in biomass, but this increase will be higher only in the C_3 plants, if other factors are non-limiting. About 85 percent of plant species come under the C_3 category. Doubling the amount of CO_2 at the optimum temperature level in a terrestrial ecosystem will increase the NPP by 16.3 percent. The existing literature reveals, *ceteris paribus*, biomass will increase with the rise in CO_2 levels above normal. However, in low temperature regions (e.g., temperate and alpine), the biochemical cycle becomes slow and the effects of CO_2 uptake becomes minimal, or nonexistent, even if the CO_2 is elevated beyond the normal level due to the lack of nitrogen in the soil. Thus, an increase in CO_2 does not necessarily mean more plant production in low temperature regions, as growth will be constrained from the lack of soil mineral nutrients. This is right condition to extract trees from the temperate region, if trees are at the maturation age.

Rainfall: Soil moisture is essential for plant productivity, whereas dry soil and erratic rainfall patterns are not conductive to their productivity. Since the late 1990s, the monsoon in Nepal has become more intense for a short time period with the occurrences of prolonged dry periods. Also, since the late 1990s, the monsoon started arriving in Nepal two weeks later than usual and often, intense rainfall began occurring toward the middle of October when the temperature started subsiding—which is typically not enough for the growth of some tropical C_3 plants. This variation in rainfall patterns has affected the phenology of different vegetation. Intense rainfall for a shorter period and a lack of soil moisture contents for a longer period results in a reduction of water uptake by plants and restricts nutrient absorption. The NPP declines due to widespread droughts. This also decreases in GPP with the decrease in above ground carbon biomass per hectare with a decrease of 100-millimeters of water. If trees are at the harvestable age, this time is perfect to harvest tree crops.

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8.5 Innovation, Entrepreneurship, and Technology and Knowledge Sharing

Abstract 5-01 - नेपालको संवृद्धिका लागि एरोमेटिक र मेडिसिनल मूल्यका रैथाने वनस्पति र जीवाणुको उधमिकरण

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एक अध्ययन अनुसार संसारका १५ हजार जातिका वनस्पतिमध्ये ३ हजार ७ सय एरोमेटिक र मेडिसिनल मूल्य बोकेका छन्। नेपालका रैथाने सात हजार वनस्पतिमा १ हजार ५ सय त्यस्ता वनस्पति भेटिएका छन् र १ सय ४५ भन्दा बढी औषधीय उपजको त सक्रिय कारोबार नै छ।

हालसम्म नेपालका वनस्पतिको अध्ययन आयुर्वेदिक महत्वलाई ध्यानमा राखी गरिएको छ। ती वनस्पति अन्यत्र खाध्य, हिलिङ्ग फुड, हर्बल सप्लिमेन्ट, औषधि, सुगन्ध, अत्तर, सौदर्य सामग्री, सिजनिङ, सेनिटरी क्लिनर, जैविक विषादी आदिमा धेरै मुनाफा लिने गरी व्यापारिक भइरहेका छन्।

मेटेरिया मेडिका अफ आयुर्वेदाले भनेको छ, संस्कृतमा त्यस्तो कुनै एक अक्षर छैन, जुन मन्त्र नहोस्, यो पृथ्वीमा त्यस्तो कुनै जरा छैन, जसको कि खाना कि औषधि न वनोस। विभिन्न अनुशन्धान बाट नेपालका रैथाने लगभग सात हजार मेडिसिनल र एरोमेटिक प्लान्टका विभिन्न औषधि, खाध्य, खाध्य सप्लिमेन्ट, सौदर्य सामग्री, उपचारका पदार्थ, प्राङ्गगरिक मल, जैविक किटनास औषधि, न्यानो टेक्नोलोजीका कोटिंग, विभिन्न उपकरणका कच्चा पदार्थ, लुब्रिकेन्ट, इन्धन, तेल, कपडा, कागज आदि बनाउने कच्चा पदार्थको रुपमा उपयोगमा आउने देखिएको छ। त्यो

मध्ये सिमित एरोमेटिक र मेडिसिनल मुल्य बोकेका नेपाली रैथाने वनस्पति र जीवाणु आज नेपाल जुन अबस्थामा उत्पादनमा छन् त्यहि अबस्थामा मुनाफा हुने गरि सदुपयोग गरेर हाल मुलुक भित्र भैरहेको आयात प्रतिष्थापन गर्न सकिने अबस्थाका छन।

प्रस्तावित योजनालाई उद्देश्य मुलुक बनाउन खाद्य, औषधि, आयुर्वेद, जैविक मल, जैविक विषादी, कृषि र हर्बल उत्पादनको आयात प्रतिस्थापन गर्ने नीति लिन एक तर्फ जरुरत छ भने अर्को तर्फ मुलुक भित्र व्यवहारिक उद्यमशील तालिम र पाठ्यक्रम प्याकेज विकास गर्ने, स्टार्ट द स्टार्टअपको लागि हर्बल र आयुर्वेद डिसरप्टिब इनोभेसन लेबरोटरिज स्थापना गर्ने, सीपमूलक तालिम र बजारमुखी उद्यमशीलताको विकासमा जोड्दिने, पब्लिक रिसर्च इन्स्टिच्युट, ल्याबरोटरिज, टेक्नोलोजी ट्रान्सफर अफिसेज र इन्क्युबेटर्स हरू सँग उपयुक्त नेटवर्क र को–क्रिएसन बिल्डिङ ब्रिजेज विकास गर्ने तथा कृषि र हर्बल बस्तु तथा सेवाको अन्तर्राष्ट्रिय गुणस्तरको मापदण्डको प्रमाणित गर्ने सहयोग पुराउने बहुआयमिक कार्यहरू एकै साथ सञ्चालन गर्नु जरुरी देखिन्छ। जसमा सबैभन्दा महत्त्व पूर्ण स्थानीय स्तरमा रहेका प्राविधिक तथा सीपमूलक तालिम केन्द्र हरुमा नेपालमै उपलब्ध रैथाने उत्पादनलाई व्यवसायीकरण गर्न सक्षम तालिम प्याकेजहरू उपलब्ध हुनु जरुरी देखिएको छ।

हाल कुल आयात ९७% र निर्यात ३% रहेको नेपालमा, हाल नेपालमा रहेको उत्पादन र प्रसोधन प्रबिधि र प्रबासी नेपालीको रुपमा हामीले क्यानाडामा सिकेको प्रबिधि र सिपको मिलान बाट नेपालको कम्तिमा निर्यात हुदै गरेको २५ हाराहारीका उत्पादन वाट नेपालमै उधम्शिलाता विकास गरि आयात घटाउन सकिने हाम्रो पुनारबलोकनको प्रारंभिक अनुमान छ।

हालको “मेकइन नेपाल” मोडलको उधोगको स्थापनाबाट एक व्यक्तिले मात्र १० लाखको लगानीमा बढीमा ३ जनालाइ रोजगारी दिने अवस्थालाई प्रस्तावित प्रबिधि तथा सिपको आदान प्रदान र सह-उत्पादन मोडलको “मेड-इन नेपाल” मोडलमा प्रति स्वोरोजगार प्रति १० लाख लगानीमा ७ जनालाइ रोजगारी सिर्जना गर्ने अनुमान गरिएको छ।

मुलुकको आयात प्रतिस्थापन गर्ने, स्थानीय रोजगारीको अबस्थामा सुधार गर्ने र मुलुकभित्र इनोभेसन कल्चर स्थापना गर्न सहयोग पुग्ने देखिएकोले यो कार्य पत्र प्रस्तुतिको लागि अनुरोध सहित पेश गरेको छ।

हालको नेपाल सरकारको मौजुदा कार्यकालको नीति तथा कार्यक्रम र बजेट मार्फत कोभिड-१९ को महामारीका कारण नेपालमा एकातर्फ स्वदेशमै रोजगारीको अभाव हुन गएको र अर्कोतर्फ विदेशमा गएका उल्लेख्य नेपाली फर्किने क्रम जारी रहेकाले मुलुक भित्र देखिएको बेरोजगारीको चुनौतीलाई लक्षित गर्दै गुमेको रोजगारी पुनरुत्थान, नयाँ रोजगारी सिर्जना तथा स्वरोजगार बनाउनका लागि कृषि, बन, हर्बल आदिमा उद्यमशीलताको अवसरको अधिकतम उपयोग गर्न विदेशमा रहेर उक्त क्षेत्रमा कार्यरत विज्ञ तथा वैज्ञानिक हरूसँग समेत आफूले सिकेको ज्ञान, सीप र अनुभव आदानप्रदान गर्न औपचारिक प्रस्ताव गरिएको सन्दर्भमा यो कार्यपत्र समय सान्दर्भिक हुने यो कार्यपत्रको यकिन छ।

Keywords: संवृद्धि, इनोभेसन, एरोमेटिक र मेडिसिनल , रैथाने वनस्पति, सीप मूलक तालिम।

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Abstract 5-02 - Hygrothermal performance of hempcrete for Ontario (Canada) buildings

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As the world continues to focus on conservation and clean energy systems, new technologies for construction are of the prime interest. Materials and systems are needed that contain energy, better manage humidity, reduce or eliminate off-gassing that threatens indoor air quality, and do not create a negative landfill burden at the end of their useful life. Hempcrete, a concrete like material, offers advantages in these areas.

Hempcrete is a bio-aggregate based composite material, which typically consists of hemp shiv (hurd), lime binder and water. It has several distinct advantages including low thermal conductivity, effective moisture buffering, and high sound absorption, while offering a high carbon sequestration index. It has a thermal conductivity rating that is significantly more than an equivalent brick/concrete structure, has a lower carbon footprint, reduced embodied energy rating, and is less expensive to recycle.

A recent study was undertaken to investigate the impact of mix proportions on hempcrete properties and the hygrothermal performance of two proposed hempcrete wall assemblies (face-sealed walls and walls cladded with a vented rain screen system) for the climatic conditions in Ontario, Canada. The research methodology was comprised of three key components: literature review, laboratory testing and analysis, and hygrothermal analysis of wall types through WUFI modeling. To test the impact on the properties of hempcrete of increasing the lime binder, three types of mixes were studied with a hemp-to-binder ratio of: 1:1, 1:1.5 and 1:2 respectively, using locally grown Canadian hemp. The experimental results highlighted the significant influence of the binder on the density and thermal conductivity of the final material. Thermal conductivity measurements of hempcrete ranged from 0.074 to 0.103 W/mK. Finally, hygrothermal (WUFI) analysis demonstrated that when using hempcrete in the Canadian climate, a rain screen wall system is more suitable than a mass wall.

Keywords: Hemp, Lime binder, Hygrothermal performance, Water content, Rainscreen wall

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Abstract 5-03 - Development of diagnostic kits for different diseases including COVID-19

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Every year many people including infants and children die due to the lack of proper diagnosis of the virus-borne diseases in Nepal, particularly in the far-western region where access to the

hospital and medicine is very limited. Dengue fever outbreak is one of the examples and risk of Dengue is typically present throughout the country.

Moreover, the recent coronavirus disease 2019 (COVID-19) outbreak from the Chinese City Wuhan has led to the global pandemic and the recent rise of COVID-19 cases in Nepal is increasingly alarming. The COVID-19 transmits human to human very rapidly and there is no medicine and vaccine for this disease as of now. Adequate testing capacity for COVID-19 is lacking worldwide. Real-time quantitative Reverse Transcription Polymerase Chain Reaction (real time qRT-PCR) is the only available diagnostic test for COVID-19. Many biotech companies around the world are developing immunoassays (manual ELISA, machine-based or lateral flow) rapid tests specific for COVID-19.

In case of Nepal, healthcare infrastructure and testing capacity have emerged as major issues. The best way to tackle such pandemic situation is to have the production of diagnostic kits in Nepal.

Shikhar Biotech pvt. Ltd., as being the pioneer antibody producing Biotechnology Company in Nepal has special expertise and facilities in antibody production and validation. We have been trying to develop different diagnostic kits like Keratinine testing kit, measles testing kit and dengue testing kit. At the meantime, we realized that it's our responsibility to utilize our resources, expertise and facilities to develop diagnostic tools for COVID-19 in order to contribute to the Nepali health care system during this crisis time. To this end, we aim to develop diagnostic ELISA kit, and rapid diagnostic test (RDT) kit based on the detection of both SARS-COV2 virus antigen and antibody against it. As of now, we are in the final stage of validation of the kits. If we succeed, we believe that, antigen based RDT kit will complement the RT-PCR test and serologic assays will be important for surveillance, contact tracing, identifying the viral reservoir and epidemiological studies.

Keywords: Diagnostic, COVID-19, Antibody, ELISA, Dengue

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Abstract 5-04 - Zero To Million : How to scale digital solutions for Nepali Market

Shankar Uprety
CEO, Hamro Patro

Nepal is a young country with a median age of 24.4 and people are adopting technology at an exciting pace. All Nepali now have access to telephone and more than 65% of them have internet access and this number will continue to increase. This adaptation has created a huge addressable market for digital solutions in Nepal. However, only a few Nepali startups have been able to capitalize the market. In this presentation, I will present how we built Hamro Patro that scaled from zero to six million users. We will also discuss how to build, manage, and improve digital solutions specially tailored for Nepali market.

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8.6 Engineering, Infrastructure Development, and Public Safety

Abstract 6-01 - Transport Infrastructure Development for Prosperous Nepal: Status, Issues and Challenges

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Government of Nepal

The Economic Importance of Transportation Development is related at improving the welfare of a society through appropriate social, political and economic conditions. The expected outcomes are quantitative and qualitative improvements in human capital as well as physical capital such infrastructures.

Because of its intensive use of infrastructures, the transport sector is an important component of the economy and a common tool used for development. This is even more so in a global economy where economic opportunities have been increasingly related to the mobility of people, goods and information. A relation between the quantity and quality of transport infrastructure and the level of economic development is apparent. High density transport infrastructure and highly connected networks are commonly associated with high levels of development.

Nepal is a landlocked country overwhelmingly depends on the roads for the transportation of cargo and passengers in the absence of rail, sea or inland waterways. The length of road network has tripled in the past 10 years, with most of the increase taking place in the rural road network. With the strategic network at nearly 13,000km (and another 2,000km under construction or planned) and the rural network considered to be approximately 60,000 km in size, the road density is around 48km per 100 square kilometers.

Nepal has been able to expedite its infrastructure development in the last two decades. This has made it possible that all the district headquarters would be road linked within next two years. Infrastructure including Road transport is seen as a vital tool towards poverty reduction. People have shown their keen interest towards infrastructure development in their areas. Transport infrastructures should be reliable and all-weather to get benefit from it.

Although there is a remarkable progress in expansion of road network in Nepal but to upgrading and making the created road assets sustainable are seems still a challenge to the different levels of governments. Since the basic accessibility target has been almost met, the emphasis has changed from one of providing basic access and connectivity to the provision of improved and upgraded levels of service. The focus is now on efficiency, reliability and safety as well as ensuring that the strategic network is maintained to appropriate standards in the most cost-effective manner. Therefore, the DoR should focus on the strategic elements of the road system to ensure an adequate and improving network to meet the fundamental economic needs of the nation. The primary issues of accessibility and connectivity have to large extent been resolved and the emphasis is now on improving the reliability, efficiency and safety of the network.

Similarly, other mode of transports railways and waterways are still in primitive stage which demands a huge investment. There is still a gap of investment in transport infrastructure development sector to achieve the national goal of “Happy Nepali, Prosperous Nepal” through the overall development of the country.

The donor support towards infrastructure development is increasing over the last few decades which have been instrumental to shape the road network of Nepal to present status. Rapid progress of China and India, the two big neighbours could benefit Nepal from their development. The opportunity for infrastructure development is, therefore, quite high in Nepal. It is high time for attracting Foreign Direct Investment (FDI) in transport infrastructure to upscale investment in this sector for the overall economic development and to achieve prosperity, the national commitment. Capacity building of government sector as well as both the consulting and construction industry is required in order to shoulder this responsibility.

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Abstract 6-02 - Public-Private Partnerships and Public Safety in Infrastructure Development

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Infrastructure development is one of the major aspects of economic and social growth of a region. In the past, development of public infrastructure has suffered due to traditional design-bid-build methods that consume excessive amount of time and money. Whereas, Public-Private Partnership (P3) methods involving both the government and the private sector have shown to be more efficient and are being used more frequently in recent projects. There are many types of P3 project delivery models, which are also known as Alternative Financing and Procurement (AFP). The effectiveness of P3s as a method of cost saving or innovation producing ventures should evaluate cost, rate of return, values for money, benefits, liabilities, etc.

The Design-Build-Finance-Maintenance (DBFM) model is one of the P3 project delivery models of infrastructure development that is combined in a single contract. The DBFM model was used in the Highway 407 East Phase 2 infrastructure development project which involved expanding the toll highway 407 by 22 km and connecting Highway 407 and Highway 401 with Highway 418 in the Greater Toronto Area (GTA) in Canada. The aim of this project was to enhance the growth of local communities by alleviating traffic congestion and increasing accessibility to goods and services through the expansion of Highway 407 from East GTA to West GTA. This project lasted from 2013 – 2019 and has a concession period of 30 years after completion of construction.

When it comes to the design and construction of infrastructures, public safety is paramount. Any engineering design that follows proper standards and codes should not compromise public safety. The designers must be able to provide sound judgment through engineering theories, principles, and practices. On the other hand, public safety also depends on the contractor’s workmanship. Public safety can be improved in construction projects when there are stringent

quality control and quality assurance processes in place. The owners of the project must have performance review systems established for both engineering design consultants and contractors.

Nepal's government and agencies should carefully choose the right P3 model depending on the type of infrastructure, risk, and the involvement of stakeholders. Investor-friendly policies and laws are key to create an environment to attract local and international investors in Nepal. Nepal and other developing countries should regularly revise the existing engineering standards, which are used by developed nations.

Keywords: DBFM, Infrastructure Development, Public Safety

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Abstract 6-03 - Hygrothermal performance of hempcrete for Ontario (Canada) buildings

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As the world continues to focus on conservation and clean energy systems, new technologies for construction are of the prime interest. Materials and systems are needed that contain energy better, manage humidity, reduce or eliminate off-gassing that threatens indoor air quality, and do not create a negative landfill burden at the end of their useful life. Hempcrete, a concrete like material, offers advantages in these areas.

Hempcrete is a bio-aggregate based composite material, which typically consists of hemp shiv (hurd), lime binder and water. It has several distinct advantages including low thermal conductivity, effective moisture buffering, and high sound absorption, while offering a high carbon sequestration index. It has a thermal conductivity rating that is significantly more than an equivalent brick/concrete structure, has a lower carbon footprint, reduced embodied energy rating, and is less expensive to recycle.

A recent study was undertaken to investigate the impact of mix proportions on hempcrete properties and the hygrothermal performance of two proposed hempcrete wall assemblies (face-sealed walls and walls cladded with a vented rain screen system) for the climatic conditions in

Ontario, Canada. The research methodology was comprised of three key components: literature review, laboratory testing and analysis, and hygrothermal analysis of wall types through WUFI modeling. To test the impact on the properties of hempcrete of increasing the lime binder, three types of mixes were studied with a hemp-to-binder ratio of: 1:1, 1:1.5 and 1:2 respectively, using locally grown Canadian hemp. The experimental results highlighted the significant influence of the binder on the density and thermal conductivity of the final material. Thermal conductivity measurements of hempcrete ranged from 0.074 to 0.103 W/mK. Finally, hygrothermal (WUFI) analysis demonstrated that when using hempcrete in the Canadian climate a rain screen wall system is more suitable than a mass wall.

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Abstract 6-04 - Achieving Energy Optimization through Real Time Operations Monitoring Tool

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Tarrant Regional Water District, Fort Worth, Texas

Tarrant Regional Water District (TRWD) supplies raw water to approximately 2.1 million people in 70 cities through 180 miles of pipeline varying from 72 to 114-inch pipe, 11 pump stations comprising54 vertical turbine and horizontal centrifugal pumps. TRWD is in the process of adding six more pump stations and 160 miles of 108-inch pipeline in collaboration with Dallas Water Utility through the project called Integrated Pipeline (IPL). The pumps vary in size from 1000 HP to 5500 HP pumps. In the fiscal year 2014 TRWD spent $29 million in pumping costs. Optimizing energy efficiency has become a core task at TRWD. To achieve this, the capability to perform real-time monitoring and long-term trending of each pump's performance has been developed. As a result, operators can more readily verify that pumps are operating within the Preferred Operating Range and adjust as conditions allow to achieve the best specific energy per pump train, striving to minimize the Kilowatt per Million gallon (KW/MG) used to pump the water.

To monitor the individual pump performance, TRWD implemented the installation of equipment from Robertson Technology employing the "thermodynamic method" (essentially pressure transducers and highly accurate temperature probes on the suction and discharge sides of the pump). Installed on all 22 of TRWD's horizontal centrifugal pumps, the technology provides Flow, Total Dynamic head, Pressure, Pump efficiency, and Wire to Water results based off the differential pressure and temperature coupled with power data. The district implemented the tool and created an excel based real time pump monitoring tool for the SCADA operators to monitor the pump performance. The operators are now equipped with a simple to use real-time tool able to assist them in adjusting pumping conditions and/or pump speeds using the SCADA decision support tool. The tool is dynamic, and the pump curve shifts automatically with the different VFD setting being read from SCADA by implementing the affinity pump laws.

The tool is also utilized for the condition assessment of the pumps to identify the pump in need of reconditioning. Instead of solely relying on the original factory test curve, TRWD is using the data to develop the actual pump curve with various valve settings (where throttling becomes

necessary) and provide the preferred operating region parameters to the operators. Conventionally, the Operators were using same valve setting for all the pumps operating in that particular pump station. In order to set the POR We tested each pump with different valve settings until we observe signs of cavitation. Overall Pump train Specific energy was calculated, and Energy loss across the throttling valve was also identified.

This paper will focus on TRWD's practices towards sustainability through Energy optimization at pump stations.

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Abstract 6-05 -Safety Focused Engineering and Infrastructure Development/Construction

Engineering principles are generally universal and tested. However, application of engineering principles, processes and methods should be scaled or tailored as per the requirements and also the size and complexity of projects and programs. Engineers, architects, designers, and technical practitioners are the professionals who plan, design, improve, analyze, build and test tools, equipments, systems, processes, structures, and materials to fulfill some functional objectives and requirements. The design and engineering should incorporate and mandate the minimum safety and quality criteria so that if followed properly the construction will be safe and sound. The professionals in Nepal should learn and continuously follow the international standards, industry standards, improved methods, technology (including software) and scaling as practiced in Americas or in developed nations to improve the safety and quality of work.

Infrastructure development means the construction of basic infrastructure (equipment, structure etc.) for improving quality of life, community development and economic growth. Americas have gone through periods of intensive infrastructure construction and now in a stage of refurbishment or replacement. China and India are already following the path of Americas in construction, and Nepal has to follow the same path i.e. Nepal needs invest in intensive infrastructure construction without further delay.

Nepal got a big potential and opportunity for a safe and sustainable infrastructure development in many sectors including hydropower, tourism related infrastructures, railways, airports, roads, bridges, buildings, communication related infrastructures, mining, etc.

The public safety is a big issue and a challenge in Nepal these days. The design, engineering, procurement, construction and commissioning should be done in such a way that it prevents and protects the public, workers and assets. Safety is always paramount, and it should be incorporated into the engineering stage and then followed through in construction. Project completion should include safety as one of the main criteria for acceptance and closure.

The improper design or engineering in the first place or not following the minimum norms and requirements of design and engineering into construction, haphazard and non-engineered

construction, inadequate funding or funding not used properly, unqualified contractors, poor monitoring and controlling mechanism, community's dissatisfaction, distrust and disinterest in the development work, work not completing in time and even those completed in time does not meet the expected quality standard, unnecessary red tapes, political interference in development work etc. are some of the key issues and challenges in Nepal.

Nepal government and agencies should encourage the public private partnership, private sector, international companies to invest and work in Nepal by simplifying the acts, regulations, plans and policies. Nepal should also find way immediately to benefit from the rising development and progress of giant neighboring countries China and India.

The Nepalese Diaspora in Americas who has such expertise will contribute in sharing the knowledge and experience to overcome those issues and challenges. NRNA and Nepalese Embassy can play a significant role to coordinate with the Nepal Government and agencies in this regard.

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Abstract 6-06 - HOW TO EAT A BIG CAKE: Journey towards Smart City

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Sanjeev Rai,
Senior GIS Developer, Jones and Carter, USA

Developed countries are in the process of shifting to a next-generation development model (NGDM) hugely based on enriched time-series data and technological advancement, most of the developing countries are still following the 1950s development model. Nepal could adopt smart planning, operation and investment approach to reach to the level of front liner countries in a short period. Smart cities need smart working culture and smart infrastructure. Smart infrastructures use the integration of IOT, cloud-based technology, GIS, advanced data analytics, integrated interactive platform, real-time data, deep learning, artificial intelligence, predictive/prescriptive analysis. Smart roads, smart streetlights, smart water distribution system, a real-time disaster warning system are some components of intelligent infrastructure. It allows planners to evaluate various alternatives based on the priorities and need of the region. To start the journey to become a smart city or smart nation, foundation should be built. Investment of every penny needs to align towards the goal of smart city. Nepali Diasporas have extensive working experience and firsthand knowledge in the "building process of smart city". The basic but smart tools / applications would help to build foundation of smart city. Nepali Diasporas bear the required skill to develop and maintain such tools and applications. The inclusion of tools like integrated planning tool, smart project prioritization applications, real-time project management and monitoring dashboard etc. would help cities to start their journey towards the smart cities.

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Abstract 6-07 - Household Water Treatment Technology Solutions for Marginalized Communities in Nepal

Dr. Betman Bhandari,

Nepal is rich in freshwater resources flowing from the Himalayas to the Indian plains; however, most rivers and streams are becoming dumping places for raw sewage and garbage. Water, Sanitation, and Hygiene (WASH) component is guided by the WASH Sector Development Plan (2016–2030), which implemented and enforced by the Ministry of Water Supply. Nepal has set specific targets in Sustainable Development Goal (SDG) 6 for the year 2030, which includes basic water supply coverage to 99 percent households, piped water supply and improved sanitation to 90 percent of households, and the elimination of open defecation (NPC, 2018). The Nepalese government accepted that safe drinking water and household sanitation is a basic need for human development, health, and well-being, as this is an internationally recognized human right (WHO, 2001).

Water-supply programs consist of three essential components: technology, people, and institutions. The interface of these facets determines whether a scheme is sustainable. Recently, many UN agencies have been promoting household water treatment (HWT) as a viable way to begin meeting the needs of millions who lack access to safe water. This paper describes the principle, an approach, rationale and feasibility to implement biosand filter (BSF) technology in Nepal to achieve sustainable development goals.

During the 1990s, Dr. David Manz of the University of Calgary developed the biosand filter, a low-cost household water treatment device. In the late 1990s, Camille Dow Baker conducted her graduate-level research on the distribution of that biosand filter, particularly as a method of improving the accessibility of clean water for the poor. She partnered with organizations and individuals throughout the world to implement the filter. A meta-analysis commissioned by the World Bank concluded that water quality intervention reduces by 35%, water supply interventions reduce diarrhea by 25%, household-based interventions reduce diarrhea by 47%, and improved wells and boreholes reduce diarrhea by 27% (Fewtrell et al. 2005; Clasen et al. 2006).The HWT technology should be integrated within the infrastructure of a water supply project in which end users will be aware of drinking water after treatment. Household water treatment technologies are easy to manufacture, affordable, user-friendly, highly useful for the removal of biological contamination, easy to maintain and operate, and locally available construction materials. Furthermore, this technology becomes a viable alternative to meeting sustainable development goals (safe water) by 2030.

ENPHO Nepal, Nepal Water for Health (NEWAH) and Nepal Red Cross Society are introducing household water treatment technologies in Nepal in the low land area in coordination with UNICEF, USAID (HIP), WaterAid, and Swiss organizations. The sustained use and technology adoption are significantly high in the arsenic contaminated areas and low land areas. The choices of water treatment technology vary based on the geographical location, affordability, quality of

existing water sources, quantity of water, availability of technology and the perceptions of the end users.

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8.7 Energy, Environment, Science & Technology

Abstract 7-01 – Activities of NAST and prospects for collaboration with Nepali Diaspora

Dr. Sunil Babu Shrestha
Vice-Chancellor, Nepal Academy of Science and Technology

Nepal Academy of Science and Technology (NAST), established in 1982, is an autonomous apex body of Nepal entrusted for the overall development of science and technology. Its four major objectives are: advancement of science and technology for overall development of the nation, preservation and further modernization of indigenous technologies, promotion of research in science and technology, and identification and facilitation of appropriate technology transfer. NAST plays roles such as Think Tank, Catalyst, Facilitator, and Innovator in Science and Technology. Prime Minister is the Chancellor of the Academy. The Chancellor chairs the Academic Assembly, the highest body of NAST. The programs of NAST are conceived and executed by the two faculties (Science and Technology) and the five divisions (Promotion, Planning and Evaluation, Statutory and Internal Audit, Personnel, General Administration) led by senior staff of the academy.

Faculty of Science consists of five research laboratories, which conduct scientific research activities in molecular characterization and DNA sequencing, carbon sequestration, radiation and nanomaterials, chemical characterization, biodiversity, environmental science and climate change, high altitude sciences, and natural product and synthetic chemistry, etc. Faculty of Technology carries out research activities in solar energy technology, bioenergy, space technology, material science and nanotechnology, instrumentation, disaster risk reduction, wind energy, and small hydropower. Promotion Division deals with the activities related to scientific publication and publicity, science and technology awareness and popularization, audio visual programs, grants and fellowship, library documentation and communication, and awards.

In the context of current national drive for “Prosperous Nepal and Happy Nepali”, the role of Science and Technology has become very crucial. To achieve this national goal, it is necessary to connect science and technology with society to solve problems of people and for the transformation of the society. NAST has been revisiting and redesigning its activities with the vision: Science for Society and Innovation for Prosperity. It has established center of innovation for prosperity and is carrying out research and development activities to combat COVID-19 of which mobile swap collection booth is an important and popular output. Similarly, Analytical Service Center has been providing water quality analysis, radiation dosimetry, materials characterization with X-ray Diffractometer, soil analysis, diagnosis of citrus greening disease, etc. Result Oriented Research (ROR), Public-Private-Partnership (PPP), Science Diplomacy, Smart NAST are under priorities of NAST. To promote activities of young and women scientists, National Young Scientists Forum and Women Scientists Forum, Nepal have already been established.

NAST is trying to establish National Building Research Center and National Space Technology Learning Center in near future. Recently, NAST has initiated Brain Pooling Program, Nepal to connect Nepali scientists and technologists in Nepal with those who are working abroad to integrate their knowledge, experiences and skills for the development of the country. NAST is also planning to expand its activities to all the seven provinces of the country by establishing centers of excellence for Research of Development on different disciplines of S&T based on the priority of the province itself, in partnership with local and provincial governments. The presentation also highlights the opportunities that are available at NAST for Nepali diaspora to connect with Nepal and also presents our expectation from Nepali diaspora who are enriched with knowledge, experiences, skills, and other resources too.

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Abstract 7-02 - Satellite Technology Capacity Building and Launching of a Pico-Satellite Built-in Nepal

Rakesh Chandra Prajapati
Founder and CEO
ORION Space
Nepal

A PocketQube is a pico-satellite suitable for university students to get hands-on experience in satellite technology, capacity development program, and for small startup companies, like ORION Space, to work on space R&D projects. One-unit size of a PocketQube is 5 cm cube and weighs less than 250 grams. SanoSat-1 (Nepal-PQ1) is a PocketQube designed by Nepalese students and engineers using commercial off-the-shelf components. The project was started at the beginning of 2017 after the students completed building a model of pico-satellite called CanSat.

From the conceptual design phase to the development of the Flight ready satellite, there are more than 25 students, from different universities and colleges of Nepal, worked on this project. Therefore, we also call this satellite as an Educational Satellite. This will encourage the Nepalese aspiring students in STEM. After graduation, some of the students were hired by ORION Space to continue to work in the satellite project and ground-station projects.

Many students from national and international academic institutes come for an internship position at ORION Space. They have published their work at international conferences. ORION Space is promoting space education and satellite technology to our young minds by organizing workshops and training in Nepal.

Our professional engineers have received training about satellite technology from space agencies and top-notch research centers. We are constantly growing, and continuing to develop and advance our technology, service, and capabilities. We are developing capacity building within Nepal to develop bigger satellites in Nepal.

The missions of the satellite are digipeater and space radiation measurement. After the launch of the satellite, students can communicate with the satellite, and receive data from space. The satellite is planned to be launched at the end of 2020 or beginning of 2021. The most expensive part of this project is the ride to space on a rocket. The cost of the launch of a satellite is proportional to the mass of the satellite. ORION Space's top priority has been to develop a satellite in Nepal, by the Nepali engineers, and launch into space. We believe in "Invest in Nepal and Made in Nepal" for the development of our nation.

Keywords: Pico-Satellite, Capacity Building, Satellite Launch

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Abstract 7-03 - Cost-benefit analysis of replacing LPG stoves with induction stoves in rural households of Kavre district Nepal

Grishma Raj Dahal
Humboldt State University

Nepal imports nearly 260,000 tons of Liquified Petroleum Gas (LPG) and other fossil fuels annually from India. This fuel dependency is one of the main reasons for Nepal's trade deficit with India. The Government of Nepal has recently started promoting electric induction stoves for cooking as an alternative to LPG. Induction stoves are pollution free at the point of use, and they are meant to reduce Nepal's dependence on LPG.

This study includes a cost-benefit analysis for replacing LPG stoves with induction stoves for households in rural areas of Kavre District, Nepal. The study involved the use of data for LPG and electricity consumption for households that use LPG and have not yet adopted induction stoves. It includes the estimated expected post-adoption (future) electricity consumption based on the cooking energy associated with the existing (pre-adoption) LPG usage.

The results show that about two-thirds of households in the study would not benefit economically from the adoption of electric induction stoves if there is no subsidy on the electricity. The amount of subsidy would depend on baseline electricity consumption and the LPG usage of the households. Future analysis of the economics of a transition to induction cooking could be improved through the collection of more precise data on LPG consumption, baseline electricity consumption, LPG prices, and the economic discount rate.

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Abstract 7-04 - Scientific Evaluation of Air Pollution Over two big cities in Nepal

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The concentration of particulate matters (PM) is responsible for affecting climatology due to the absorption and scattering of solar radiation as a direct effect and by impacting the formation of clouds in the atmosphere as an indirect effect. The PM of an aerodynamic diameter smaller than 2.5 also has a significant impact on human health. A study of air pollution over Nepal using a variety of aerosol optical instruments shows that air pollution over Nepal is an essential topic for aerosol researchers. In this study, we have analyzed air pollution data observed from a combination of aerosol data such as obtained from commercially available Purple Air Monitor, with two particulate matter sensors, Cimel Sun Photometer as a part of Aerosol Robotic Network (AERONET), and satellite images of biomass burnings. Two different Purple Air Monitors were installed in the compound of Prithvi Narayan Campus (Pokhara), and Pulchowk Campus, Lalitpur in January 2020, and AERONET provides a continuous aerosol optical and microphysical data measured over the Pokhara. A comparison of air pollution data shows that the PM concentration is slightly degraded from the end of March in both cities, and we suggest the effect of COVID-19 lockdown. It also shows that the primary air pollution over these cities is also associated with anthropogenic products such as emission from the vehicle and roadside dust. A further investigation of transboundary air pollution over these cities will also be computed simple air parcel trajectories using the NOAA HYSPLIT trajectory model, which will support identifying different aerosol types other than local pollution. Our research-based study strongly recommends intense scientific research and advanced knowledge of air quality to determine and implement effective air-quality policy in Nepal.

Keywords: Particulate Matter, Air Quality, Purple Air Monitor, AERONET, Trans-boundary Pollution

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Abstract 7-05 - Head Start on STEM (Computer Science and Robotics) Education for Young Generation in Nepal

Deepak Neupane
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Partner in STEM Education with Carnegie Mellon Robotics Academy (CMRA)

Even during economic downturns in the past, and now in the economic downturn due to the COVID19 pandemic, demands for skills in technology have stayed robust worldwide. With the right pedagogy and early start, many of Nepal's future generation can be brought into and trained to be professionals in the technology sector.

Nepal is fortunate to have a young population. This could be its most significant resource to uplift the economy. One of the significant developments in Nepal's private sector in the last 20 years

has been the establishment of private schools all across Nepal. Gone are the days when parents had to send their kids to Kathmandu for decent K - 12 education.

With the right curriculum and pedagogy, these schools could graduate students who are well trained in technology to elevate Nepal's economy and export technical know-how worldwide. Instead of exporting low wage blue-collar workforce to the Middle East and other parts of the world, Nepal could be exporting technology. In a knowledge-based workforce, women would be included as well, doubling the contribution in the economy.

Thanks to a small number of young and motivated software professionals, Nepal has been a small but important destination for outsourcing technological work from the developed nations. Thanks to organizations like the Robotics Association of Nepal, college-age young adults can now learn and explore their skills in robotics.

We can and must go further by introducing STEM (ROBOTICS and Computer Science) education during the formative middle school years. STEM programs taught to middle and high school students have to be age-appropriate, enjoyable, and motivating.

Through the renowned Carnegie Mellon Robotics Academy (CMRA), Carnegie Mellon University has been teaching Robotics and Computer science to millions of students in the US for over 20 years. Arguably, these are the best STEM programs. Robotics and Computer Science is not just about coding and putting some hardware together. In CMRA STEM programs, students learn 21st Century Skills hands-on, applying concepts learned in math and science courses.

We have been teaching these courses in South East Asian countries to great success. We strongly believe these programs would significantly impact the development of technology in the young generation in Nepal.

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8.8 Education, Social Empowerment, and Equitable Development in Nepal

Abstract 8-01 - Education, Social Empowerment, and Equitable Development in Nepal

Hari Prasad Lamsal, PhD
Provincial Secretary, Office of the Chief Minister and Council of Ministers
Joint Secretary of the Ministry of Education, Government of Nepal

Education leads to individual and social empowerment. It is considered as an engine to growth and development which is understood as individual, social and physical development. No common understanding exists to conceptualize the development. However, experts conceptualize it as both a process and end product. They understood development as a stage in

society and human development which are internalized. These stages can also be visualized with the help of the indicators that can point out the development as a process and an output. In this regard, development includes both the development of an individual and social domains.

Individual empowerment can be measured through knowledge and skills acquired through education. Such empowerment is measured, not limited to, through literacy, enrolment in school education or university, cohort retention at different levels of education, completion of certain level of education, achieving high scores in exams or assessments, job placement, earning, participation in public positions and public affairs, etc. Only quality education with the focused interventions to the needy one will help to bring such changes within an individual.

Social empowerment includes both the development of individual capacity and development of society as whole. The concerns of sense of autonomy, self-confidence, ability to act individually and collectively to bring social change in relationships, the functioning of institutions and discourses are broader area of social empowerment. It is not easy to measure the social empowerment through indicators. However, some proxy indicators are used for this, such as poverty, fertility rates, mortality rates, life expectancy, human development index, gender index, etc. The higher the values in these indicators would indicate the development of society relatively.

Every government aims to achieve the goal of individual and social development by means of education and other provisions. These provisions must be introduced with the notion of social justice and fairness. Therefore, the notion of equity is considered important to bring the desired changes in the domains of individual and social aspects. Government claims that Nepal is no exception in expediting the process of development by empowering the people and developing society. However, the results have not confirmed that the interventions are relevant and useful. If so, there is a need to uncover on what did not work and what will work in empowering the individual and develop society.

This presentation provides the brief status of the development of education in the country with the help of the few selected indicators. Similarly, social development, here, is perceived as progress in some of the selected social indicators. It attempts to uncover the prevailing disparities and inequity in the education and development as a whole with a view to explore the ways of improvement. Why Nepal missed the development opportunities are also discussed in the presentation. At the end, some options are provided for further proceedings, which are themselves not as recommendations.

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Abstract 8-02 - Learning Crisis in Public Schools in Nepal

Dilli Ram Subedi
President, National Campaign for Education, Nepal

Quality education is increasingly becoming a new debate linked to learning enhancement, a subject incorporated with a greater focus in the agendas of UN Sustainable Development Goals (SDGs). The aim is simply to ensure quality education and learning is equitable and widespread (UN, 2015). Nepal education sector plan SSDP further specified to ensure the access to quality

learning and education to every single individual irrespective of background (MoE, 2016). Enshrined in our constitution is the right to free and compulsory education with due consideration in equity and equality (Gov, 2015). Academic qualification without the aspect of quality learning/achievement/ outcomes no longer corresponds to the quality of life, development of society and individual empowerment (OECD, 2012). Quality education and learning contributes to mitigate the disparities suffered by children from disadvantaged and marginalized groups and children with disabilities from remote areas.

However, the quality education and learning in public schools of Nepal is still a far-fetched dream. The NASA 2019 report shows alarming situations of the public schools where the key challenge is that students perform below average in math, science, social studies and linguistics. The report shows that 32% of students of grades 3, 5 and 8 achieved only 5% of the tested curriculum in the basic level. In total, 71% students have achieved below 28% of the tested curriculum in Mathematics. Only 29% of the students have adequate knowledge and skills in Mathematics curriculum. The situation is similar in the higher grades too. Government initiated these in-depth studies indicate that a common problem our public schools' student is their tendency to underperform in the core subjects up and down the grades. This means that we have a serious learning crisis in the public school of Nepal, which has been a key barrier to obstruct an equitable development and prosperity of the country in the long run.

Researches inform us that the learning crisis in the public schools of Nepal is associated with inadequate funding from governments, lacking skills to manage the available and funded resources for effective delivery, lack of a plan for school leadership, and lack of child-friendly learning environment. Additionally, poor coordination between the three tiers of the governments in delivering the policies instituted also has been the factor in constant degradation of the quality of students' learning. Another factor is on the students' assessment and examination where we have an inclination to weigh more on the scores alone.

Hence, this paper will discuss multidimensional and cross-cutting challenges faced by public school in relation to student's learning crisis and its linked to the nations dream of equitable development. The paper will also come up with some helpful policy recommendations for policy makers and practitioners. And the paper will also try to dwell around the questions that 'how a campaign of no child should be left behind basic level should be initiated?'

Key Words; Quality, Achievement, Public Schools/Education, Underperformance, Empowerment, Development.

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Abstract 8-03 - Building Primary and Secondary School System for the 21st Century Human Resource Needs in Nepal

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There is an urgency to improve the school education system focusing students to empower them to be skillful, knowledgeable, and eminent future leaders. Therefore, the government is recommended not to be conservative, invest more funds, acknowledge the contribution of the private sector, initiate curriculum amendment by involving practitioners to make education innovative. Similarly, the teachers are suggested to be committed to making the teaching

profession respected, make the learning process interesting, open the ground to let students' question and provide the opportunity for experiential learning without caste and gender discrimination. Likewise, the parent's involvement in their children's learning and school operation is essential. This results in the students gaining transferrable skills to practice in their life to become critical thinker, analytical and problem solvers. The challenge and limitations are recognized and thus, to raise 21st-century human Resources, remodeling in the education system in Nepal is required.

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Abstract 8-04 - Opportunity is massive, Nepal need entrepreneurial movement: perspective from higher education lens

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This paper discusses different aspects of higher education ---its philosophy, structure, system, procedure and its relation to entrepreneurship development with particular emphasis on its relations to the opportunities in Nepal. The discussion will overview good practices in entrepreneurship education across the globe with more insights from European/Canadian higher education landscape. Excerpts of a variety of research which were commissioned by academia as well as development organizations such as World Bank, OECD, ADB, IMF will be pooled together to support key arguments presented. I have purposively focused on literature which have focused in smaller/emerging economies in Asia (South East Asia and Middle east) as their experiences could be much more relevant and transferable for Nepalese planners, policy makers and business community.

Together, this paper is significantly fed with the reflection of my own professional experiences both in academia and practice. The practice part primarily comes from my professional engagement in development sector (policy work and development extension) in Nepal and carries insights from tourism and agricultural sub-sector. My academic experiences encompass a much larger geography covering my research in Asian, African, North American, and European continents as well as the professorial experiences in post-secondary sector in Canada. My stay, as a visiting scholar, at the IOE (University of London) has provided me with enough insights in comparative education in international scale. My role in 'peer review' as well as being a member of editorial board for a number of international journals in entrepreneurship in recent years may surely have impacted my perspective being presented in this paper. Among other things, the research I accomplished for the ICE committee in Canada on 'business-academia partnership' has provided me with a number of key learning in entrepreneurship with particular emphasis on developed economy. Thus, drawing from both milieu of professional experiences (practice and academia), I will present a list of recommendation as a 'take-home message' for the audience who has interest in the debate of socio-economic development in Nepal in general and 'entrepreneurship opportunities' in particular in which the role of higher education will be centrally anchored.

Keywords: higher education reform; entrepreneurship; tourism; agriculture

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Abstract 8-05 -Curriculum Design, Policies, Practices, and Reforms

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Educational philosophy guides curriculum design, and curriculum refers to an instructional document with defined objectives to achieve. This document outlines a nation's broader picture of educative and evaluative process with enough room for flexibility to adapt changes as required. This implies that education is key to bring desired changes in any country's social and economic development, and for that to happen, a country's social, cultural, and political structures play a crucial role.

Nepal, after the promulgation of the constitution in 2015, has entered into the federal system with 7 provinces, 77 districts, and 753 local levels (also known as governments). This re-structuring of governance at different levels ensures a certain degree of autonomy offered to local governments in various fields including education. Taking this rapidly changing socio-political context into consideration, this paper makes a critical review of National Curriculum Design (2019), attempts to examine national/provincial policies in education, and explores potential educational practices with reference to federal, provincial, and municipal school boards. While doing this, the paper looks deeply into the connectivity between federally controlled National Curriculum Design (2019) and its implication to provincial and municipal levels.

The aim is to highlight the need and practice of autonomy in developing place-based curriculum by local schools and school boards while getting governed by the centre in major areas of learning. The paper concludes with a couple of recommendations for future research and reforms in the field.

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Abstract 8-06 - Opportunities and Challenges of Distance Teaching/Learning in Higher Education: An Experience of Nepal Open University

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Distance learning is considered one of the most important educational innovations. It is an alternative to conventional education. It has become an accepted and indispensable part of the mainstream of the educational system in almost all the countries of the world. With education worldwide being thrown into disarray by a coronavirus, more and more educators are being forced to teach their students from home. Distance teaching and learning practices have several opportunities and challenges. In Nepal, Nepal Open University (NOU) is the pioneer in implementing of distance teaching and learning methods in education. Currently, NOU is offering

five undergraduate and 10 graduate degree programs. Approximately 1200 students from almost all the districts are enrolled and are supported by instructors and full-time and part time faculties. This study aims to investigate the opportunities and challenges of distance teaching/learning in higher education of NOU. Students have appreciated opportunity of learning at their own pace in the virtual classroom. Faculties can teach in virtual mode and share their expertise and experiences from any corners of the world. This has also benefitted learners for their academic and professional career enhancement.

However, distance learning is still a pale imitation of the interactions between learners and teachers at university. Telecommunication technology can't replicate the active engagement and enthusiasm that a group of students and teachers generate when we are in a face-to-face setting. Constructivism, interpretivism, and computing technology, separately and often together, have redesigned the conception of the challenges and opportunities of learning, and brought about new learning possibilities for almost all teaching and learning situations, including traditional classroom teaching, distance learning, and self-learning. In developing countries like Nepal, despite several challenges, distance learning has apparent scope in academia due to the availability of learners, widening accessibility of internet, and enthusiasm of collaborators and faculties to serve distance mode and the possibility of collaboration internationally. The shift in the traditional distance education system of higher education from text to the web has brought several advancements and opportunities in teaching and learning systems. This demands a paradigm shift in academia and Nepal.

Keywords: Opportunities; challenges, distance teaching, distance learning, Nepal Open University

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Abstract 8-07 -Reexamining Higher Education and Economic Development in Nepal

Amrit Thapa, Ph. D
Senior Lecturer, University of Pennsylvania, Philadelphia, USA

The literature on economics of education indicates that human capital has a positive association with the economic development of a country. This study investigates the role of education, with a particular focus on higher education, in the context of the economic development in Nepal. The Nepalese education system has undergone many important changes in the past few decades that have been rife with political changes. Given the mounting attention to higher education in developing countries, this paper explores its connection to the country's economic development. The paper also points out to the mismatches, issues, challenges as well as opportunities relating to higher education and economic development of Nepal.

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9. Biographies of Session Presenters

9.1 COVID-19 and its Impact on the Economy

Ms. Sagun Bista (Gender and Social Development Specialist), holds Master of Science in Natural Resource Management from AIT, Bangkok, Thailand. She has 19 years of experience in community development and rural poverty alleviation through the promotion of natural resources especially high value NTFPs, women economic empowerment, partner capacity development.

She is currently employed as Country Coordinator- Nepal, CECI-PCV (Volunteer Cooperation) project (April 2020 - present) implemented with financial contributions from the Government of Canada, provided through Global Affairs Canada. CECI-PCV mobilizes Canadian Volunteers in Nepal with the objective of enhancing technical and managerial skills of local NGOs partners. Prior to CECI-PCV projet, Ms. Bista was coordinating Uniterra, a volunteer cooperation program implemented by CECI and World University Services Canada implemented with financial contributions from the Government of Canada, provided through Global Affairs Canada.

From 2006 –2010 Ms. Bista was employed as Program Manager, external program (Bangladesh, India, Pakistan and Sri Lanka) in **17 Women's economic empowerment projects** implemented by Heifer International. The project aimed at improving the socio-economic conditions of around 10,000 households in four countries in South Asia through promotion of women's self-help groups. Prior to this, Ms. Bista started her career as Program Officer/NRM in Community Based Economic Development Project (CBED) implemented by CECI funded by CIDA (1999-2003). The project's main goal was poverty alleviation through sustainable increase in rural incomes by involving communities in production and marketing of high value agricultural products, micro-finance, sustainable use of forest resources such as NTFPs and community health initiatives. She was responsible for forestry component of the project.

She has worked in Nepal, India, Bangladesh, Pakistan, Sri Lanka and Thailand.

9.2 Public Health & Medicine

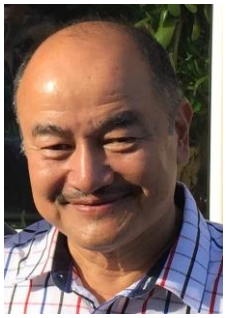
Ashok Devkota, MD, is an Attending Physician at the Rhode Island Hospital, and also a Clinical Assistant Professor of Medicine at Department of Medicine, Brown University. He completed medical school from the Institute of Medicine, Kathmandu, and Residency in Internal Medicine from the Interfaith Medical Center, Brooklyn, New York. He is involved in providing clinical care in hospital and primary care settings and teaching medical students. He has special interest in international health and development. He is a cofounder and current President of Health Foundation Nepal (HFN). He continues to provide technical support and consultation in health care and development in Nepal through various projects supported by HFN.

Biraj Man Karmacharya is Director, Public Health and Community Programs, and Associate Professor at the Department of Public Health at Dhulikhel Hospital, Kathmandu University School of Medical Sciences. He obtained MBBS from Kathmandu University and PhD degree from the University of Washington in Seattle (USA). Dr. Karmacharya was the founding member, and he has been leading the Department of Community Programs since 2006. He also leads the Nepal Technology Innovation Center at Kathmandu University a platform for bringing academia and industries together for rural development. Dr. Karmacharya is engaged in developing and setting up innovative community-based health and integrated health and development programs in rural settings in Nepal.

Dr. Shankar Man Rai is a plastic surgeon at Nepal Cleft and Burn Center (NCBC), Kirtipur Hospital. He also serves as the Country Director, ReSurge International. NCBC Kirtipur Hospital remains the largest modern acute burn center in Nepal. Upon completing a fellowship in Plastic Surgery in Texas in 1995, he returned to Nepal and established the Plastic Surgery Unit at Tribhuvan University Teaching Hospital (TUTH). Dr. Rai's and his team have also been providing care and services to the poor people with post-burn contracture deformities and disabilities, post cancer reconstruction, pressure sores, hand surgery and complex wound care especially needing microsurgery both in Kathmandu and in several outreach centers. The services provided through the outreach centers include free operative surgical care but also speech therapy, basic dental care, physiotherapy and splinting on regular basis. The team also has established the only Skin Bank in the country and has been working towards the prevention of burn injuries in collaboration with several social organizations. Dr. Rai has volunteered his services in several countries. He has been recognized for his humanitarian work nationally and internationally; he has received many awards and decorations.

Manaswi Sangraula is a mental health researcher and has worked on US-based and international public health efforts for the past ten years. She received her Master's in Public Health from Columbia University and is currently a PhD candidate at the University of Amsterdam, Netherlands. Born in Nepal and raised in Virginia, USA, she began her journey in public health working as an advocate for patients in a low-income community health clinic in Washington, DC. She has since conducted research and worked with the homeless population in Boston and adolescents receiving services from School-Based Health Centers in New York City. Manaswi's research interests include the intersection between mental health and society, gender-based issues, and stigma. She is also a trained yoga instructor and is passionate about a holistic approach to mental health and wellbeing.]

Kulesh B. Thapa, MD, DCH, a paediatrician, is presently working as the Medical Director of the Nepal Ambulance Service (NAS) in Kathmandu. He is also the founding member of the NAS that played a big role during the 2015 earthquake in Nepal. Dr. Thapa is a recently retired employee of the Government of Nepal. For several years, he was closely involved with the Disaster Management and the Program for Enhancement of Emergency Response (PEER) programs. He has also served as the Country Representative of the Britain Nepal Medical Trust. He has also been involved with various national and international organizations, including the Nepal Red Cross and the Mother-Infant Research Activities. As lead organization in managing the ambulatory needs of the COVID 19 patients, the current pandemic has kept Dr. Thapa much busier than ever before.



9.3 Exchange of Knowledge and Skills in Nursing Practice

Ms. Roshani Laxmi Tuitui is the Chief Nursing Administrator, currently working as a Director of Nursing and Social Security Division, Department of Health Services, Ministry of Health and Population, Nepal. She is responsible for promotion and execution of nursing services and various program of social security including geriatric and gender issues. Ms. Tuitui has been involved in drafting National Health Policy, 2019, Public Health Service Act, 2018, Safe motherhood and Reproductive Health Right Act, 2018 and the strategy / regulation related to various areas in Nepal. She is also putting efforts to establish visibility and autonomy of nursing service including expansion of nursing specialization in Nepal. She was an academician as well as a researcher too. Before coming to the ministry, she has been engaged in National Academy of Medical Sciences (NAMS) for more than one decade and has dual responsibilities as Nursing Clinician and Associate Professor to guide bachelor and master students. She was closely involved in disaster management in 2015 earthquake and was focal person of disaster preparedness and management committee of Bir Hospital, NAMS. She had published articles in national and international journal and was author of 11 books related to nursing, midwifery, and other allied health sector. She did master's in nursing from Tribhuvan University and post graduate research

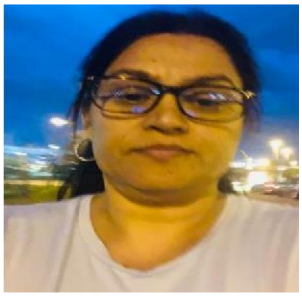
student from The University of Tokyo.

Dr. Bibha Gautam is an Associate Professor of Nursing at Texas Tech University Health Sciences Center, School of Nursing in Lubbock, Texas. She teaches in an accelerated BSN program and has been a nurse since 1993. She obtained her proficiency certificate level nursing from Maharajgunj Nursing Campus in 1993 and earned her PhD in nursing from the University of North Dakota in 2011. She is very passionate about nursing research and has been involved in many research studies nationally and internationally as PI or Co-PI. Some of her completed research studies are: 1) Prevention of HIV-1 transmission via breast milk, 2) Obesogenic Toxins in Breast Milk of Lactating Women, 3) Post-partum sleep and weight, 4) Accelerated BSN Program Coaching Model. Several of her manuscripts have been published in peer reviewed journals. Her areas of research interests are developmental origins of obesity, biology of obesity, and simulation in nursing education. Dr. Gautam is an active member of several professional nursing organizations: Sigma Theta Tau international, American Nurses Association, and Texas Nurses Association. She serves on the advisory board of the Society of American Nepalese Nurses (SANN).

Ms. Manju Sangraula has been an RN for more than 30 years in both Nepal and the United States. She has worked in many units and with people from diverse backgrounds during her years of experience. She is passionate about social work to make a positive difference in the community. Manju is a founding member of a free clinic and manages two free clinics. In addition to managing these two free clinics, she is also the point of contact for all the patients and guides them through complex health systems. During this pandemic, Manju has been organizing virtual meetings for nurses to discuss how healthcare workers are affected by the COVID-19 pandemic. She has also helped Nepali visitors who are stuck in the US due to the pandemic to find healthcare for medical problems and medication. She is the founding president of the Society of American Nepali Nurses (SANN) that currently has 300 life members. Manju is also currently pursuing a master's degree in diabetes and management at Columbia University. She resides in Virginia with her husband and has two daughters. She also loves spending time with her family, cooking, and gardening.

Mr. Ramesh Subba, RN received master's degree in nursing science in psychiatric nursing from MV Shetty Institute of Health Sciences, Manglore affiliated to Rajib Gandhi University of Health Sciences. He has worked in different hospital as staff nurse and nursing supervisor in different hospitals including BPKIHS Dharan and Chitwan medical college Bharatpur. He has worked as a nursing instructor and Lecturer more than 20 years. Currently he has been working as associate professor and head of department of psychiatric nursing in Chitwan Medical College. His interest in social and professional involvement was highlighted as he was elected as central member of Nursing Association of Nepal (NAN) for the term 2014 to 2019 and in current term, has been serving as NAN Senior Vice President and one of most active members advocating change in nursing profession, as coordinator of private hospitals and medical colleges nurses. He has

attended in international training and conferences representing Nepal.



Ms. Durga Deuja has master's degree in nursing from TU Nepal and other courses, including mental health nursing, in Canada. As an RN, she is currently working as Care Hub Leader in Collaboration Act in Alberta Health Services. She has been working as an RN since 1996, 12 initial years in Nepal and since 2012 in Canada. In Nepal she worked in different hospitals and in teaching BSN and diploma level nursing students. She has also served as Nursing program Chief for two years. She has very good leadership skill and involved in many community activities in Calgary/Canada.

Mr. Lilanath Pandey has bachelor's degree in nursing education and master's degree in public health from TU Nepal. During his 18 years nursing and public health career in Nepal, he worked as a Public Health Nurse in government sector and in various other INGOs namely Save the Children US, UMN and GTZ providing nursing and public health leadership. Also taught nursing and public health subjects and guided nursing, public health and medical students for dissertation, in Nepal and internationally. He also served as campus chief in CMA campuses and public health program HoD in BPH program. In Canada, he has been working as a Public health nurse in Toronto Public Health in Tuberculosis program since 2012. He has been also actively involved in community health awareness programs in Canada and Nepal including **"Dignified Menstruation".**

Ms. Parwati Pandey is a Registered Nurse specialized in Critical Care Nursing, a social worker, and a literature lover. Currently, she is practicing nursing at William Osler Health System, Brampton Civic Hospital, Ontario, Canada in ICU. Having 18 years of career in nursing, most of her clinical experiences are in Cardiac related units like cardiothoracic surgery, CVICU and PCI unit. Being passionate in teaching, she served as a lecturer at Manmohan Memorial Institute of Health Sciences, Kathmandu for BScN, and Post Basic Bachelor's in Nursing program. Ms. Pandey is a member of Registered Nurses' Association of Ontario (RNAO). Besides, Ms. Pandey is keen in literature and serves as an Executive Member of Nepali Literature Society, Canada. Also, she is involved in social activities as a Vice President of a social organization, Nepali Canadian Mahila Chautari. Academically, she graduated her bachelor's degree in Nursing from Tribhuvan University and was awarded a Gold Medal and completed her Masters in Sociology from the same University. Moreover, she got an opportunity to complete her BScN honor from York University as well.

Ms. Radhika Aryal has been working in the Canadian Health Care sector ranging from geriatric to acute nursing. She is a facility charge nurse at Chartwell LTC and Providence Health Care, Unity Health Toronto. She is also a practicing Registered Nurse in the surgical department at Scarborough Health Network. She graduated with a Master's in Nursing (Advanced Practice Nurse) from Ryerson University, Toronto, Canada. She is also awarded with Master's in Social Science and Humanities, Bachelor's in Nursing, and Bachelor's in Education from Tribhuvan University, Nepal. She was involved in educational projects at St. Michael Hospital, Toronto to implement new policies across various health care settings. Before moving to Canada, she worked as a Nursing Officer at Tribhuvan University Teaching Hospital for two decades. She participated in a year-long medical development training held at South Korea organized by the Korea-Nepal Joint Medical Project. Throughout her extensive career span, she has also been involved in working at the urban as well as rural areas of Nepal, in coordination with various health projects. She continues to be an active member of the community by engaging in various professional organizations (RNAO, ONA, CARE) as well as literature societies. She is passionate about social work and literature.

9.4 Entrepreneurship Development in Agriculture and Allied Sector

Dr. Purna Kandel (University of ALBERT/ University of LIEGE) is working on International Business based in Toronto and Kathmandu. He is also global coordinator of NRNA Agriculture Promotion committee and Panel chair in 2nd National Knowledge conference will be held in Kathmandu in October in Agriculture and Food security. He has international business interest in AgriFood, BioMed, Garment, Aviation and Home between Nepal, Canda, US and other south Asian countries. Before working on Business, he was Marie Curie Researcher from European Union. He has worked as a government officer in Nepal and researcher in Netherlands, Belgium, Ireland and Canada. He is from Chitwan, Nepal and currently based in Toronto Canada.

Prof. Dr. Tulsi Dharel is International business Professor in Centennial College Canada and Advisor in Canada Business Council. He has several years teaching experience, business promotion support to start up as well as multinational. He supported the growth and expansion of multiple businesses on the International stage. He is from Chitwan, Nepal and currently based in Toronto Canada.

Dr. Drona P. Rasali is a multidisciplinary health and life science professional working actively as population & public health epidemiologist, healthy living Planner, quantitative animal geneticist, veterinarian, higher education campaigner and social equity activist. He earned his PhD degree from the University of Manitoba, Winnipeg, Canada. He holds the professional designation as the Fellow of American College of Epidemiology (FACE). He is currently the Director, Population Health Surveillance & Epidemiology at the Provincial Health Services Authority, British Columbia and Adjunct Professor, School of Population and Public Health at the University of British Columbia. His current program focus is on the health promotion and chronic disease prevention that encompass areas of healthy communities, healthy schools and food security. Formerly, he was a senior Scientist at the Nepal Agricultural Research Council.

Dr. Rasali served as Deputy Regional Coordinator for Americas in the Non-Resident Nepali Association International Coordination Committee (2009-2011) and Advisor of the NRNA-ICC (2011-2013) and is currently active as a Director, Nepal Science Foundation Trust, a Science & Technology wing of NRNA.

Dr. Bishnu Prasad Gautam[1] received his B.S. degree from Wakkanai Hokusei Gakuen Universiy (Transferred from Colorado University, USA), Hokkaido, Japan and received his M.S. and Ph.D. degrees from Shinshu University, Nagano, Japan in 2009, and 2016 respectively. He is currently working as an Associate Professor at Kanazawa Gakuin University, Kanazawa, Japan. His he teaches wide range of classes that include, Computer Networks, Network Security, Computer Programming and many other computer science related subjects. Dr. Gautam's research interests include community wireless networks, network security, IoT (Internet of Things), traditional knowledge and Smart Community etc. He has conducted an extensive survey of Wakkanai City of Japan to recommend a design and implementation of Smart City (Smart Community) and its network model in 2012. He has published over 40 technical papers in reputed international journals and conferences, which include papers published in top IEEE and its related conferences like AINA and NaNA. He has been invited as a Keynote speaker in various International conferences and Universities.

Dr. Gautam was the winner of National Championship Prize, Highest Prize Championship Award Highest Score Award ET at Robotic Contest 2018 National Championship Competition Held on Yokohama, Japan, November 2018. He is also the winner of the Best Presentation Award 62nd Intelligent Transportation Systems and Smart Community Research Workshop organized by IPSJ-SIG, in 2015, Wakkanai, Hokkaido, Japan and also the winner of incentive award in the same conference. He is a member of IEEE, a member of IPSJ and IAENG.

Dr. Bharat Pokharel[2] earned B.Sc. (Forestry) degree with Honours in 1998 from the Australian National University in Canberra, Australia and Ph.D. in Forest Biometrics in 2008 from the Michigan Technological University in Houghton, Michigan. In between of his periods of university studies, Dr. Pokharel worked over five years for a non-profit organization, the World Wildlife Fund (WWF), in different capacities as a resource professional in Nepal. He has four years of post-doctoral experience from Michigan Technological University and Nipissing University, Canada. He joined Tennessee State University in 2014 as an assistant professor of Applied Statistics. Dr. Pokharel is a biometrician and applied statistician, who is interested in designing research experiments, testing research hnd bring back the prosperity to Nepalese people.

Dr. Niranjan Aryal is originally from Syangja, Nepal. Currently, he is a lab director at Certus Analytics, Murrieta California USA. He received doctoral degree in Plant Biotechnology from

[1] Short Bio of Dr. Bishnu Prasad Gautam, Associate Professor, Kanazawa Gakuin University, Kanazawa, Japan

[2] Associate Professor, Tennessee State University, Nashville, Tennessee, USA

Montana State University. His interests include: Plant secondary metabolites, plant biotechnology, Plant Pharmaceuticals.

Dr. Aryal also has research interest in secondary metabolites in cannabis (cannabinoids, terpenoids, flavonoids-biosynthetic pathway, evolutionary history, distribution among different strains and across the non-cannabis organisms); biotechnological production of secondary metabolites from cannabis in other organisms such as yeasts; and medicinal values of secondary metabolites from cannabis plants. He is also advocating for the legalization of cannabis in several countries, especially in south Asia. He believes that if if legalized and regulated, Cannabis plants can boost the Nepalese economy and bring back prosperity to Nepalese people.

Sandesh Thapa is currently pursuing a bachelor's degree (4th semester) in agriculture from Tribhuvan university and represent Gokuleshwor Agriculture and Animal Science College, Baitadi, Nepal. He is highly interested in Agro-ecology and Environment Sciences. He has published a dozen articles related to medicinal plants, rooftop gardening, and home gardens. Furthermore, also lead an organization 'IAAS local committee GAASC, Baitadi' as a local director.

His current research project is "Assessment of the linkage of urban green roofs and nutritional supply, diversity status of the rooftop garden, and its associated constraints in Nepal."

9.5 Innovation, Entrepreneurship, and Technology and Knowledge Sharing

Dr. Suresh Kumar Dhungel is a Senior Scientist at the Nepal Academy of Science and Technology, Faculty of Technology. He received a Ph.D. in Engineering with Electronics and Electrical Major. His specialization includes Silicon Photovoltaics and Dye-Sensitized Solar Cells. He is currently researching Solar Radiation Monitoring and Applications of Solar Energy Technologies, Dye-Sensitized Solar Cells, and Energy Conservation. He has published more than 45 research papers in peer-reviewed scientific journals. In the past, he has worked as Senior Researcher at Advanced Nano Products Co. Ltd. , Republic of Korea; Team Member of 3 kW residential Solar Photovoltaic System, A national Project of the Republic of Korea, and as a Director/ Head of Institution, Rosebud School, and Sr. Physics Teacher and Head of Gaurishankar House, Budhanilkantha School. He received "Nepal Bidhya Bhushan" Class-A from the President of Nepal, Dr. Ram Baran Yadav, and Mohandwoj Basnet Academy Award from the Prime Minister of Nepal, Mr. Girija Prasad. Koirala. He has also received an award from the President of Sungkyunkwan University for academic excellence and exemplary conduct on the Convocation ceremony of Sungkyunkwan University, Republic of Korea.

Dr. Dhilung Kirat is a Research Scientist in the Cyber Security Intelligence group at IBM T.J. Watson Research Center. His research interests revolve around areas of computer security, in particular malware analysis, AI-powered security analytics, and ethical hacking research. Dhilung received his PhD in Computer Science from University of California, Santa Barbara. He is the lead researcher behind IBM Watson for Cyber Security and the study of possible misuse and weaponization of AI dubbed DeepLocker, which has received wide international coverage. As a member of Shellphish hacking team he has helped organize the iCTF international hacking competition for several years. He is a Fulbright Science and Technology PhD Fellow who is also passionate about landscape photography. Dhilung is originally from Bhojpur, Nepal.

Shankar Uprety is an entrepreneur and founder of Hamro Patro, Inc., an online platform that connects over five million Nepali language speakers worldwide. Under Mr. Uprety's leadership, Hamro Patro has grown to become the most widely used Nepali app in the world. Mr. Uprety is also president of Smart Ideas Pvt Ltd, a software development studio that provides technical solutions to clients including Google, MetLife, and various non-profit organization including The Asia Foundation. Before launching his entrepreneurial career, Mr. Uprety was a principal software engineer at Symantec, and prior to that was the principal software engineer at Verisk Health. He also worked for five years at D2 Hawkeye as an engineering manager. Mr. Uprety holds an M.S. in Computer Systems Engineering from Boston University.

Dr. Sunita Gautam, received a Bachelor's degree in Microbiology (2005) from Trichandra College, Tribhuwan University, and Master's degree (2008) and Ph.D. (2014) in Molecular Biotechnology from Saitama University, Japan. After completing Ph.D., she worked as a Postdoctoral researcher in RIKEN Brain Science Institute, Japan, from 2014-2018. She is currently Research and Development Manager at Biotech Pvt. Ltd. and a Postdoctoral fellow (as IBRO return home fellow) at Kathmandu University. She is a recipient of the Japan Student Services Organization (JASSO) scholarship 2007 to 2008 and the International Brain Research Organization (IBRO) Return Home fellowship 2019

Narayan Ghimire has Over 22 years of experience on Disruptive Innovation Operations and Management, hands-on expertise in Innovative Food Scientist and Lean Six Sigma Change Leader in the Agri-food Ingredients Industry, and engagement in the creation of over three hundreds customs designed innovative food flavorings annually. Most creations are offered to the large-scale food manufacturers in the North American and abroad to meet evolving market demand.

Established flavour spray drying facilities, advanced analytical labs with GC-MS-electronic nose, and innovation labs. Deployed custom designed ERP business intelligence to implement real time lean manufacturing operations. Wrote FSSC 22000 Manuals, Sensory Evaluation Gold Standard, Cannabis Further Processing Manuals and Cannabis Research Protocol. Lead several applied research and experimental development initiatives for the past two decades. Exhaustively engaged in real time body of knowledge capturing for multiple innovative body of knowledge gain review. Engaged in cannabis processing and research protocol development for cannabis and hehp based innovative research and processing parameters development.

A senior member of American Society of Quality (ASQ), Institute of Food Technologists (IFT) and British Society of Flavourists (BSF). Holds post-graduate degree in Quality by Design, a Food Science Graduate, and Lean Six-Sigma Master Black Belt. Maintaining several professional certifications including ASQ Certified Six Sigma Black Belt, ASQ Certified Quality Engineer, IFT Certified Food Scientist, BSF Certified Flavourist, and OACETT Applied Science Technologist, Certified Pharmaceutical Analyst and SR&ED Practitioners titles. Confidence on developing healing foods, excipients and the innovative ingredients.

9.6 Engineering, Infrastructure Development, and Public Safety

Kedar Shrestha, P.Eng., is a highly skilled Manager/Contract Administrator and Tunnel Specialist with over 25 years of experience in the roads/bridges/highway construction, tunnel design and tunnel construction fields. Professional Engineer Ontario, Canada. He has a master's degree in civil engineering with a specialization in Bridges and Tunnels from Belarus and Certificate in Civil Engineering from Pulchowk Campus, Nepal. Mr. Shrestha served 10 years in Nepal and over 15 years in Canada. He has experience in both design and construction of infrastructures which includes contract administration, construction management, project management, design analysis and construction management of (transit, hydropower, water, sewer) tunnels and related underground structures. Preparing technical specifications, contract documents, report writing, and presentations are part of the everyday job.

Ujwal Dhakal, MBSc., is a building science (MBSc, 2016), and civil engineering (M. Eng., 2020) graduate from Ryerson University, Canada. In addition, he has possessed MSc degree in Construction management from Nepal (2003) and BEng in Civil Engineering from India (1988). He has over 25+ years of international (Nepal, Qatar, and Canada) work experience in building science, building restoration, site supervision, and construction management. During his undertakings, he worked at Department of Urban Development and Building, Nepal; Central Builders, Nepal; Arab Engineering Bureau, Qatar, and Build Max Limited, Canada in the capacity of civil/structural engineer, construction manager, and engineer associate, respectively.

Sangita Rana works towards providing high quality drinking water for over two million people in North Texas. She has an MS in Environmental Engineering from Southern Methodist University and is an active member of the American Water Works Association. Sangita currently serves in the national committee of sustainability in American Water Works Association. Her passion lies in sustainable operation and design of sustainable infrastructure. Sangita was the Project manager of ENVISION application of 2-billion-dollar project which received the highest level of achievement in the US in water transmission system by Institute of sustainable infrastructure (year 2016). Following her passion in sustainable Infrastructure design, Sangita Rana takes a lead role in sustainability at the District. Apart from her day job, Sangita has been involved in Children's education in Nepal for the past ten years. Sangita is native of Nepal and presently resides in Texas with her husband and an eleven-year-old son. In her spare time, she likes to make pottery and volunteer to different organization.

Chet Nath Pokhrel, PMP, P.Eng., is a Director in PCM International in Ontario, Canada. He is a licensed Professional Engineer from Ontario, Canada, and a Certified Project Management Professional from USA. Mr. Pokharel completed BE from Pulchowk Campus, Nepal and ME from Asian Institute of Technology (AIT), Thailand. He has 27 years of experience in all aspects and phases of projects and programs. His geographic experience includes Nepal (4 years), Thailand (2 years), Australia (6 years), and Canada (15 years). He has led and managed major and complex projects and programs including Engineering, Procurement, Construction (EPC), Public Private Partnership (P3) and Joint-Ventures (JV) multi-billion dollars investments. His recent mega project experience is CAPEX $50 billion Chevron Gorgon LNG Project in Western Australia (One of the biggest in the world) and CAPEX $13 billion Bruce Power Candu Refurbishment Project in Ontario, Canada.

Satish Tripathi, PE, Managing Engineer, Houston Water Planning, City of Houston, USA Over 14 years of experience in Water Infrastructure Planning; Smart Utilities. Ph. D. Candidate, Water Resources Engineering, Texas A&M University, College Station, USA. Co-Chair, Science, Technology & Innovation Task Force, NRNA USA Canada.

Betman Bhandari, is a Country Representative for India joined Canadian Red Cross Society in November 2018 to implement WASH project in

Ethiopia. He now leads the Kerala Flood Response Project in India which is responsible for implementing water supply, sanitation, hygiene promotion and renovation of regional warehouse in Kerala. He holds a PhD in Rural Water Supply from the Asian Institute of Technology, Bangkok and Postdoc in Watershed Management from the University of Calgary. His research focuses on sustainable development and formulating sustainable WASH program policies. He has published many articles about water, sanitation, sewage sludge management, gender, and water treatment technologies in different peer review journals. Betman has over 20 years' experience working in the humanitarian aid and development sectors focusing on water, sanitation, and hygiene. He has worked in Canada, Nepal, Cambodia, Laos, Thailand, Ethiopia, Zambia, Vietnam, Afghanistan, Jordan, Syria, and India in the capacity of Program Manager and WASH Technical Advisor.

9.7 Energy, Environment, Science & Technology

Mr. Rakesh Chandra Prajapati is a senior test Engineer working in Switzerland. He received a master's degree (MSc) in Electronics and Space Technology from École polytechnique fédérale de Lausanne - EPFL, Lausanne, Switzerland, in 2010. He has worked in Switzerland's biomedical and space industries, like, in TECAN AG, RUAG Space, and ROCHE Diagnostics. At TECAN, he has developed tools using Matlab and LabVIEW for autonomous testing and post-processing test data. At RUAG Space, he has developed a software tool to control Thermal Vacuum Chamber (TVC). The software provides data-acquisition and logging from the test-unit (Solar Array Drive Mechanism) inside the TVC chamber, communicates with EGSE (Electrical Ground Support Equipment), and regulates control units to perform temperature cycle. He has worked in different projects at ROCHE as a system integration engineer, troubleshooting engineer, and test engineer. He has a strong interest in the space-related job, and he has also completed some training and summer schools related to nano-satellite technology from Samara State Aerospace University and Hokkaido University (source: shorturl.at/ahrNR)

Grishma Raj Dahal received his master's degree in Energy Technology and Policy from Humboldt State University (California State University) in 2020. His master's thesis was on "Cost-benefit analysis of replacing LPG stoves with Induction stoves in rural households of Kavre district, Nepal. His accomplishments lie in data analysis and quantitative analysis. He worked as a data analyst for one and a half years for Clean Cooking Alliance (CCA) Nepal, collaborating with Schatz Energy Research Center (SERC). His expertise also lies in off-grid and grid-connected solar PV systems. He has designed multiple solar PV systems ranging from 120kW to 1 MW.

Jeevan Regmi, Ph. D. Scholar, teaches (Faculty) solid state physics in M.Sc. program at Prithvi Narayan Campus, Pokhara, Tribhuvan University. He completed his master's degree from Central

Department of Physics, Kirtipur, Tribhuvan University. He is interested in the research of Lower Atmospheric Physics. Currently, he is involved in the Aerosol related research work. Impact of aerosol in human health, solar radiation, visibility, crop productivity and climate change are his special area of interest. He is also interested and involved in science awareness program to develop scientific thought in students and common people through seminar, workshops etc. His research work has published in national and international peer-reviewed journals.

Deepak Neopane is a software engineer consultant in California, USA. He is also a founder of City University, Yangon Myanmar, which offers a UK Degree in Engineering, Computer Science, and Business. Besides, he also runs a Carnegie Mellon Robotics program in Myanmar and South East Asia and is interested in expanding the program in Nepal.

9.8 Education, Social Empowerment and Equitable Development

Dr. Hari Prasad Lamsal is a Joint Secretary of Government of Nepal. Currently he is working in the Bagamati Pradesh, Office of the Chief Minister and Council of Minister, Hetauda as a Provincial Secretary. Mr. Lamsal received education from University of Leeds (Master), Tribhuwan University (MPhil) and Kathmandu University (PhD) in education discipline. He has worked more than 25 years in education sector under different capacities ranging from secondary school head teacher, school supervisor, District Education Officer to the senior management position in the Ministry of Education.

During his tenure, he has participated in different seminars and meeting about planning, data and information, foreign aid, education management, education governance, research works, and financial management organized in Nepal and abroad.

Mr. Lamsal has published Five books in the area of education governance and management, and education financing. In addition, he has also published several articles relating to education governance and management, education financing and education in federalism. Likewise, Mr. Lamsal has also presented his papers in international seminars about the education in federalism and education financing.

Mr. Dilli Ram Subedi, an education and a political activist, currently heads Nepal Campaign for Education (NCE), which is an organisation with a large network of membership comprising more than 364 national organizations and a member of Global Campaign for Education. He was catapulted and elected to this post after serving for more than six years at NCE in various capacities, which demonstrates his keen interest in the field of advocacy for education. To this credit, he has a master's in education (M. Ed.) and MA in Sociology from Tribhuwan University.

On the political front, Mr. Subedi, young leader of NC has served as vice president in the central committees of Nepal Student Union. He was also elected to the presidency of Free Student Union at Kathmandu Shiksha Campus.

Mr. Subedi also displays a strong interest and long involvement in the areas of leadership, advocacy, community mobilization and mass communication. Under his belt, he has served as 'Editor In chief' of ' Bichar Bishesh Quarterly' a semi academic journal published by Public policy pathshala l. Mr Subedi also authored and edited nearly a dozen of articles , journal and booklet on cross-cutting issues pertaining to education leadership and political reforms in magazines and academia.

Dr. Tirtha B. Thapa is a founding member of the Board of Trustees of Gandaki University. He founded a non-profit organization, Human Development and Community Services (HDCS). HDCS supports and operates Kathmandu International Study Centre that offers international curriculum K-12. HDCS also supports additional community schools throughout Nepal. Dr. Thapa also manages Lamjung District Hospital and this hospital has now recognized as a model district hospital. He also manages community hospitals in Rukum and Chitwan.

Dr. Thapa earned his Ph.D. from Chiang Mai University, Thailand with an excellence thesis award. He has received ‘Excellent Management Award’ twice in 2015 and 2017. In recognition of his community services for the poor and disadvantaged, Dr. Thapa was honored with "Nepal Samman 2016" by Sagarmatha Foundation.

Dr. Lok Bhattarai is a Social Scientist with extensive experience in development practice and research. His research geography covers different continents with much focused work in the UK, Canada, and Nepal. Dr. Bhattarai was invited as a Visiting Scholar by a number of named institutions globally and is affiliated to Sheridan College in Canada as a Professor.

In line of his interest in entrepreneurship and development in Nepal, Dr. Bhattarai's 'opinion articles' occasionally appear in the named newspapers and portals in Nepal. He is also actively involved in 'peer-review team' as well as has served in 'editorial board' for a number of reputed International Journals primarily in entrepreneurship, development planning, and higher education. His professional experience and entrepreneurial ideation mainly intersect tourism, agriculture, education, and service industry when it comes to the prospects of Nepal.

Dr. Laxmi Pathak is an educator, teaches research courses, and has spent over thirty years working with students and educators at schools, colleges, and universities. Working as the first author, he has designed and developed series of textbooks for English as Second Language (ESL) learners. He has published book reviews and articles in journals.

He is currently working as Lecturer in the Faculty of Education, ESL Instructor at Lakehead International, and Academic Writing Coach for graduate students across disciplines at Lakehead University. Dr. Pathak’s areas of interest include educational philosophy, curriculum studies, character education, multi-cultural education, language philosophy and literature. As a qualitative researcher, he is keen on researching in education for change.

Dr. Yadav Prasad Joshi is an Academic Faculty and Program Coordinator of Masters in Environmental and Occupational Health Program in Nepal Open University. He is an Environmental Epidemiologist and is involved in interdisciplinary research on climate change and health, air pollution, infectious diseases, and vulnerability assessment. He has published 15 first-authored research articles in peer-reviewed journals and three co-authored books. He has presented more than 20 scientific papers in national and international seminars.

Dr. Joshi has over 14 years of academic experience from elementary to graduate levels in Nepal in biology, infectious diseases, environment, and other interdisciplinary areas. He is also an Editorial Board Member in the Journal of Infection in Developing Countries and reviewers in various national and international journals. He remained a Steering Committee member of research students over four years in the International Society for Environmental Epidemiology.

He has been working in various consulting assignments of the Government of Nepal, WHO, and other I/NGOs. He has been actively serving in policy development, training program, and advisory works to the Nepal Government. In a project of the Ministry of Forests and Environment, he is currently working on vulnerability and risk assessment of climate change in health and identifying adaptation options.

Dr. Amrit Thapa is a Senior Lecturer in the International Educational Development Program at Graduate School of Education, University of Pennsylvania. He received his bachelor's and master's degrees in economics from Sri Sathya Sai University, India, and M.Phil. and Ph.D. in economics and education from Columbia University. Dr. Thapa is also an Affiliated Researcher for the Center for Benefit-Cost Studies of Education at Teachers College, Columbia University, and vice president for The Institute of Global Education (IGE), an NGO that has consultative status with the Economic & Social Council of the United Nations. Dr. Thapa is also consultant to UNESCO Institute of Statistics and serves as chair for the Economics and Finance of Education Special Interest Group for Comparative and International Education Society.

His research focuses on economics of education in developing countries, international education, monitoring and evaluation, and school climate research. Prior to Penn GSE, Dr. Thapa worked as a research director at the National School Climate Center (NSCC), an educational non-profit organization, where he was involved in a number of school climate related projects such as development and validity/reliability studies of school climate/Socio-emotional learning instruments.

9. Toronto, Canada, Declarations – Sept.6, 2020

GoN Registration No.: 01-2070/71 FOR NEPALI BY NEPALI नेपालीका लागि नेपाली

Non-Resident Nepali Association (NRNA)
गैरआवासीय नेपाली संघ

Ref.

Toronto, Canada, Declaration- Sept. 6, 2020
NRNA-ICC 2nd Knowledge Sharing Conference

"Sharing Knowledge, Experience, Skills, and Values to help improve Science & Technology, Entrepreneurship, Policy, and Practice in Nepal."

Between 4 and 6 September 2020, NRNA members, Innovators, Scientific communities, Academicians, Practitioners, Entrepreneurs, Journalists, Activists, High-level officials from the Government of Nepal, including the Ministry of Education, National Planning Commission, Nepal Academy of Science and Technology, Universities, Research Centers, International Organizations, Private Sectors, Industries, Startups and Knowledge Incubators, convened in Toronto, Canada (in Spirit) to discuss and address Nepal's old and new development challenges.

The conference covered eight thematic areas: 1) COVID -19 Impact in Economy; 2) Public Health and Medicine; 3) Innovation, Entrepreneurship, Technology, and Knowledge Sharing; 4) Agriculture, Forestry, and Related Areas; 5) Engineering, Infrastructure Development, and Public Safety; 6) Knowledge and Skills in Nursing Practice; 7) Energy, Environment, Science & Technology; and 8) Education, Social Empowerment, and Equitable Development, and included oral presentations and a panel discussion. The conference centered on sharing applied diaspora knowledge while identifying required suitable and applicable tools, methodology, and concepts.

The conference attendees acknowledged that the global community is in the midst of an ongoing crisis and faces significant challenges ahead due to the COVID-19 pandemic. In Nepal, the impact of COVID-19 could be more severe. However, by working together and supporting one another, Diaspora and non-diaspora can create real change in Nepal. The participants acknowledged that given the ongoing COVID-19 pandemic crisis, Nepal's existing policies might need revision. Many different new policies may be required to address the pandemic's challenges. However, there are ample opportunities for Diaspora and NRNA to bring their knowledge, skills, and experiences for Nepal's benefit to deal with post -COVID-19 pandemic challenges.

The high-level government officials acknowledged the benefit of knowledge and skill exchange between Nepal and the Americas. They assured that the Nepal Government is ready to collaborate with Diaspora and NRN on mutually agreed technology and skill transfer areas. The convention observed that some of the ideas and approaches discussed require further research, but many could be implemented immediately. The program could be implemented through the Government, non -government, or private sector. Some programs could also be implemented through NRN Foundation.
The convention concluded with a call for collaboration as the key to "Prosperous Nepal and Happy Nepali."

Conference Preparatory Committee

Laxmi Pathak, PhD	Amod Pokhrel, PhD	Er. Narayan Ghimire
Coordinator	Special Collaborator	Deputy Coordinator

P.O.B 1189 Kathmandu, Nepal (977-1) 4426005/4411530 info@nrna.org www.nrna.org

10. Other Documents

Ontario

Premier of Ontario - Premier ministre de l'Ontario

September 4 – 6, 2020

A MESSAGE FROM PREMIER DOUG FORD

I want to welcome everyone to the Regional Meeting and Second Knowledge Sharing Conference Americas Event of the Non-Resident Nepali Association (NRNA) ICC.

Our province is proud to be home to a flourishing community of Ontarians with Nepali roots. Their skills and talents, and rich traditions have contributed much to this great province.

I thank the hardworking team of NRNA for hosting this virtual conference. This is a great opportunity for industry leaders, innovators, academics, scientists and members of the global Nepali community to exchange ideas and best practices, and lay the groundwork for future collaborations and partnerships.

As we move to safely re-open our province, multicultural organizations such as yours will play a vital role in keeping the community strong and engaged, ensuring the success of our emergence from this unprecedented challenge.

Best wishes for a productive and inspiring conference.

Doug Ford
Premier

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In consideration of the Premier providing a message of greetings or congratulations, the recipient and user of the Premier's message agrees as follows:

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That the requester will ensure the Premier's message of greetings or congratulations is not used or reproduced, in whole or in part, for any other future purpose without the written authorization of the Writing Services Unit, Cabinet Office (WSU).

That the requester will not post, reproduce or authorize the posting or reproduction of the Premier's message of greetings or congratulations, either in whole or in part, on a website without the written authorization of WSU.

That, in seeking authorization for any further use of the Premier's message of greetings or congratulations as contemplated by this agreement, the requester agrees to be bound by any further restrictions or conditions on the use of the Premier's message, which WSU considers appropriate, including a restriction from altering, editing or severing in any way parts of the Premier's message of greetings or congratulations.

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