

# 1st NRN Global Knowledge Convention 2018



## Summary and Recommendations

**Non-Resident Nepali Association (NRNA)**  
**Kathmandu, Nepal**

# 1st NRN Global Knowledge Convention 2018

## Summary and Recommendations

Non-Resident Nepali Association (NRNA)  
Kathmandu, Nepal

This report is submitted to the Government of Nepal, National Planning Commission, Provincial Governments, and Research and Educational Institutions of Nepal.

Copyright: © NRNA

10 January 2019

## Foreword

In the backdrop of the formation of a stable government and economic development taking a centre stage in the political discourse of the country, NRNA, in partnership with the Government of Nepal, organized the 1st NRN Global Knowledge Convention on 12-14 October 2018 in Kathmandu, Nepal. We are glad to present the outcomes of the convention summarized in this report.

The focus of this convention was to bring knowledge and innovation into the forefront and contribute to build a prosperous nation. The convention was successful in pooling personal skills of diverse experts together. It was also able to create a conducive atmosphere where experts deliberated on many critical topics, and thoroughly explored and weighed them in terms of their overall impact. The conclusions of the convention will be concurrently examined for their impact on research, innovation, project planning and product creation.

I believe that the outcomes of this convention will encourage the concerned authorities to adopt pertinent knowledge leading to innovation in their respective fields. This collaboration between Nepali Diaspora and Resident Nepalese helps to fulfill the existing knowledge gap. I am confident that this collaboration and future endeavors will lead to mobilization of currently underutilized knowledge and expertise bank of Nepali diaspora and national experts. I trust that the recommendations derived from the deliberations will not be restricted to documentation alone, but seriously considered and truly implemented through innovative approaches so that the benefits are felt at the grassroot levels.

I take this opportunity to thank the Government of Nepal, Nepali Diaspora, Resident Nepali experts, all paper presenters, participants and the organizing committee for making this event a grand success. Many people have worked relentlessly to organize the conference and prepare this report. I thank all chairs, paper contributors, panelists and rapporteurs for the hard work. I would like to thank chairs of the organizing committee, Mr Kumar Pant (Vice President, NRNA) and Dr Hem Raj Sharma (Advisor, NRNA) who spent many sleepless nights in organizing the conference and even more nights in finalizing the intellectual outcomes. I would also like to express NRNA's sincere appreciation of Member Secretary of this convention Dr Hari Dahal without whose total commitment this conference would not have been possible.

Thank you.

Bhaban Bhatta (President, Non-Resident Nepali Association)

## Preface

After a long political turmoil, Nepal has a stable government. The government has emphasized and prioritized sustainable and rapid economic growth as its short and long-term priorities. To achieve the development goals, the country needs to embrace evidence-based policy formulation, experts-driven project planning and execution, emerging technology and newly discovered resources. For optimal execution of development projects, we need concomitant human resources. Nepal's economy has suffered from mass exodus of one third of its human capital. Fortunately, the Nepali diaspora scattered around the globe is eager to be an integral part of the development of their motherland. In this context, the Non-Resident Nepali Association (NRNA) organized the 1st NRN Global Knowledge Convention, in partnership with the Government of Nepal, on 12-14 October 2018 in Kathmandu, Nepal.

The convention brought together international, Non-Resident and Resident Nepali experts to showcase and share their skill, knowledge, innovation, expertise and experience that, moving forward, can be utilized to transform Nepali economy to knowledge-based economy. The content of the convention was highly cross-disciplinary. On behalf of the organizing committee, we would like to express our deepest gratitude to all invited speakers, plenary discussion members, and paper and poster contributors. We acknowledge all international, Non-Resident and Resident Nepali sponsors for their generous financial and technological support for the convention. We express our sincere thanks to the members of the advisory board and organizing committee, and plenary and symposium session coordinators. Without their due consideration, the convention would not have been as rich in quality as it became. We are thankful to the NRNA secretariat for their support.

We are confident that this convention has marked the beginning of a new era in the philanthropic endeavors of NRNA. We are hopeful that we will be able to make future editions of this convention even more productive.

Thank you.

Conference Chairs

Kumar Panta (Vice-President, NRNA)

Dr Hem Raj Sharma (The University of Liverpool, UK)

## Executive Summary and Recommendations

The 1st NRN Global Knowledge Convention was organized by the Non-Resident Nepali Association (NRNA) in partnership with the Government of Nepal (GoN) on 12-14 October 2018 in Kathmandu, Nepal. Education and research institutes, private sector and various stakeholders were the convention supporters. The Rt. Hon. Prime Minister of Nepal Mr KP Oli inaugurated the convention on the evening of 12 October. Foreign Minister Hon. Mr Pradip Kumar Gyawali, Minister of Education, Science and Technology Hon. Mr Giriraj Mani Pokharel, Minister of Agriculture and Livestock Development Hon. Mr Chakrapani Khanal, and Minister of Labour, Employment and Social Security Hon. Mr Gokarna Raj Bista addressed the convention. Similarly, members of the Federal Parliament of Nepal, former ministers, high-ranking government officials, senior authorities of universities and research institutions, leaders of private sector, accomplished international, national and NRN experts, and students attended the convention.

This convention brought together experts from Nepal, Nepali diaspora and international community to share their knowledge and expertise, to develop networking and collaboration, and to share their experiences and eventually develop an action plan to help Nepal move towards knowledge-based economy. The convention comprised of 27 sessions on 4 plenary and 15 symposium topics including science and technology policy, knowledge-based economy, innovation and technology transfer, infrastructure, sustainable energy, disaster management, physical sciences, health, agriculture, education, environment, good governance, social security and finance. A total of 166 experts presented their papers and 78 distinguished panel members gave their input on wide varieties of subjects. About 500 participants from 21 countries attended this convention. The abstract booklet, program details and presentations have already been published on the convention website at [www.knowledge-nrna.org](http://www.knowledge-nrna.org).

Based on the knowledge shared through presentations, panel member inputs, and expert views on participant questions, the convention organizing committee submits this convention report to Non-Resident Nepali Association and the Government of Nepal. It contains the summary of all presentations and detailed recommendations. Below we present those recommendations in the concise form.

1. Some of the basic structures needed for collaboration between the Nepali diaspora and Government of Nepal has already been built since the establishment of Non-Resident Nepali Association in 2003. To make this collaboration more effective for knowledge-based economic development, we recommend that GoN and NRNA establish sector-based committees comprising representatives from GoN, NRN and resident experts. We also recommend GoN to invite diaspora experts in GoN's policy making bodies. These mechanisms will help to bridge the existing gap between the development needs of Nepal, and solution diaspora can contribute by providing skill, knowledge and expertise.

2. We strongly recommend NRNA that it create a conducive environment to bring in broader diaspora experts by introducing adequate structures. NRNA has initiated and undertaken some knowledge-based programs such as Skill Directory, Skill, Knowledge and Innovation transfer, Open University Nepal, NRNA Policy Institute, Nepal Science Foundation, NRNA Academy, Road Security, Health and Hygiene Improvement. But they do not seem to attract direct involvement of many recognized experts who are not yet in the mainstream of NRNA movement. We recommend that NRNA bring all of the above seemingly independent initiatives, projects proposed in the 1st Global Knowledge Convention and any future endeavors under a single framework.
3. Make outcome-oriented and visionary Science, Technology and Innovation (STI) policy. Recognize knowledge-based economy as an essential part of nation's economy. Revamp STI development policy to encourage multi-sector collaboration in economy, in line with vision 2030 for peaceful and prosperous Nepal. Increase investment in research and development from current 0.35% of GDP to at least 1% and gradually raise it in the long run to over 2%. Build globally competitive research institutions. Maximize the development and use of state-of-the-art technology in all sectors of economy in collaboration with NRN.
4. Create skilled human resources and maximize the utilization of already available human capital. Reverse and recycle the brain-drain culture to brain-gain through specific measures. Increase resources, and change traditional administrative approach and mechanisms for smooth transfer of returnee professionals in the local research environment. Utilize migrant workers' skill and expertise in the development of Nepal. Open training centers and provide seed money at the local levels to help them integrate in the economy. Address urgent issues of migrant workers such as legal issues aboard, pension for migrant workers, establishment of shelters particularly for adversely impacted women.
5. Establish NRN/GoN/private sector Innovation Endowment Fund to promote technology and innovation. Make Nepal's economic policy friendly for innovation-based start-ups endeavors. Introduce entrepreneurship-based curriculum in Nepali Universities and increase partnership with the industries to transform academic research into application. Revamp GoN's infrastructures to improve patent database and intellectual property rights enforcement. Encourage NRN and international entrepreneurs to innovate and invest in our indigenous resources and technology.
6. Increase collaboration and scholar exchange programs from Nepali education and research institutions with NRN and international scientific communities in areas such as Material Science, Agriculture, Education, Physical Sciences, Health, and Finance. Involve NRN global expertise and experience in developing academic materials and resources.
7. Develop infrastructure projects, procurement and delivery structures where the government, the market and civil society work in harmony. Work with experts and stakeholders. Do not reject alternate views/ recommendations off-hand. Encourage and support one-stop decision making. Stop political interference in infrastructure project

- development and management. Stop rent-seeking and license-raj management style. Develop enough in-house capabilities to reject irrational conditionalities from donors. Set up a credible agency to forecast the country's hydropower needs and development strategy. Develop committed and knowledgeable project oversight agencies.
8. Consider adopting modern technologies such as Trenchless Technology (TT) in all urban pipe laying projects and support the development of local expertise in TT by utilizing diaspora skills.
  9. Develop a long-term energy plan with ingrained implementation transparency. Start a balanced approach in creating energy from mixed renewable energy sources such as solar, wind, hydro, biogas etc. Prioritize the use of technology for Waste to Energy conversion as it is highly applicable in Nepal. Reduce consumption of electrical energy by adopting efficient appliances and equipment, and smart usage.
  10. Use smart engineering for efficient energy generation, transmission and distribution. Use smart grid technology focusing into community microgrids, and resilient transmission and distribution system.
  11. Introduce a system of food security, food safety and promotion of healthy eating programs in partnership with private sector and NRNA.
  12. Establish an Agro-food innovation supercluster in Nepal to ensure global competitiveness in agro-food industries through shared reliance-based knowledge partnership among foreign and domestic laboratories, technology transfer offices, research and academic institutions, and small and medium enterprises. Develop ayurvedic, medicinal, and aromatics plants and microbes commercialization for agro-food substitutes.
  13. Increase government visibility in health education system. Establish rehabilitation health care facilities to help patients effected by natural disaster and complicated diseases. Improve health care service delivery to patients affected by dementia, and psychological and mental disorder. Establish sperm and ovum bank in Nepal. Make radiation oncology more affordable through public-private partnership (PPP). Expand safe motherhood program and in-vitro-fertilization using PPP. Take advantage of tele-medicine.
  14. Empower local government to establish, operate, monitor and evaluate educational institutions ranging from pre-school to high-school and education for bringing innovation in education. Make educational institutions accountable to the public. Ensure equitable access to public education for all. No one should be left behind. Restructure educational facilities to provide easy access to education for disabled and traditionally marginalized populations.
  15. Devise higher education system to suit the needs of specific interest of students such as research, innovation and entrepreneurship; professional, market adaptive and broad-based education; open-admission-based technical, vocational, liberal arts and specially-targeted community education; lifelong learning, open learning, local-creativity and business incubation learning; international-students-focused for-profit and taxable corporate education or philanthropic education that takes minimum of half Nepali students based on merit.

16. Transform quality of public education system by recruiting teachers who have high competence in subject knowledge, good leadership skill, motivational and inspirational quality and capacity to self-educate new knowledge and competencies. Increase the options for continued education and training for school level and higher education teachers. Design apprenticeship programs so that post high school students can learn and earn at the same time. Make vocational education more widespread. Prepare students for jobs that do not exist. Make graduates highly innovative, entrepreneurial and capable of adapting to changing work environment.
17. Establish a Center of Excellence (CE) for environment, climate change, global warming and sustainability at Tribhuvan University in collaboration with ICIMOD, Kathmandu University and NRNA Academy. CE will engage in understanding the impact of environment pollution, and suggest technology and policy-based solutions. It will also prepare Sustainable Environmental Management Action Plans (SEMAP) in consultation with GoN. Integrate CE with the global institutions and diaspora community for expert knowledge.
18. Establish Community Environment Academy (CEA) at local levels for education, awareness, participation and behavioral change of citizens. CEA will work closely with GoN, CE, local authorities and businesses to implement SEMAP. CEA will conduct regular town hall meetings, workshops, presentations at schools and local communities.
19. Incorporate disaster risk reduction and management as an essential part of every development project. To improve disaster risk reduction and mitigation, increase investment, perform multi-hazard and risk mapping, adopt emerging technology, reduce food waste by improving storage capabilities and pre-storage treatment measures, increase awareness for disaster preparedness and infrastructure constructions, reduce post-disaster response time and increase the size of relief operation.
20. Liberalize financial investment policies to encourage foreign direct investments by replacing One Window Investment Policy with Automatic Rules as being practiced by our neighbors, reducing government involvement in international private party business contracts, allowing investors to choose international jurisdictions for business dispute settlements, simplifying bankruptcy and insolvency rules for easy exit venues, allowing direct repatriation of funds via commercial banks without needing central bank's prior approval, allowing brokerage and wealth management licenses to NRNs and foreign investors, increasing the fraction of allowed shareholding in capital intensive projects, and management and consultancy services to attract big international investors.
21. Extend Double Tax Avoidance Agreement (DTAA) to all countries from where foreign investment is coming into Nepal. Nepal should introduce General Anti Avoidance Principles (GAAP) so that Nepal will be able to control tax leakages and close potential loopholes such as sham transactions, treaty shopping especially for capital gains taxes. Expand Bilateral Investment Protection and Promotion Agreement (BIPPA) concurrently with DTAA to make foreign investors feel safe about their investments.
22. Make comprehensive social security policy to cover private sector, Nepali workers living abroad and informal-sector employees. Achieve sustainable social security through job

creation from public and private sector, and shifting from noncontributory (pay as you go) to contributory system. Implement performance-based pay system and non-permanent contract employments in public sector.

23. Institutionalize the rule of law, transparency, accountability, control of corruption, peoples' awareness and participation, right to information, global-local linkages and learn from best practices from abroad to maintain good governance.

In this first convention, the organizing committee was mostly comprised of NRN and resident Nepali experts. We recommend that in the future years, GoN's representation and role in the convention program selection is increased so that the committee can incorporate thematic sessions that are pertinent and aligned to GoN's current development priorities.

Last but not the least, the global knowledge convention is proposed to be organized in every two years. The preparation for the 1st knowledge convention was completed in six months. Although the convention exceeded our expectations in terms of quality and quantity of presentations, and volume of participation, we can make future editions more productive by expanding the participation of wider international experts and by choosing the venue that allows larger public participation. We recommend that GoN and NRNA assure the continuation of this convention, and fix the calendar year and starting date of the convention.



# Contents

<b>1</b>	<b>Background</b>	<b>12</b>
<b>2</b>	<b>Reports on Plenary Sessions</b>	<b>14</b>
2.1	Science and Technology Policy . . . . .	14
2.2	Knowledge-Based Economy and Development Pathways . . . . .	16
2.3	Knowledge and Technology Transfer . . . . .	19
2.4	Role of Nepali Diaspora for Development Policies . . . . .	22
<b>3</b>	<b>Reports on Symposium Sessions</b>	<b>24</b>
3.1	Agriculture and Food Security . . . . .	24
3.2	Disaster Risk Reduction . . . . .	28
3.3	Education . . . . .	30
3.4	Environment Pollution . . . . .	37
3.5	Financial Policy and Investment . . . . .	42
3.6	Health Education and Policy . . . . .	46
3.7	Hydropower, Transportation and Utilities . . . . .	48
3.8	New Frontiers in Physical Sciences and Prosperity . . . . .	58
3.9	Social Security and Good Governance . . . . .	60
3.10	Sustainable Energy . . . . .	63
3.11	Technology Transfer and Innovation . . . . .	66
<b>4</b>	<b>Reports on Focussed Sessions</b>	<b>69</b>
4.1	Agro-Food Innovation Supercluster . . . . .	69
4.2	Returnee Professionals, Scholarship and Research Funding . . . . .	72
4.3	Innovation and Private Investments . . . . .	74
<b>5</b>	<b>Organizing Committees</b>	<b>75</b>

# 1 Background

The Non-Resident Nepali Association (NRNA), an organization of millions of Nepalese residing outside Nepal, is an active partner of the Government of Nepal (GoN) and of Nepali people in advancing the country's aspirations for socio-economic development. Since its inception in 2003, NRNA has attempted to bring together diaspora resources to assist in Nepal's development efforts. In pursuit of this, it has organized numerous conferences at international and national level to explore areas of collaboration with the GoN. These conferences deliberated on diverse topics- financial investment, tourism and trade, constitution and democracy, residency and citizenship- and submitted related reports to the GoN.

With the anticipated stability of the new government and its focus on economic development, NRNA believes there is an urgency to systematize the previous knowledge sharing efforts and mobilize the diaspora's knowledge pool to complement the GoN's development efforts. The mobilization would augment the country's knowledge base and help close the knowledge gap that the GoN and Nepal's private sectors consider impediments to their development objectives. It would also lead to knowledge transfer, investment, and long term capacity building of the country.

In this context, NRNA organized the 1st Global Knowledge Convention, in partnership with the Government of Nepal. The proposal to held this Convention was approved by the 2017-2019 Executive Body of NRNA led by its President Mr Bhaban Bhatta. Mr Kumar Panta (Vice-President of NRNA) and Dr Hem Raj Sharma from The University of Liverpool, UK (Advisor of NRNA) jointly chaired the Convention. An Advisory Board and Organizing Committee of esteemed group of knowledge experts in diverse fields of education, research and policy making laid the foundation for this Convention.

The objectives of the Convention were as follows:

- Identify inadequacies of Nepal Government's Science and Technology (S&T) policies in inviting and encouraging global knowledge investment
- Understand Nepal's S&T State-of-the-Art, and identify knowledge gap in comparison to nation's developmental aspirations
- Identify expertise pools in diaspora community, and explore modalities of transferring such expertise to address Nepal's needs
- Enhance nation's confidence by aligning diaspora's skill, knowledge and innovation to development projects of national priorities

Distinguished invited speakers and panel members addressed the following four plenary sessions:

- Science and Technology Policy
- Knowledge-Based Economy and Development Pathways
- Knowledge and Technology Transfer
- Role of Nepali Diaspora for Development Policies

Invited and contributed papers were presented on following thematic topics:

- Agriculture and Food Security
- Disaster Risk Reduction
- Education
- Environment Pollution
- Financial Policy and Investment
- Health Education and Policy
- Hydropower, Transportation and Utility
- New Frontiers in Physical Sciences and Prosperity
- Social Security and Good Governance
- Sustainable Energy
- Technology Transfer and Innovation
- Agro-Food Innovation Supercluster
- Returnee Professionals, Scholarship and Research Funding
- Innovation and Private Investments

Based on the knowledge shared through presentations, panel member inputs, and participant questions and expert answers, coordinators of the respective sessions present the following summary, recommendations and plan of action.

## 2 Reports on Plenary Sessions

### 2.1 Science and Technology Policy

The NRNA initiated Global Knowledge Convention 2018 in Kathmandu is a timely organized platform in bringing the decision making actors from political, economic and technological sphere. In context of stable government formed after the new constitution, the deliberations made by the Convention will support in achieving the country's vision of *Prosperous Nepal, Happy Nepali*. The plenary session on S&T policies was the opening activity of the technical deliberations.

#### Summary and Recommendations

1. Increase investment in R&D (research and development). Proven is that only scientific research and technological development can boost economic development and maintain it. Presently Nepal's GERD (Gross Domestic Expenditure in Research and Development) is staging at 0.35%, this should be increased to 1% at the earliest for visible impact of S&T in the development, and gradually raised.
2. Utilize skilled human resources. Nepal has achieved a critical mass of HRST (human resources in science and technology), which is 3000 per million population. On one hand this trained resources is under-utilized, on the other hand, a majority of Nepal's migrant human resources are complying with unskilled employment.
3. Formulate a visionary STI policy with set priorities. Nepal has S&T Policy formulated in 2004, it needs immediate revision or replacement. Keeping view the resource constraints and resource richness, the S&T policy should set priorities, where Nepal can compete and take comparative advantage and promote home-grown business. Suggested areas are:
  - (a) Nutrition and Preventive Health
  - (b) Organic (bio) Agriculture and Forest Management (seed bank, compost, organic fertilizers, organic pest control)
  - (c) Water Cycle Strategic Program (eco-sanitation, water recycling, rainwater recovery, water basin management)
  - (d) Renewable Energy (micro-hydraulic generation, solar energy, small wind turbines)
  - (e) Eco-construction (ecological construction, rural, seismic, low cost thermal insulation in walls and roofs, energy efficiency and low cost, eco-sanitation, rainwater recovery, composting latrines, ferro-cement)
  - (f) ICT (information communication technology) and Electronic Commerce Strategic Program

4. Enhance institutional collaboration. To create knowledge-based economy, there needs strong collaboration between academia/universities and industries/entrepreneurs/production sectors. Integration of economically focused strategic plan with R&D led knowledge economy and innovation in development efforts is most wanting. Such collaboration will bring out the Nepali universities from isolation cocoon, their knowledge be articulated for economic and social development.

## Plan of Action

NRNA can help the GoN in implementing above recommendations.

1. NRNA should start exploring the possibility of helping the GoN to increase the funding for Research and Development.
2. One of the biggest strengths of Nepali diaspora is in the area of skilled human resources. They possess high level of skill and knowledge due to their education and involvement in development projects in the prosperous nations. NRNA and GoN should create an environment for skill and knowledge investment in Nepal.
3. Nepali diaspora has expertise in formulating visionary STI policy for the knowledge-based economy. GoN should take advantage of this resources and NRNA should facilitate the easy transfer of such expertise in Nepal.
4. Nepali professionals studying and working around the global are in a unique position to facilitate collaboration of Nepali research institutions with the international scientific communities. GoN can immediately start making use of this possibility.
5. Nepali diaspora not only extend its help to the federal government of Nepal but also to the state and local governments. NRNA's willingness to help should be communicated to all levels of Nepali government.

*Former Vice chair of NPC-GoN, Dr Dinesh Chandra Devkota, chaired the session, while Dr Dinesh Bhujju (NAST) facilitated it. There were two presentations: the first was on the status of STI in Nepal, contributed by Dr Bhujju, and the second was an invited lecture by Dr Eduardo Martinez (UNESCO) on Science, Technology and Innovation Federal Strategy and Policy in Nepal 2019-2022. The panelists team included: Dr Malakha Shrestha (Hannover, Germany), Dr Fernando Quivedo (ICTP, Italy), Dr Sharad Onta (Public Health Foundation, Nepal), Dr Ganesh Raj Joshi (former Secretary, GoN), Dr Rejina Maskey-Byanju (TU, Nepal). During the open floor, 10 participants put their views and questions.*

## 2.2 Knowledge-Based Economy and Development Pathways

Nepal's underdevelopment is often blamed for politico-institutional weaknesses, instability and conflicts in the past. Nepal has now entered into a new era of federal system of governance and political stability. Our in-country institutional, human and financial capacities are improving. Our infrastructure and capacity for information and knowledge access, and our ability to translate them for development is rapidly rising. Policy makers have enough avenues for making efforts. Policy makers are also increasingly focused on providing consistent and long-term policy initiatives and there is presence of large Nepalese diaspora willing to support Nepal on knowledge and skills, technology and investment. Our aspiration for prosperity and development, must hinge on good development vision and targets and conducive pathways.

### Summary

Our action must hinge on good development vision and knowledge-based economy. Knowledge based economy integrates knowledge and technology beyond the traditional approach and rooted in evidence-based policies and programs. Greater access to information and knowledge systems due to digitalization of economy and society must be factored-in. The key pillars of Knowledge based economy are education and skilled labor force, system of innovation, maximum utilization of IT infrastructures, social networks and sound policy and regulatory environment among others. There is a common aspiration that Nepal must graduate from LDC category sooner- far before 2030. We need clear future vision of development aspiration and goals. Globally, 2030 SDGs have decided 17 goals and 169 targets. Nepal needs vision not only for 2030 but beyond and these visions must be shared across broad stakeholders. India and China have managed high economic growth; Bangladesh is one of the fastest growing economy globally. We must learn from successes and failure of other countries in the region and beyond.

In this context, this plenary session discussed Nepal's development goals and aspirations and deliberated on modalities of the development pathways utilizing the potentials for knowledge-economy with critically assessing them. This further elaborated the role of diaspora in translating to knowledge-economy.

Key questions addressed by keynote speakers and panelists were (a) What are our development aspirations? What are/should-be our development goals, 2030 and beyond? (b) What are key drivers for development pathways and role of knowledge-based economy? What are the pre-requisites for these pathways? (c) What are our opportunities for developmental leap-frogging?

### Recommendations

1. We must aspire for ambitious economic development goals reaching between 4,500 (moderately ambitious) to 10,000 USD (extremely ambitious) per capita GDP (current terms) in next 20-30 years. This means a double digit and sustained economic growth and productivity rise for the next two decades. However, this growth must also be managed for many attributes such as inequality, disparity and distributional issues across socioeconomic-strata as well as across geographical regions.
2. Double digit growth needs larger development expenditure in our economy (which stands about 30 billion as of now) and more capital investment which must be sourced internally as well as externally. Our internal sources alone are not sufficient. Outside investment is key and urgently needed from variety of means and sources. The role of diaspora is key not only in thought, skill and knowledge but more importantly for investment.
3. Developing country like Nepal needs to do many things in every sectors. However, Nepal must understand global mega-trends and align itself to harness its competitive advantages in selected few priority areas with the clear long term goal, policy consistency, and consistent and continuous effort for at least two decades. Global geopolitics and shift in economy and trade gravity must be factored-in. That clarity is urgently needed. Few key priority sectors are: (a) infrastructure development - physical and non-physical connectivity are key sources to trigger growth in many sectors (b) modernization of subsistent agriculture (c) industrial development, in particular, niche competitive-advantaged and productive sectors, and (d) service sector promotion, especially tourism and IT.
4. Nepal stands in bottom strata of the countries in Knowledge-Economy Index in the world. Our economic development must be rooted in knowledge, technology, evidence-based policies and programs, and must embrace emerging drivers, such as, greater access to information, young demography (median age of population is around 23 years) and digitalization of economic growth. Key to these are economic incentives and institutional regimes, effective and appropriate system of higher education and skill sets, R&D and innovation. Nepali government must invest in R&D, IT, higher education and build knowledge institutions.
5. Modernization of education is key. Knowledge-economy requires world-class universities to address our needs and niche areas together with few Center of Excellences.
6. Structural transformation is a key for Nepal. Challenges for structural transformation is immense and we must overcome too. Role of government is essential in guiding economy. The key priority sectors are already mentioned in earlier bullet, however, this needs few key facilitations: good governance, better institutional arrangement, better knowledge base, great push to infrastructure development, and enhanced ability to invest.
7. Nepal must leap-frog, we must take-off; it asks for transformation changes. Business-as-usual is no longer enough. We must also learn from those countries which have leap frogged such as East Asia and South East Asia in particular and also must realize Nepal's geopolitics situation.

8. NRN must play ambassadorial role to promote Nepal and especially for facilitating capital and foreign direct investment. Our expectation from NRN are also to facilitate knowledge and skills, development of research and academic ties, facilitating market access, promote trade opportunities, promote tourism, extend our soft power through cultural exchange and others.

## **Plan of action**

1. NRNA, with the Nepalese Government and related communities to bring these discussions into further depth, through more expert-dialogue in specific areas mentioned above. Subject to funding availability from NRNA and others, such dialogue can be hosted in Nepal and outside (one such place is AIT-Thailand which has a critical mass of leading Nepalese experts and is also close to Nepal physically to invite experts from Nepal) in 2019.
2. The summary and recommendations of this session to be communicated to NPC and related agencies to provide inputs in the process of formulation and implementation of Nepal's development plans.
3. NRNA to pay more proactive role in knowledge-economy, especially through mobilizing diaspora policy, developing knowledge Centers, and one World Class University.
4. NRN should play ambassadorial role to promote Nepal and facilitate capital and investment. Our expectation from NRN is for knowledge and skill, development of research and academic ties, market access, promote trade opportunities, promote tourism, cultural and other soft power.

*This session received valuable contribution from speakers having diverse experience on Nepal's economy and development policies. The presentations were made by Dr Bindu Nath Lohani (Former VC, Asian Development Bank), Dr Baburam Bhattarai (Former Prime Minister of Nepal), Dr Swarnim Wagle (Former Vice Chairman of National Planning Commission, Nepal), Mrs Yankila Sherpa (Former State Minister of Tourism and Civil Aviation, Nepal) and Mr Jiba Lamichane (Former President of NRNA). The session was moderated by Dr Shobhakar Dhakal (Asian Institute of Technology, Thailand).*

## 2.3 Knowledge and Technology Transfer

This plenary session focussed on Nepal S&T investment policies and challenges on Innovation, Knowledge and technology transfer for sustainable development, Knowledge investment from NRN perspective and Agro-food innovation supercluster concept in Nepal. **Summary**

The presentations discussed elaboratively on the underlying issues and gaps in the current S&T policy, planning, implementation and funding scenarios. The session also discussed possible approaches to knowledge and technology management, understanding learning and innovation in real terms and their critical drivers to achieve S&T excellence. The session emphasized the necessity to create a collaborative culture, supportive infrastructure and sensitive measurement system to facilitate the effective and efficient acquisition and in the deployment of emerging knowledge and technology. The need to encourage discovery and utilization of knowledge at every level, working collaboratively with all related organizations to encourage entrepreneurship and link science from service to productivity was highlighted. The information to global knowledge and technology development is important to understand in the context of Nepal for the effective implementation and utilization of knowledge and technology. Organizations like NAST, RECAST, NARC needs to develop national flagship projects in key priority areas and work jointly to utilize resources and fundings to yield a tangible outcome. NAST role and limitation as an S&T apex body needs to be reviewed to enable NAST play an effective role in synthesizing and implementing future S&T policy. NAST led R&D research and technology transfer initiatives also has limited impact due to lack of intra and inter collaborations. An increase in S&T funding to 1% of the GDP was suggested.

Ministry of Science Technology and Environment (MoSTE) policy needs to be directed to provide necessary tax incentives and funding resources with focus to increase R&D infrastructure capacity and capability. NRNA presentation also focussed for its proactive role as an S&T partner and highlighted the significance of NRNA SKI/Academy's active role and their representations at S&T institutions such as NAST, National Planning Commission and in Government Advisory Boards. Setting up a joint NRNA/GoN R&D endowment innovation fund of \$10 million was mentioned to develop various grants scheme such as discovery grant, linkage and talents program to provide incentives to R&D. Sizable diaspora population are now engaged in scientific pursuits globally and has acquired expertise in several areas health, energy, agriculture, food and manufacturing which needs to be harnessed and imported to Nepal through development projects. NRNA commitment and partnership with Government of Nepal in knowledge initiatives needs to be pushed further into real projects on the ground in national priority areas to facilitate innovation, technology transfer and share global knowledge through global exchange program. A diaspora's partnership in agro-based innovation supercluster with Nepal government is necessary to share knowledge and entrepreneurship and bridge the existing gaps and prepare Agriculture sector to global competitiveness in agro-food industries. Such initiatives are necessary to energize

economic growth, employment generation in the largest agriculture sector. Nepal is rich in bio-diversity of high medicinal values in the field of Ayurveda, medicinal and aromatic plants and microbes commercializations. Nepal's location between China and India with market proximity to their vast population provides a unique opportunity, and support to Agro-food supper cluster hub will hep take Nepal's agriculture to global market. NRNA and Government partnership is critical to the success of this hub to a large industry base for export.

## **Recommendations**

1. Government led Knowledge investment perspective and initiatives needs to be pursued in partnership with private sectors and NRNA.
2. Review current S&T policy to align to 2030 vision
3. Review of NAST role and function
4. Develop a white policy paper for NRN Academy and NRN S&T policy
5. Develop a clear mechanism for R&D and commercialization drivers
6. Convene a high-level meeting to review global conference recommendation
7. Develop an inclusive and collaborative approach for co-investment in S&T start-up and projects of commercial significance
8. Establish NRN/GoN Innovation Endowment Fund
9. Create strong linkages and representation of NRNA SKI in Government policy and institution
10. Develop a white policy paper on NRN Academy
11. Establish an Agro-food innovation supercluster in Nepal
12. Develop full database of SKI inventory of diaspora

## **Plan of Action**

1. Submit a white policy paper to GoN
2. NRNA to organize a follow up meeting with concerned government agencies to discuss white policy papers and identify role and responsibilities
3. Identify niche areas to develop a joint collaborative project proposal
4. Submission of the proposal for funding through GoN to donor institutions
5. Discuss representation of NRNA SKI in S&T bodies
6. Finalization and implementation of SKI database
7. Establish joint NRNA/GoN innovation fund

*The presentations were given by Prof Jiba Raj Pokharel (Former VC of NAST), Prof Pramod Bahadur Shrestha (Institute of Engineering, Pulchowk), Dr Raju Adhikari (RMIT University,*

*Australia), Mr Narayan Ghimire (Flavorcan International Inc, Canada). This session was chaired by Hon Minister of Education, Science and Technology Mr Giriraj Mani Pokhrel and moderated by Dr Raju Adhikari. Each presentation was followed by Q&A from the floor and the summary of the session was presented at the end by the chair of the session.*

## 2.4 Role of Nepali Diaspora for Development Policies

### Summary and Recommendations

1. Government of Nepal has realized the importance of diaspora as a development partner. Diaspora's strength in research and experience in best practices that can be utilized in reforming old ones and formulating new public policies suitable for current situation in Nepal to improve governance, socio-economic development, business, industry, education and research.
2. National Planning Commission (NPC) Vice Chair advised NRNA to start collaboration with NPC at the broader interest of nation and its citizen.
3. Minister of Foreign Affairs proposes that NRNA collaborate with Nepal Government through NPC, Policy Research Academy and other relevant government agencies. Diasporas multi-angled perspectives will be instrumental in the policy discourse for the sustainable development of Nepal. Minister of Foreign Affairs also pointed that NRNA collaboration can be instrumental in auditing existing policies to make them relevant and efficient to achieve national goals.
4. Diaspora resources should be well defined and the dynamics of different diasporas (labor migrants to permanent migrants including in SAARC region) and Diaspora Economic Model need to be critically analyzed in the process of formulating Nepal's public policies. The session suggested for a physical office in Kathmandu to manage the regular policy debate and research activities on top of its international office.
5. Panelists agreed that establishment of NRNA policy and knowledge platform will have a significant impact on the social and economic development of Nepal as policy scholars around the world can swiftly bring multi-angled perspectives with evidences. It will add value to NRNA as a global institution as well and facilitate the implementation of NRNA vision 2020 and beyond.
6. GoN and NPC expressed interest and commitment to engage NRNA for the public policy discourse and any other relevant activities.
7. The challenges to make use of diaspora expertise in development policy areas can be mitigated by establishing a GoN and NRNA collaboration mechanism. Both parties should prioritize the formation of such a mechanism.

### Plan of Action

1. NRNA President commits to endorse and adopt the National Policy Institute founding strategic plan immediately. President illustrated that due to the connectivity, diaspora policy scholars can contribute remotely to achieve NPI goals. Complete by January 2019

2. NPI to prepare a comprehensive project proposal or a concept document in collaboration with GoN officials and other stakeholders. Approve by January 2018.
3. Plenary session recommended that NRNA move forward NPI-proposed Founding Strategic Plan 2019-2021. Complete by February 2019
4. Plenary session recommended to take an immediate action to develop a MoU between NPI and NPC. NPI should expand its partnerships with private sectors and academic institutes in Nepal and abroad that work in the interest of Nepal and Nepali to contribute towards Nepal national goal Prosperous Nepal, Happy Nepali. Complete by March 2019

*Prof Puspa Raj Kadel (Vice Chairman, National Planning Commission) and Mr Bhim Udas (Founding International Coordinator of NRNA) delivered invited lectures. Mr Sharad Neupane (NPI, Thailand), Dr Krishna Adhikari (University of Oxford, UK) and Dr Yub Raj Pokharael (South Asian University, India) gave contributed talks. Mr Bhaban Bhatta (President of NRNA), Prof Madan Kumar Dahal (Central Department of Economics, TU), Ms Sharu Joshi Shrestha (Former Strategic Partnership Specialist at UN Woman) were the member of panel discussion. Hon Foreign Minister Mr Pradeep Kumar Gyawali addressed the session as a guest speaker. The session was chaired by Dr Bhekh Bahadur Thapa and moderated by Mr Khagendra Dhakal.*

## 3 Reports on Symposium Sessions

### 3.1 Agriculture and Food Security

Agriculture has been the mainstay of Nepal's economy as well as the main source of livelihoods for majority of people in the country from the time immemorial to date. Yet, the country has increasing dependence on the imports of food and agriculture inputs over time. Despite much emphasis put on agriculture development in the periodic plans for nearly half a century now, the capacity to achieve appropriate agricultural education, innovation of technology, multi-sectoral collaboration and investment required thereof have not been adequate to explore the vast potential of diverse agricultural resources in order to secure sufficient, safe and healthy food for the people.

By the end of the period of the first long-term agricultural plan of Nepal, the Agriculture Perspective Plan (APP), 1995/96 – 2014/15, productivity, infrastructure, food security and poverty situation are known to have improved substantially. However, the status of agriculture development was still considered to be in a low development stage due to inability to achieve the level of growth as anticipated. Despite some subsectors such as dairy processing, poultry, tea, vegetable seed and fisheries showed positive signs, they are not yet sufficient to lift a large number of people engaged in agriculture out of poverty and make a dramatic dent in reducing malnutrition and assure food security of the nation. This has been the assessment during the formulation of the current long-term plan, Agriculture Development Strategy (ADS) that is expected to guide the agricultural sector during strategy period, 2015-2035. Over the period of this two decade long plan, the structure of the agricultural sector is expected to change considerably, with the agribusiness and non-farm rural activities growing relative to accelerated agricultural growth. The ADS considers the agricultural sector in its complexity, and encompasses not only the production sectors (crops, livestock, fisheries, forestry) but also the processing sector, trade and other services (storage, transportation and logistics, finance, marketing, research, extension).

The ADS outlines its expected impacts through accelerated agricultural growth as follows:

- Ensuring food and nutrition security through improving productivity, profitability and competitiveness in agriculture,
- Reducing poverty reduction through accelerated agricultural growth,
- Providing an important source of foreign exchange through agricultural trade surplus,
- Promoting inclusion of disadvantaged groups and regions through an approach to value chain development for higher and more equitable income of rural households
- Providing institutional mechanisms to ensure farmers' rights to participation in the planning, decision making, implementation, and monitoring of the strategy.

All these expected impacts remain only a tall talk if the country does to acquire the required capacity early enough for achieving the expected outputs i.e., improved governance, higher productivity, profitable commercialization and increased competitiveness as projected by the ADS. Importantly, the vast number of the Nepal's current pool of professional expertise remain in foreign lands as Diaspora human resources that should be redirected back to the motherland to revitalize innovation and adaptation of technologies as well as multi-sectoral collaboration and investment for transformative leap forward in the agriculture sector. The Symposium on Agriculture and Food Security organized as a part of the 1st NRN Global Knowledge Convention aimed to address these concerns.

## **Summary and Recommendations**

The two sessions of the Agriculture and Food Security Symposium discussed some of the major potentials, issues and challenges of agriculture and food sector of Nepal. Based on the deliberations during the two sessions of the Symposium, the following recommendations are made.

1. Collaborations in teaching and research between Nepalese institutions such as the Agriculture and Forestry University (AFU) and NRNA through Nepali Diaspora organizations should be discussed seriously, planned and initiated.
2. NRNs should mediate collaborations between Agricultural institutions in Nepal and relevant academic and government institutions in countries of their residence. Exchange of scholars and students between the institutions of respective countries and agriculture and food related research are some of the examples of collaborative programmes that should be established.
3. NRNs can contribute knowledge and financial investments to some of the areas of agriculture development including but not limited to the following areas of agriculture development for ensuring food security in the country:
  - (a) A comprehensive Agricultural and Natural Resources Development and Management Strategy (ANRDMS) should be developed with the technical support from NRNA for sustainable agricultural and natural resources development and management in Nepal.
  - (b) Agriculture modernization, with development of technologies appropriate to diverse agro-ecological zones.
  - (c) Branding, packaging and marketing of products for export markets should be increased to meet the increasing demands of international niche markets products.
  - (d) Capacity building required to meet the high level human, knowledge and materials resources can be met through academic teaching and research, especially helping Nepalese institutions in graduate studies (Graduate Diploma, MSc, PhD) and short-term skills training.
  - (e) Development of academic resources materials should utilize NRN capacity; for an example a book on food security, an initiative of NAPA, is currently in the

- process of publication.
- (f) NRNs can contribute to technology development such as precise weather forecasting and matching right varieties, mechanical planting and harvesting
  - (g) NRNs can have catalyzing and facilitating role in increasing investments in livestock food commodities, genetic improvement of livestock, developing livestock marketing system.
  - (h) A system of food safety and promotion of healthy eating should be introduced in partnership between agriculture sector and public health sector.

## Plan of Action

It is proposed that the Government of Nepal formulates a policy framework to engage agricultural experts of Nepali origin to establish and operationalize formal collaboration between NRNA and Agricultural institutions of Nepal. As a result of such a framework, some of the initiatives as a plan of action such as the following strategies can be put in place for planned and implemented as initial efforts for the benefit of agriculture sector in the country:

1. A post-graduate level academic training program on Sustainable Livelihoods and Food Security is proposed to be launched as a collaborative initiative between the AFU and NRNA Academy in support of Canada Foundation for Nepal (CFFN) and Nepalese Agricultural Professionals in Americas (NAPA). CFFN has already published a text book, Sustainable Livelihoods in Nepal: Principles and Practices. NAPA is in the process of publishing a text book on Sufficient, Sustainable, Safe and Healthy Food: Principles and Practices of Food Security. These two books can be readily used as text books for the proposed academic training program.
2. The National Planning Commission should organize annual or biennial advisory meeting between top officials of agriculture, livestock development and research with globally known experts of agriculture and livestock among Nepali Diaspora around the world. This will help understand better the gaps in the capacity for agriculture development in Nepal for mitigating those gaps utilizing the vast wealth of knowledge and capacity resources that exist among NRNs.
3. The Government of Nepal should propose to the Food and Agriculture Organization (FAO) a program for inviting agricultural experts of Nepali origin living abroad to serve as short-term Technical advisors on voluntary basis or competitive basis at national and provincial levels to fill the current gaps of technical expertise under the new federal structure of the country.

*Session1 Chair: Prof Ishwari Prasad Dhakal (Vice Chancellor, Agriculture and Forestry University); Presenters: Dr Yubakdhoj GC (Secretary of the Ministry of Agriculture and Livestock Development), Prof Durga Poudel (University of Louisiana at Lafayette, USA),*

*Dr Krishna Dev Joshi (International Rice Research Institute, Manila), Dr Nanda Prasad Shrestha (Former Executive Director, NARC), Dr Drona Rasali (Provincial Health Services Authority, Canada), Mr Ram Bhandari (Founding President, IISUMOD)*

*Session 2 Chair: Dr Dil Bahadur Gurung (Member, National Planning Commission); Presenters: Dr Tek Bahadur Gurung (Agricultural Research Council, Nepal), Dr Surya Bhattarai (Central Queensland University, Australia), Dr Bholanath Singh Basnet (Retd. Principal Scientist, NARC), Mr Dharmendra Kalauni (Agriculture and Forestry University, Nepal), Mr Pradeep Wagle (ANAPA, USA), Mr Ravindra Nyaupane (Swansea University, UK), Dr Purna Kandel (Liam BioChem International, Toronto, Canada); Poster Presenters: Mr Jeevan Bahadur Shahi (Dutelo Agro, Nepal), Mr Raju Pandey (Citrus Research Board, USA); Rapporteurs: Dr. Neena Gorkhali (Senior Scientist, NARC), Dr. Pradeep Wagle (Research Scientist, US Department of Agriculture); Coordinators: Dr Drona Rasali (Provincial Health Services Authority, Canada), Dr Keshav Adhikari (IAAS, Tribhuvan University, Nepal)*

## 3.2 Disaster Risk Reduction

The title of the first session was the disaster risk reduction policies and strategies and the second session with the title of earthquake was organized under disaster risk reduction symposium 2. In the first session, five topics were presented highlighting various policies and strategies in relation to disaster risk reduction in Nepal. Newly formed disaster risk reduction legal framework, such as under new constitution 2015 of Nepal, DRRM Act 2017, Local Government Act 2017, National DRR policy and strategic action plan (2017-2030) are also highlighted. Hazard and risk mapping for different types of disasters were addressed. Newly emerging green solutions for protection of shallow landslides and soil erosions in the hills and mountains of Nepal can be adapted. A huge amount of food wastage due to poor storage facilities, therefore, food storage facilities in all geographic regions are required to be established, which is also very useful during disaster period. It is better to protect all information we gather from lessons learned during the previous disasters. Engaging social network and web-based information and mobile technology for disaster risk reduction is helpful both in disaster preparedness, early warning system and post disaster rescue and relief operations.

### Summary and Recommendations

1. Legal framework: Nepal's new constitution 2015, disaster risk reduction and management act 2017 and political party related act 2017 all address disaster risk reduction and management.
2. Multi-hazard and risk mapping is necessary.
3. Adaptation of new and emerging technologies for preparedness
4. Disaster risk reduction and management should be incorporated as an integral part of every development work not as a separate and external component together with climate change adaptation.
5. Disaster risk reduction in the youngest and the most fragile Chure region of Nepal can be addressed combining river system management plan as adapted by President Chure-Terai Madhesh Conservation and Management Plan.
6. A large quantity of food wasted due to poor storage facilities needs to be addressed by improving storage capabilities and pre-storage treatment measures, which can be used in post-disaster emergency relief.
7. More investment in disaster risk reduction in the form of preparedness by building awareness and constructing infrastructures is needed.
8. More training, advanced equipment and facilities are necessary for post disaster response and relief operation.

### Plan of Action

1. Establishment of National Disaster Management Authority is recommended.

2. Fast adaptation of emerging technologies for all natural and human induced disaster is needed.
3. More investment in disaster preparedness including installation of early warning systems
4. Establishment of well-equipped and fully authorized institution for post-disaster rescue and relief operations including well facilitated health centers
5. A well-suited development model required to make for fragile region like Chure region different than other regions.
6. Strictly making land use plan and policy in all provincial levels and their soon implementation.
7. Establishment of new web-based network or mobile network for disaster preparedness

*Chair: Mr Sushil Gyawali (CEO, National Reconstruction Authority); Speakers: Dr Ganga Lal Tuladhar (Chair of High Level National Commission on Education, Nepal), Mr Banshi Acharya (Under Secretary, Disaster Management Division, Ministry of Home Affairs), Dr Moti L. Rijal (member, President Chure-Terai Madhesh Conservation Development Board, Government of Nepal and Central Department of Geology, Tribhuvan University, Kathmandu, Nepal), Mr Dinanath Bhandari (Practical Action Nepal), Mr Surya Bahadur Thapa (National Disaster Management Network of Nepal), Dr Madhu Sudan Acharya (University of Natural Resources and Life Science, Austria), Mr Prashant Paudel (Agriculture and Forestry University), Mr Surya Narayan Shrestha (Executive Member, National Society for Earthquake Technology), Dr Peetambar Dahal (University of California, USA), Mr Mukti Suvedi (Humber College, USA); Coordinator: Dr Moti L. Rijal (member, President Chure-Terai Madhesh Conservation Development Board, Government of Nepal and Central Department of Geology, Tribhuvan University, Kathmandu, Nepal)*

### 3.3 Education

The symposium on Education System, Knowledge Infrastructure and Knowledge Institutions was organized with an aim of drawing lessons and inspirations for qualitative transformation of Nepal's education system, particularly to provide helpful inputs to High-Level National Education Commission 2075 (HLNEC) formed by Government of Nepal, which aims to develop national education policy for the coming decades under federal system. The symposium had two thematic sessions and a half-day Extended Session where diaspora participants gave feedback to HLNEC. Session A: Working Towards Quality Education Session B: Reforming Higher Education Extended Session: Policy Feedback by Diaspora Nepali to HLNEC

#### Summary

On State of Nepalese education system:

1. While there is improvement in male-female parity in education and high enrollment rate in Grade 1, there is a growing gap between the rich and the poor and between the urban and the rural. The inequity is largely fueled by privatization, uneven access to ICT, institutions and facilities, and poor intervention mechanism for those who do not fit into the mainstream.
2. While individual rate of return from gaining education in comparison to not gaining education is much higher for people with disabilities, there is poor access and incentives on quality education to people with disability and high dropout rate among disabled children, claimed to be 1/3 of all dropouts.
3. Federalism is a new practice in Nepal. Lawmaking at all levels in education being still incomplete, there is now a tug of war between the Federal, Provincial and the Local governments regarding the clarity of role and responsibilities, and some concurrence of roles among the actors as mentioned in the Schedule 5, 6, 8 and 9 of the Constitution. There is a potential contradiction between the role of local government and CTEVT on technical education and also on who is regulatory and who is executional authority. CTEVT trying to become executional authority could be problematic and limit innovation and diversity.
4. Education system is yielding good quantitative output but is generally poor in quality. Severely lacking are critical thinking, problem solving, innovation, entrepreneurial pursuit and augmentation of personal, social and professional ethics in education. Education is severely disconnected from life and life-skills, livelihood, experiential understanding of social and natural environment, and pursuit to improve and innovate upon what is.
5. Nepal practiced politics in education instead of practicing politics of education. Therefore, education system has had a complex relationship with society as a victim and perpetrator of conflict. It is doing poorly in promoting tolerance, respect to diversity, inclusive citizenship, developing reconciliatory relationships and, thus, affecting equal

- opportunities. We could not separate the seats of Raja and Rishi.
6. Of all graduates, only 25% are getting employed internally and the number of Nepali students studying abroad is growing exponentially, with number of LOI for studying in foreign institutions surpassing 76000 this year alone and millions of youth work as unskilled laborers in Middle East, Malaysia and elsewhere, signaling multidimensional and complex problem involving education as a key player of the complexity.
  7. Having upheld the view that public funding must come with accountability to the government (instead accountability to the public), the government is reluctant to provide autonomy in operation and management of educational institutions. Instead of forcing educational institutions to be efficient through innovation, competence, collaboration, self-sufficiency and sustainable approaches, it is creating dependency syndrome and incompetence.
  8. Education is revolving around textbooks, lecture notes and exam preparation guides, consequently power to memorize them being the primary measure of student outcome. A million students studying in the same grade in a given year had the collective capability of studying hundreds of million lessons but we are limiting our nation's collective learning capacity and capacity to create by limiting on few textbooks and fixed lessons, same lessons for Humla, Kathmandu, Jhapa, Saptari and Baglung and we expect all of them to have interest on the same stories and lessons, although even within a single class all the children could have different capabilities and interests.
  9. Education system has been a collection of subject ladders and it is not like a tree. System does poor recognition of the fact that all the fields of knowledge are the branches of the same knowledge tree and are interconnected and people have limited choice to combine different branches of knowledge to meet their interest and needs even within one institution let alone combining them from different universities.
  10. Education is plagued by Affiliation-Raj and Licence-Raj, thereby corrupting the institutions, and diverting institutions away from their core functions. Be the granting institutions be Nepali or foreign, this model leads to a corrupt and extractive system. Instead of having a separate agency for allowing the opening of new and for closing of defunct and decrepit institutions, Nepal is allowing teaching and research institutions themselves like universities and CTEVT to engage in such activities, which has led to an erosion of ethics in the institutions.

## **Recommendations**

1. Inspire quality transformation in present public education system by recruiting teachers who are highly competent in subject knowledge, who have good leadership, motivational, inspirational quality, who have self-motivation and capacity to self-educate on new knowledge and competencies. This must be combined with (1) end to permanence and entitlement in education sector jobs; all jobs must be permanent only until the time the person renders competent, efficient and ethical execution of the duty, (2) beginning of the competitive hiring of teachers from among graduates of all fields, providing

- training afterwards, and requiring continuous professional and leadership development for license retention, and (3) recognition of the fact that quality of education is strongly correlated with quality of teacher and quality of educational leadership.
2. While adhering to constitutional aspiration on equity, inclusion and social justice, and to national qualification frameworks and national quality standards, use local government's authority over establishment, operation, monitoring and evaluation of educational institutions ranging from preschool to high-school and vocational education as an opportunity to bring innovation in education by injecting critical-thinking, local problem solving, entrepreneurship, job-creation, skill-training, social-service, and ethical citizenship in education.
  3. Taking *No one should be left behind as a Mantra*, Nepal's education policy should take inclusive, equitable and quality education as a key paradigm not only for emancipation of the disabled, marginalized and remote and rural population but also to boost economic, intellectual, innovative and compassionate capacity of the nation. Treat education not only as human right but also as tool to boost earning capacity, where higher rate of return is gained from extra public intervention, beyond base support for all, on deprived population more so. Education strongly segregated into private and public systems based on capacity to pay could lead first to inequality and inequity, and subsequently to future conflict. This should be noted in making education policy.
  4. Rather than making educational institutions accountable to the government (which usually they are not), they must be made accountable, first and foremost to public, the people, and then importantly to autonomous governing boards of those institutions. Recognize the fact that only autonomous entities develop and defend their territories, gain sense of self-image and competence, and take self-initiative for improving efficiency, capability and quality, and non-autonomous institutions spend more energy on demanding extra money from government than on innovating, enterprising and being more efficient.
  5. Education system should be guided by *Vidwan Sarvatra Pujyate* philosophy and in that matter people who built scholarship outside Nepali universities, universities of other countries, or scholarly institutions of other countries by resident or diaspora scholars as well as international scholars should be actively utilized in Nepali universities as well as academic and research institutions. All discriminatory practices and policies in the institutions of academics and research should be abolished in recognition of the fact that highly capable and educated citizenry is the foundation of all developments, and the knowledge grows through trans-cultural and trans-geography intellectual cross-fertilization and breeding.
  6. Federal government should largely hand-off development of educational institutions to provinces and local governments but provide academic, research and innovation funding in accordance with a publicly endorsed, understandable and accountable formula-based funding system. Public institutions of academics, research and innovation must be funded based on public contribution. To facilitate a fair funding system, there must be a federal requirement for all local, provincial and federal institutions to mandatorily

and annually report certain nationally mandated performance parameters to the federal government.

7. Federal government must allocate separate and substantial fund for research and innovation not lumped in education funding. Higher education and research institutions competing for such funds must voluntarily release certain information annually to the federal government, including (1) number of short-term, graduate, post-graduate and PhD learners, (2) student distribution in different levels and types of programs, (3) academic performance in terms graduation rate, employability or enterprise activity, (4) annual spending and output in creation, support and dissemination of public knowledge and public service based on national criteria, (5) research and innovation budget as percentage of total budget, (6) number of full-time equivalent of research and innovation staff with post-graduate and PhD degrees, (7) equipment and infrastructure capital for research and innovation, (8) enterprise incubation success and internal revenue generation (which ought not to be used to cut funds but to encourage such initiatives), (9) national and international collaboration in academics, research and innovation (public, private, industrial or academic), (10) number of publications, inventions, patents, and public inventions. However, public funding formula must be so as to grow widespread grassroots culture of research, innovation, inventions and discoveries, and not allow all the money to be syphoned away by elite institutions only.
8. Higher education system must be divided in focused streams (1) Research, innovation and entrepreneurship, (2) Professional, market adaptive and broad based education, (3) open admission based technical, vocational, liberal arts and specially-targeted community colleges, (4) lifelong learning, open learning, community environment academy, local-creativity and business incubation system operating in local communities, (5) international student focused for-profit and taxable corporate education or philanthropic education, that takes minimum half intake of Nepali students based on merit without any discrimination based on ability to pay. Each system must specialize in its focused area and should not encroach upon another's jurisdiction, while the whole system must be seamlessly integrated and cohesive.
9. Education system must have national qualification framework, national agency to inspect quality and performance of institutions, national system of selecting competitive talents for specific purposes, and have national system for accreditation, credit-transfer, credit-accumulation, tree-model of learning, trans-disciplinary studies and pervasive widening of fields and materials of learning within the qualification framework. All institutions operating in Nepal should comply with that system. National accreditation system should have international compatibility and transferability. There must be cross-country qualifications of higher education acquired through MOOC and use of newer technologies so as to make university level education ubiquitous.
10. Education system should produce graduates who are not only qualified for employment and entrepreneurship but also are ethical role models and exemplary citizens of the society, who build compassion, peace, justice, inclusion, tolerance, harmony, and spirit of collective-humanity in the society. Education system must build ethics, leadership,

citizenship and humanistic elements in curriculum.

11. *Prepare students for jobs that do not exist* should be the motto of future education system that has to address the need of rapidly changing society and economy. Graduates of future education system should be adaptive to changing workplaces, and highly innovative and entrepreneurial. Therefore, career counseling, student-industry linkage cooperative education, career knowledge, and continuous evolution of career must be imparted from within education system and through continuing and lifelong education.
12. Education should shift from disciplinary silos to multi- inter- and trans-disciplinary systems from primary school to universities. Collaborative culture in education, research, science and innovation must be made not only among institutions, but also among Nepali residing in Nepal and those working or living abroad, and among disciplinary boundaries within a single institution, with particular emphasis on knowledge synthesis towards solving more complex problems of the society and making knowledge more useful to society.

## **Plan of Action**

1. Diaspora scholars, particularly young ones, selected through rigorous system, could volunteer for one-two year terms as teachers in public schools, and train local teachers by setting examples. Innovations made by TFN in teacher could provide some important insights. A diaspora center of excellence could act as a coordinating agency to work with the government on diaspora recruitment.
2. Contributions to empowering local government in developing models in governing, managing, improving physical ambience, incorporating public services, and designing and developing learn and earn type apprenticeship programs in public education institutions at school level through a center of excellence.
3. Contribute engineering, IT, content and other services through a center of excellence to restructure physical facilities and service rendering system more equitable for differently abled people. Contribute in improving public education system of a municipality as a model to demonstrate that we could develop efficient, competent and self-improving education system.
4. Collaborate with one municipality to develop full autonomy with public accountability model of public education system, that can provide example learning model for other municipalities, and such system knowledge could be spread in other parts of Nepal through a center of excellence.
5. Collaborate with governments to establish a model center of excellence where local, diaspora and international scholars are freely recruited and demonstrate to wider population the benefit of intellectual cross-pollination. Government of Nepal and NRNA must collaborate in developing global inventory of diaspora Nepali skilled human resources through a comprehensive deliberation and planning through such center of excellence. NRNA and GoN must sort out why this principle was agreed in the first

place and violated in the time of establishment of the Open University. They must re-establish one principal institution to build model for collaboration that sends a message of trust to local, diaspora and international scholars.

6. Engage in formulation of developing such funding and performance measurement schemes. Contribute to creation of endowment fund to promote high academics, research, innovation and entrepreneurship in Nepal. Develop an appropriate and plausible mechanism to engage diaspora know-how in formulation education and research policies.
7. Engage in formulation of building funding formulas and performance measurement criteria for institutions of higher academics, research and innovation. Develop mechanism to engage diaspora know-how in building public policies in such matters. One model of fund disbursement of innovation fund presented to HLNEC 2075 during GKC 2018 could be taken as reference to adapt or to devise better models.
8. Engage in formulation of such system by bringing in international experience of not only diaspora Nepali but also global thinkers and innovators to inspire dialogue and critical thinking over the matter.
9. Help make linkage with global accreditation agencies and their experiences and systems. Create environment for diaspora engagement in devising such systems.
10. Bring in global experiences, develop such programs and disseminate such knowledge through a center of excellence.
11. Develop career related programs and render training to higher education students, graduates and administrators of Nepali educational institutions through center of excellence. Help Nepali universities collaborate with global institutions in transferring knowledge in deficit areas.
12. Contribute in some key fronts (1) mechanisms to bring working population in Nepal and abroad in lifelong learning by developing interdisciplinary learning systems that are inspiring and immediately beneficial to value add their knowledge, skills and career advancement, and career transformation, (2) creating new occupations and jobs through trans-boundary fusion of problems, ideas and solutions, (3) trans-disciplinary research and innovations in scientific areas, (4) technology adaptation and transfer, (5) capacity building in institutions on knowledge synthesis and integration.

*We thank members of HLNEC who attended the conference and the extended sessions to take the input from the diaspora participants of the conference. We acknowledge the contribution of the session chairs and paper presenters and individuals who enthusiastically provided feedback and comments. Although the comments and inputs received during those 3 sessions and other feedback received in response to them were many more than these but we have limited this report to these dozen recommendations, which may not fully present everyone's views to the best possible extent. The coordinators express an apology for any limitations of this report.*

*Session 1 Chair: Prof Mana Prasad Wagley (Kathmandu University, Nepal); Presenters: Dr Kamal Lamichhane (Faculty of human sciences, The Uni-versity of Tsukuba), Dr Hari Lam-*

sal (Joint Secretary, Ministry of Education, Government of Nepal), Ms Swastika Shrestha and Mr Shisir Khanal (Teach for Nepal, Nepal), Dr Tejendra Pherali (University College London, UK), Mr Laba Prasad Tripathee (Former Joint Secretary and Spokesperson, Ministry of Education, Science and Technology, Nepal), Mrs Sushma Basnet (Brunel University London), Ms Amrita Sharma (School of Education, Kathmandu University), Prof Shabnam Koirala-Azad (University of San Francisco, USA), Prof Sriram Bhagut Mathe (Nepal Education Foundation- Consortium of Colleges), Dr Drona Rasali (Provincial Health Services Authority, BC, Canada), Prof Chaitanya Mishra (Tribhuvan University, Nepal), Rhymes Shakti (School of Education, Liverpool John Moores University, UK)

Session 2 Chair: Dr Gangalal Tuladhar (Former Minister of Education, Nepal); Presenters: Dr Kamal Lamichhane (Faculty of human sciences, The University of Tsukuba), Dr Hari Lamsal (Joint Secretary, Ministry of Education, Government of Nepal), Ms Swastika Shrestha and Mr Shisir Khanal (Teach for Nepal, Nepal), Dr Tejendra Pherali (University College London, UK), Mr Laba Prasad Tripathee (Former Joint Secretary and Spokesperson, Ministry of Education, Science and Technology, Nepal), Mrs Sushma Basnet (Brunel University London), Ms Amrita Sharma (School of Education, Kathmandu University), Prof Shabnam Koirala-Azad (University of San Francisco, USA), Prof Sriram Bhagut Mathe (Nepal Education Foundation- Consortium of Colleges), Dr Drona Rasali (Provincial Health Services Authority, BC, Canada), Prof Chaitanya Mishra (Tribhuvan University, nepal), Rhymes Shakti (School of Education, Liverpool John Moores University, UK); Coordinators: Dr Pramod Dhakal (NRN Academy), Dr Tejendra Pherali (University College London, UK)

## 3.4 Environment Pollution

### Summary

Air pollution is the major environmental and societal problem specially in developing countries mainly in South Asia including Nepal. Air pollution has impacted on many sectors from health, ecosystem, tourism, crop yields, weather etc. About 35,000 people died prematurely due to poor air quality in Nepal in 2016, and countless illnesses (Global Burden of Diseases, 2016)

*Domestic Cooking:* Solid biomass fuel is a principal source of energy used for domestic purposes in low- and middle-income country like Nepal. Household air pollution (mainly indoor air pollution) is a major risk factor associated with causing chronic obstructive lung disease in adult and acute respiratory infection in children.

*Vehicular Pollutants:* Vehicular pollutants include CO, HC, NO<sub>x</sub>, SO<sub>x</sub>, lead and particulate matters which have damaging effects on both human health and ecology. Diesel-driven vehicles emit particulates that are very fine and a large proportion of them are less than 2.5 microns in size, which can penetrate deeper into our lungs. These pollutants are believed to affect the respiratory and cardiovascular systems. Uncontrolled growth of vehicle population, poor transportation infrastructure, traffic congestion, driving patterns and inefficient public transportation systems are major factors in increasing vehicular pollution levels.

*Waste Burnings and Forest fire:* Waste burning is a common waste management technique used in most of the pre-urban parts of our country, people find this method is simple, easy and less time consuming. In cities, open waste burning to manage garbage is a common practice. The smoke released from the waste contains vulnerable gases like carbon dioxide, carbon monoxide and sulfur dioxide.

*Brick and other Industries:* Around 950 brick kilns are operational throughout the country. Around 110 of those are located inside the Kathmandu Valley. Amongst various types of brick kilns; Induced Draught Zigzag (FDZZ), Natural Draught Zigzag (NDZZ), Natural Draught Straight-Line Kiln (NDSL) are the most common ones in Nepal. Brick industry provides employment to 175,000 workers which annually produces 3.2 billion bricks with estimated huge investment of USD 36 million. However, the operational patterns in brick production has created the environmental and social implications in the brick manufacturing industry. Various aspects like type of fuel or fuel mixture used, brick stacking and firing pattern, technical strength of workers, overall brick kiln design, etc. play important role in both efficiency and environmental performance of brick kiln. If such aspects are considered with a high importance by the stakeholders, brick industry will be more efficient, economical, and environmentally friendly as well as brick factories will abstain from increasing social challenges.

*Infrastructure Development:* Construction activities that contribute to air pollution include: land clearing, operation of diesel engines, demolition, burning, and working with toxic materials. All construction sites generate high levels of dust (typically from concrete, cement, wood, stone, silica) and this can carry for large distances over a long period of time. Construction dust is classified as PM10 - particulate matter less than 10 microns in diameter, invisible to the naked eye. Research has shown that PM10 penetrate deeply into the lungs and cause a wide range of health problems including respiratory illness, asthma, bronchitis and even cancer. Another major source of PM10 on construction sites comes from the diesel engine exhausts of vehicles and heavy equipment. This is known as diesel particulate matter (DPM) and consists of soot, sulphates and silicates, all of which readily combine with other toxins in the atmosphere, increasing the health risks of particle inhalation.

*Waste Disposal at Streets:* Garbage pollution arises when the waste in dumping sites keeps rotting, spreading odor and cause air pollution in the surrounding areas, which also creates problems at the administrative level. It is often seen that waste including inorganic material such as iron cans, paper, plastic, glass pieces, or leftover food, animal bones, vegetable peels etc. are dumped in the open space. Rivers are also polluted by industrial and household wastes. Increasing disposal of solid waste and sewerage, as well as discharge of industrial effluents into in the water sources is spoiling the landscape.

*Transboundary Air Pollution:* Research shows that Nepal has received poor air quality from the neighboring countries and even having a greater pollution impact over the Himalayan Region changing the color of snow, melting of ice in the Himalayan region.

*Population Growth:* According to CBS Report 2014, the annual population growth rate has been more than 2 percent over the period of four decades. High population growth and internal migration (from rural to urban) is considered as the major causes of environmental degradation. In the case of Nepal, unmanaged settlement is largely the reason behind environment degradation in urban centers, particularly in the greater Kathmandu Valley.

Water contamination is widespread especially in big cities in Nepal. Approximately 75 % of water pollution is caused by domestic and industrial waste, polluted air and soil. Sewage is the liquid waste discharged from all domestic and industrial sources. Untreated sewage is discharged into freshwater bodies. As the sewage contains organic matter that harbor disease-causing microorganisms and accelerates dissolved oxygen consumption for decomposition of such huge amount of organic matter by microorganisms. This process leads to develop maximum biological oxygen demand (BOD). The BOD value of clean water is usually between 1 and 2 mg/liter. It is used as an indicator of the degree of pollution. Sulfides, sulfites and other organic residues are the major pollutants of water released from various industries such as Dairy, Tanners, Paper mills, etc.

*Soil Pollution:* Soil pollution is largely from agrochemicals sources include fertilizers, manure

and pesticides and to a lesser extent by domestic, industrial and pollutant air and water. Different types of heavy metals are basically released from pesticide, fertilizer, and use of industrial effluents for irrigation in Nepal. The use of pesticides has been increasing rapidly in recent years. The total amount of pesticide is used 347 tons per year in Nepal, which consists of 68% fungicide, 11% rodenticide, 17% insecticide and 4% herbicide. All these pesticides contain a different concentration of heavy metals which is available in considerable amount in the soil once they are being used. The available heavy metals in the soil get accumulated in the vegetation by the natural process of bioaccumulation. The main pollution effect caused by fertilizers, pesticides, and chicken manure is the introduction of heavy metals into the soil.

The exponential growth of CO<sub>2</sub> and other greenhouse gasses in the atmosphere is causing climate change. It affects agriculture, forestry, human health, biodiversity, snow cover and aquatic to mountain ecosystems. With an average of 0.06°C/year, a rise in temperature from 1975 to 2006 by 1.8°C has been recorded in the country. A study done on CO<sub>2</sub> enrichment technology at Khumaltar revealed that the yield of rice and wheat increased by 26.6% and 18.4% due to double CO<sub>2</sub>, 17.1% and 8.6% due to increase in temperature respectively.

*Impact on Human Life:* According to the World Health Organization (WHO), air pollution causes detrimental health consequence to people including diseases like cancer, stroke, heart disease, or asthma. Contaminated water causes rapid spread of water-borne disease and the toxic substances in water that kill the beneficial living organisms and destroy the biological activity. There is an increasing trend of neurological problems in Nepal.

*Impact on Climate:* Climate change is seriously affecting the weather patterns, which will hurt geology, geography, agriculture, and social structure. Changes in climatic factors like temperature, solar radiation and precipitation have potentials to influence crop production. The problem of frequent drought, severe floods, landslides and mixed type of effects in crops have been experienced in Nepal because of climate change.

*Impact on Tourism Industries:* Given the country's unique natural assets, including the highest mountain range in the world, and rich heritage and cultural diversity, tourism is a potential vehicle for economic development. However, current air, water and pollution has adversely affected the tourism industry.

## **Recommendations**

*Collaboration and Technology Development:* Diaspora researchers have been involved along with the Nepali researchers to study the indoor, outdoor, transboundary air pollution and its impact on human life by collecting data from different monitoring stations in various regions of Nepal. Modeling work being done at Universities across the world on air pollution will enormously help in predicting and planning air pollution management in Nepal.

*Promoting Environmental Education and Awareness:* Environmental education can prepare citizens to respect and understand the importance of environmental impacts on human life and society. Preparing students from the elementary school level will encourage them to understand environmental issues and build an environmentally friendly behavior.

1. Establish a Center of Excellence for Environment, Climate Change and Sustainability at Tribhuvan University in collaboration with ICIMOD and NRNA Academy.
2. Review local, provincial and national level environmental policy to include an integrated policy planning in the areas of green energy industries, sustainable utilization of soil and water resources, developing low carbon ecological cities with environment friendly and socially responsible transport system.
3. Assist GoN to prepare an international policy to understand and manage transboundary pollution.
4. Engage with GoN to develop a policy on vehicular emission e.g. low emission vehicles such as electric, LPG and Hybrid. Review and modernize Brick Kiln Industry.
5. More concrete policy and strict implementation of Environmental Management Action Plans (EMAP), Social Action Plans (SAP) and Work Zone Traffic Management Plans in civil construction, open waste burning, waste disposal at streets.
6. Conduct a pilot study in a selected town or city to demonstrate a desirable electrical stoves and renewable energy for domestic cooking.
7. NRNA to support local organizations and businesses in solid waste management, community cleanup activities, proposed bicycle lanes, proposed smart traffic lights in various cities.

## **Plan of Action**

1. Formalize Environment and Climate Change projects with NRNA by January 2019.
2. Start developing a concept project document with Tribhuban University, ICIMOD, and NRNA academy for a Center of Excellence to complete by July 2019.
3. Work with GoN to review and prepare new policy by December 2019

*Chair: Er Ganesh Shah; Presenters: Dr Maheswar Rupakheti (Institute for Advanced Sustainability Studies, Germany), Ms Shila Maskey (Department of Environmental Science, Patan Multiple Campus, Nepal), Mr Bhupendra Das (Central Department of Environmental Science, Tribhuvan University, Kathmandu, Nepal), Ms Shristi Shrestha (Central Department of Environmental Science, Tribhuvan University, Kathmandu, Nepal), Mr Ranjit Pariyar (Central Department of Environmental Science, Tribhuvan University, Kathmandu, Nepal), Ms Rashmita Shakya (Central Department of Environmental Science, Tribhuvan University, Kathmandu, Nepal), Dr Nabin Aryal (Biological and Chemical Engineering, Aarhus University, Hangovej 2, DK-8200 Aarhus, Denmark), Mr Nirmal Babu Aryal (Kathmandu*

*University, Nepal), Ms Sandila Shrestha (Central Department of Environmental Science, Tribhuvan University, Kathmandu, Nepal), Mr Sher Bahadur Gurung (Kongju National University); Panelists: Mr Bhusan Tuladhar (UN-HABITAT, Nepal), Mr Purna Subedi (UN-HABITAT, Nepal), Dr Maheswar Rupakheti (Institute for Advanced Sustainability Studies, Germany), Dr Bishu Chapagain (Nyayik Sansar, Kathmandu, Nepal), Dr BN Oli (Secretary of the Ministry of Forests and Environment), Dr Keshab Paudel (Medical Director at Lovelace, USA), Dr Udhab Khadka (Asta Ja, Kathmandu, Nepal); Poster Presenters: Mr Ashish Singh (Institute for Advanced Sustainability Studies, Germany), Mr Bhupendra Lama (Central Department of Microbiology, IOST, TU), Prof Durga D. Poudel (Asta-Ja USA), Keshav Parajuli (United Nations University, Germany), Khadak Singh Mahata (Institute for Advanced Sustainability Studies (IASS), Potsdam, Germany), Maiya Pahari (Kathmandu University), Sujan Sapkota (Kathmandu University), Dr Yadav P Joshi (Manmohan Memorial Institute of Health Sciences, Kathmandu), Rasmila Kawan (International Center for Integrated Mountain Development (ICIMOD), Nepal), Deepak Lohani (Organic Life, Kathmandu, Nepal); Moderator: Dr Udhab Khadka (Asta Ja, Kathmandu, Nepal); Coordinators: Dr Mahesh Rupakheti (Institute for Advanced Sustainability Studies, Germany), Dr Durga D. Poudel (University of Louisiana at Lafayette, Louisiana, USA), Dr Udhab Raj Khadka (Asta-Ja Research and Development Center, Kathmandu, Nepal), Dr Puru Shrestha (Geommet Consulting Company, Arizona, USA)*

## 3.5 Financial Policy and Investment

Domestic investment in Nepal is not enough to realize double digit growth rates in order to achieve target of becoming a middle-income economy by 2030 and in order to have double digit growth we need Foreign Direct Investments (FDIs) in excess of 2 billion annually. Therefore, the foreign and diaspora investments will play a major role towards overall Nepal's socio-economic development. NRNs are around 6 million spreading in 79 countries with potential annual savings in excess of USD 4 billion and professional knowledge in many fields, which can be harnessed to partner with GoN, private sectors and academic institution. In order to effectively harness the diaspora resources and attract foreign investment Nepal should have sound financial policy and investment for potential investors.

### Summary

Nepal's current FDI definition include both Non-Resident Nepalese (NRNs) and foreign persons as Foreign Investors (FIs). Proposal to increase economic activities and thereby economic growth in Nepal, we need to increase governance level, Double Tax Treaty (DTA), Bilateral Investment Promotion and Protection Agreement (BIPPA), 2nd generation investments and various policies improvements. Financial policies that should be improved and provisioned in the upcoming Foreign Investment Technology and Transfer ACT 1992 (FITTA 1992) being due for endorsement under the cabinet of Nepal; making particular reference to empirical study done by De Gregorio, who has concluded in his paper for a set of emerging countries like Nepal that FDI is usually 3 times more efficient than domestic investment. Further few recommendations such as allow outbound investments let say a fixed amount on yearly basis such as 20% of the net assets of the company, allow let say \$10K investments into secondary stock markets and facilitate free repatriation of such capital including its gains at any point of time via commercial banks without requiring central bank approval and allow Nepalese companies to issue American Deposit Receipts (ADRs) which will be attractive to 2nd generation NRNs were few of the recommendations.

FDI in Nepal, complication and way forward: Major reasons as to why though the government of Nepal has always encouraged the FDI and introduced various directives, policies, rules and regulations to ease the FDI process, however, it is still a complex process to get FDI approval and bring investment into the country. Despite all the government measures, FDI is still very timely process with various authorities involved and hectic documentation process. Among various reasons behind the FDI process to be hectic, lack of coordination between interconnected government authorities for approval of FDI has been significant. Also, conflicting provisions of existing laws, rules and regulations has made the process even more confusing. Moreover, problems have been faced in implementation of existing laws, rules and regulation. For the FDI to flourish in the country, the government needs to introduce favorable laws, rules and regulations and establish necessary infrastructures to implement these laws, rules and regulations to ease the FDI process in benefits of all stakeholders.

Foreign investment through Capital Market in Nepal: Avenues, Challenges and Solution: Foreign Investment Policy 2015 has opened the door for NRNs and foreign institutional investors to enter into Nepalese capital market through portfolio investment as well as direct investment. The capital market of Nepal is mainly dominated by Equity Securities. The concept of fixed income securities and alternative investment is still not very clear among the investors despite of having great prospect. Security Exchange Board of Nepal has issued initial draft of Alternative Investment Fund Act 2075 which has opened the door for Alternative Investment in Nepal and Non-resident Nepalese qualifies to invest in such fund. The increasing awareness and the investors, evolving semi-automated to fully automated trading platform, increasing trend in the listed companies, shortening of share allotment and listing process and the real sector's interest to get listed in the exchange are the major prospects of stock market.

Problem in online trading, simplicity of transaction, repatriation, double tax treaty, exchange related problems, corporate governance, insider trading, and transparency of the fund managers, data security are hurdles to the investments in capital markets. In order to address these problems, there need to be frequent lobbying as well as meeting with the concerned authorities by forming a committee including the representatives from NRN Association, Foreign Investors, SEBON, NEPSE and other specialists in the investment industry as well as other sectors. The existing problems regarding the bringing in fund and repatriation must be addressed by NRB and concerned authorities so that foreign investors could invest and repatriate profit in hassle free environment. Strong law enforcement could significantly mitigate the other technical challenges.

Improving reliability of the public financial system in Nepal: Firstly, Audit aspect of financial reform, both private and public sector. Secondly, Nepal is suffering so much Unverified (Beruju) amounts that exceeds billions due to lack of financial professional, as the Auditor General admits the weakness. Thirdly, Nepal should have been able to export chartered accountant services to other developed countries that we have not lack of market but lack to quality. Forth, the corruption is the single most factor that ashamed us as NRN abroad and that has been barrier to the foreign investment.

## **Recommendations**

1. Facilitate Automatic Rules (Like India uses this route to get more than 80% of FDIs) allowing Foreign Investors to get into Nepalese markets rather than one window policy most of the time creates one more window and obstruct FDIs.
2. Streamline foreign investment policies and processes, Government shouldn't intervene into private party contracts. For instance, the model for Joint Venture shouldn't be enforced by government. JVs are between two or more than two private parties and the terms and condition are generally mutually agreed upon by the parties themselves.
3. Liberalize policies for dispute settlement such as allowing investors to choose interna-

tional venue such as UK or Switzerland or other jurisdictions that the investors chose and also not to have any monetary limit that will otherwise attracts Nepalese laws. Investors should feel free and countries like Rwanda and Albania have provided these polices and have seen tremendous growth in FDIs.

4. Bankruptcy and insolvency rules must be simplified on priority for simple exit venues.
5. To allow \$10K free repatriation (directly via commercial banks without needing prior central bank approval) of the investments made into stock markets by NRNs. This will help connect 2nd generation towards Nepalese economy.
6. Problems with repatriation of profits, (time consuming, discrepancy between stated policy and implementation). Therefore, this should be clearly followed up in practice.
7. To allow Nepalese companies/Investors to invest abroad. Except Nepal and Bhutan, rest of SAARC countries allow outward bound investments. Gradually, let say 20% of Net assets. This will increase transparency in financial reporting as part of the motivation of investments and doing so will increase tax revenue. There are no more bank secrecy rules and further with the automatic exchange of information, tax authority and the government authorities can easily track of the outbound investments and their tax rights.
8. To allow brokerage and wealth management licenses to NRNs and Foreign Investors who in turn will bring portfolio investments into Nepal and on top, this will help increase marketing of Nepalese companies into the world's stock markets. Empirical studies in similar countries have shown that the Diaspora investments into capital markets is much greater than the investments made under FDI and therefore, the proposed legislation changes in capital market should be finalized and implemented at the earliest possible.
9. Corruption control measures, the absence of which has made very hard for listed companies into invest into Nepal due to short sellers shorting listed companies shares in host countries which are subject to foreign corrupt practice acts. For instance, Telia-sonera Group, previous shareholder of Ncell faced similar situation back in 2014 and eventually they went out of Nepal.
10. FDI in Nepal is coming from more than 90 countries and most of these investors are from tax haven or low tax jurisdictions such as cook island, BVI, Seychelles, West Indies and others however, we have got DTTA with 10 countries only and therefore, Double Tax Avoidance Agreement (DTAA) at least should be extended to following countries (these countries manage large pool of funds which might potentially be the large foreign investors for Nepal). NRN-NCCs in collaboration with Embassies in these regions, can play a big role for this Singapore, Switzerland, Hong Kong, Luxembourg, Ireland, Germany, USA, Japan, and Australia.
11. While negotiating for DTTA, Nepal should introduce GAAP (General Anti Avoidance Principles) so that the state will be able to control tax leakages and close potential loopholes such as sham transactions, treaty shopping especially for capital gain taxes).
12. Likewise, for the investors to feel safe about their investments, we should expand concurrently Bilateral Investment Protection and Promotion Agreement (BIPPA) with

aforesaid countries.

13. In order to attract the fund industry (open ended or closed ended fund) into Nepal, we should provide some additional changes in fiscal policy that will incentivize foreign investors to invest into capital markets, for example countries like Netherlands, Cyprus, Luxembourg did in order to attract large number of funds and now these countries have managed to get global footprints.
14. To allow 100% shareholding participation in capital intensive project especially telecom (such as Cambodia allows 100% participation and have a very sound and healthy competition and doing great in telecom industry). Having local participation in emerging countries create a lot of problems for foreign investor, several cases can be found in India, Vietnam, and Cameroon.
15. To allow to increase shareholding participation from 51% to 80% in management and consultancy services so that we will see international companies such big 4 audit firms, McKinsey, Atkins entering Nepal and allow foreign investors to own majority shares in travel and tour operator ventures.

## **Plan of Action**

1. Approval from NRN ICC by January 2019
2. Formalize Concept Document by June 2019
3. Approval by relevant GoN agencies by December 2019

*Chair: Mrs Bhabani Rana (President, FNCCI, Nepal); Moderator: Mr Lokraj Sharma (NRNA, Copenhagen, Denmark); Presenters: Mr Bhisma Raj Dhungana (Nepal Rastra Bank), Mr Ranjeet Mahato (Neapolis University Paphos, Cyprus), Mr Abhaya Poudel (Reanda Biz Serve, Kathmandu, Nepal), Mr Sunil Paudel (National Merchant Banker limited), Mr LN Pandey (Asmita Associates Ltd, London, UK), Ms Sristi Tandukar (World Renew Nepal), Mr Dila Kharel (Innovative Associates, Sydney, Australia); Panelists: Mr Anal Raj Bhattarai (Former CEO, Sanima Bank), Mr Mahesh Shrestha (City Express Group, Japan), Mr Maha Prasad Adhikari (CEO, Nepal Investment Board), Mr Rajendra Khetan (President, Nepal Britain Chamber of Commerce); Coordinators: Mr Keshab KC (Nepal Rastra Bank, Nepal), Mr Ranjeet Mahato (Neapolis University Paphos, Cyprus)*

### **3.6 Health Education and Policy**

On the topic of health care rehabilitation since Nepal is one of the high risk countries regarding disasters like earthquake, flood, landslide and during the 2015 earthquake in Nepal, 8857 died, 3.5 million were homeless, then almost 50% people are still living under tent and shelters and over 5000 facilities destroyed. Discussion on mental health emphasized that this area was important for our communities and ways to improve it was discussed, for example self-care as well as community based care. The speaker who discussed drug policy in Nepal, emphasized on the importance for further amendment of Drug Act so that the number of foreign companies could drop down. There was an elaborate discussion on Apitherapy and how certain elements could be beneficial as medicines. Cardiac rehabilitation was an important agenda, the speaker concluded that it was time to incorporate this issue in policy and start cardiac rehabilitation center justified. While discussing the General practitioners (GP) knowledge, practices and obstacles in diagnosis and management of dementia, the need Improvement in dementia knowledge and self-confidence would lead to an improvement in service delivery in Nepal. On the topic of Economic and societal benefits on investment and policy formulation in radiation oncology and cancer treatment in federal republic of Nepal; it was discussed that program should be based on capital investment and professional training of Rh screening can help in decreasing the incidence of HDFN and increase in the appropriate clinical use and doses of anti D immunoglobulin can be helpful for fetal wellbeing and improved outcomes. For those who unable to conceive, Nepal has its own expertise for Nepal has not its own skilled manpower for IVF. Development of faculty through theory based training is key to successful medical education. Curriculum should be competency based as per public need and socially accountable.

#### **Summary and Recommendations**

1. The country should focus on Health care rehabilitation by making a Preparedness plan where immediate action taken after disaster as people are mobilized by themselves and our health facilities should be ready to deliver service at any time.
2. Improvement in dementia knowledge and self-confidence would lead to an improvement in service delivery in Nepal.
3. Possible screening for red cell antibodies First trimester screening enables timely treatment of HDFN.
4. Need of establishment of sperm and ovum bank in Nepal
5. Increase government visibility in health education system.
6. Education system should be modernized and newer methods should be applied.

#### **Plan of action**

1. Specific policies like damaged based compensation and priority for compensation should

- be on the need basis.
2. For radiation oncology Public private partnership should be established to reduce the out of pocket expenditure as radiation therapy is a cost effective lifesaving intervention for cancer patients
  3. System of subsidizing the cardiac patient as well as other health problems by government of Nepal
  4. Incorporate with safe motherhood program in case of screening for Rh incapability.
  5. Service expansion for IVF through PPP model.

*Session 1 Chair: Dr Gunaraj Lohani (Executive Director, Department of Health Services); Moderator: Dr Binod Shah (Albert Einstein College of Medicine, New York, USA); Presenters: Mr Deepak Raj Sapkota (Karuna Foundation Nepal), Dr Bisundev Mahato (Resident Psychiatrist, Greater Hudson Valley Health System (GHVHS), NY), Dr Pan Bahadur Chhetry (Orange Regional Medical Center, New York, USA), Mr Krishna P. Pathak (Macedonia University, Greece), Ms Kiran Chandra Rayamajhi, Mr Bharat Nepal (ANP Inc), Dr Dilli Banjade (Center West Cancer Care Center, Orange Hospital), Mr Fanindra Panta (BTS TT, NRN Academy, Sanquin Blood Supply Foundation), Dr Indira Tiwari (Grande city hospital, Kantipath, Kathmandu, Nepal), Dr Nisha Jha (Swansea, UK)*

*Session 2 Chair: Prof Bhagawan Koirala (Teaching Hospital, Tribhuvan Univesrity); Moderator: Dr Archana Amatya (IOM, Tribhuvan University, Nepal); Presenters: Mr Sheetal Bhandari (Patan Academy of Health Sciences), Prof Jay N Shah (Patan hospital, patan academy of health sciences, kathmandu, Nepal), Prof Malakh Lal Shrestha (Hannover Medical University Germany), Mr Krishna Prasad Pathak (Alzheimer's Related Dementia Society, Nepal); Panelists: Dr Dipendra Raman Singh (Ministry of Health and Population), Dr Mukti Ram Shrestha (President of Nepal Medial Association); Coordinators: Dr Archana Amatya (IOM, Tribhuvan University, Nepal), Dr Binod Shah (Albert Einstein College of Medicine, New York, USA)*

### 3.7 Hydropower, Transportation and Utilities

Nepal's delivery record of large infrastructure projects is dismal. Almost every project gets mired in serious contractual disputes; runs behind schedule and suffers from huge cost overruns. Melamchi Water Tunnel, Tribhuban International Airport expansion, Kathmandu's Ring Road expansion, Road widening from Kalanki to Chondol are some examples. Often the completed projects, large and small, fail to meet performance standards. Many of Kathmandu's pavement overlays last less than a year, manholes are seldom at-level with the road surface and catch basins are left open or are clogged. The government's answer to these problems has been to blame specific project contractor for non-performance. If the non-performance were project specific, not every project would go through similar difficulties.

The problems are not project or contractor specific. They are systemic; they are structural. If future projects are to be completed in time and within budget, an overview of the existing project development practice and procurement modalities is required to identify structural issues that result in poor project delivery.

During the Symposium, five eminent engineers with extensive experience in domestic and international infrastructure projects shared their experience and suggested what, in their view, ails Nepal's project performance and recommended remedial actions. Some of the presenters had direct experience of working in Nepal government at the highest level.

The presentation covered Hydro Power Projects; Railways; Roads and Airports and Trenchless Technology. Dipak Gyawali and Ram Monohar Shrestha spoke on Hydro Project; Som Dutta Sharma covered railways; Birendra Bahadur Deoja deliberated on Roads and Airports. Naresh Koirala discussed Trenchless Technology. Panelists(Arvind Kumar Mishra; Tulasi Sitaula and Keshab Sharma) provided their comments on the presentations and shared their own experience. Tharka Sen and Madhu Sudhan Acharya made short presentations on Road safety and Public Transport respectively.

A summary of each presentation and recommendations arising out of the presentation, (as interpreted by Naresh Koirala, the Chair of the session) are given below. The reader is encouraged to view the presentation slides used by each presenter for details.

#### Summary

Hydropower (Dipak Gyawali): Nepal's aspiration to produce enough hydropower to meet the country's domestic needs and for export is contingent on its ability to produce hydropower cheap and speedily. It must be reliable and the development must be regionally balanced. The temptation to export must be resisted until achieving a strong base.

What is happening is just the opposite. Nepal's per unit infrastructure development cost

is among the world's highest and we seldom complete infrastructure projects, including hydropower, in time and within budget. The reason for this is a severe lack of nexus approach aggravated by excessive rent-seeking behavior, lack of transparency, expensive political representation processes, and questionable donor conditionality in identifying, evaluating and moving a project forward. Our inability to learn from mistakes made in the past adds to the aggravation.

Gyawali used government's return to Arun-3 at all costs despite the projects known problems; its refusal to discuss an alternative to Melamchi which would have provided water for Kathmandu cleaned Bagmati, hydropower, and irrigation in Terai as examples of the government's debilitating silofication. He also argued construction of ropeways as a mode of transportation across rivers in remote areas would be much more efficient and cost-effective than the construction of long windy roads.

A balanced efficient societal development requires the three solidarities - Government, Market, Civil Society - to work in harmony. In Nepal, the harmony is distorted by Rent Seeking and License Raj; Crony Capitalism and NGOs with huge vested interests.

Hydropower (Ram Monhar Shrestha): Nepal lacks clarity on the country's electricity needs. The government's demand targets change frequently. In 2017, the target was installing 17,000 MW of electricity generation capacity in seven years. A recent Whitepaper by MOEWRI has declared the target to be 15,000 MW in ten years. The completion of hydropower projects to achieve the target capacity will need to match the rate of economic growth of the country. The question whether per capita electricity target is realistic and whether it is in tandem with the forecasted economic growth appears to have escaped the government's attention. Government agencies working in isolation (silofication) is a problem. A competent institution for official electricity demand forecasting is desirable. Thailand provides a good example.

Competing energy producer e.g solar or wind will directly influence the future price of electricity. Falling cost of power from renewable energy and the rising cost of hydropower generation will challenge finding an external market for our hydropower. Nepal's hydropower production costs are affected by higher construction material costs (cement/steel) than of our neighbors. India is selling electricity to us at a lower price than our production cost. How can we make our electricity generation more competitive than imported power from India?

All of Nepal's projects are afflicted by time and cost overrun. There is insufficient cross-border transmission capacity.

Nepali government's governance of hydropower projects is clearly problematic. The government has declared competitive bidding for hydropower projects, but when it comes to practice, it frequently flip-flops its decision. The case of Budhi Gandaki project is an ex-

ample. In May 2017, the government decided to award the project to CGCC and signed an MOU with CGCC in June 2017. Since then the government has canceled the contract with CGCC and in November 2017 it declared the project will be constructed with Nepali resources. In September 2018, it decided to revive the contract with CGCC. The Upper Trisuli 3A project is another example of the government not knowing what it wants and the contractor taking advantage of it. West Seti; Karnali projects provides other examples of delays due to the government's lack of firm ideas on what it wants and adequate homework to support it.

The government needs a competent institution to forecast its hydropower needs. The data provided by the government are inconsistent and confusing. Government agencies work in isolation, thus creating confusion. Policy makers, hydropower developers and people at large in Nepal seem to have several misunderstandings about the hydropower resource of the country. Despite the existence of relatively abundant hydropower potential, there is a growing concern about the cost competitiveness of the hydropower in Nepal as an energy resource. There also seems to be inadequate understanding about the future demand for electricity in the country and the economically most efficient way of meeting the demand. India; Thailand; Sri Lanka provide examples of long-term planning of hydropower demands.

Hydropower development needs to be based on sound analysis of market demand for power and integrated assessment of hydropower resources basin-wide.

Electricity demand forecasting has to be done by a credible agency with the participation of experts and stakeholders.

An integrated power development plan should be developed and updated periodically; it should be the basis of determining the optimal projects, generation capacity mix and timing of project implementation.

Hydropower projects need to be awarded on a competitive basis.

Ways must be found to make hydropower development less costly.

Stability of policies and credibility of government decisions must be ensured.

Trenchless Technology (Naresh Koirala): Kathmandu's traffic disruption and horrendous air pollution during the recent "Melamchi Pipe" installation could have been substantially reduced if along suitable pipe alignment sections, Trenchless methods had been used as an alternative to the conventional open cut installation and if the open cut construction had followed minimum acceptable construction standards.

Nepal's utilities agencies are proposing to soon start laying the existing overhead transmission

lines in Kathmandu underground. If the conventional pipe installation method by open cut- excavate a trench, lower the pipe and fill the trench by a suitable backfill material- is followed, during the proposed burying of the utility conduits/wires, more traffic disruption is inevitable. Depending on the standards of project management and construction planning, the open cut installation may have a severe impact on Kathmandu's environment, including air quality, during the construction period. Kathmandu's air quality during the Melamchi Pipe installation is a potent reminder of how bad things can get.

The rising public demand for safe construction with minimal carbon footprint and traffic disruption has made the application of Trenchless Technology for installing utility pipes in urban areas increasingly popular in developed countries. Developing countries such as India and China have also started using TT in their construction.

Horizontal Directional Drilling is one of the most commonly used trenchless methods to install utility conduits. The technology is new to Nepal and requires engineers and contractors with specialized skills. The introduction of the technology will need significant government support in the beginning, but the investment will pay off if we can develop Nepal as a TT hub in South Asia.

Railways-Delhi Metro (Som Dutta Sharma): The construction of the Delhi Metro reversed India's long-standing project delays and cost overrun malaise. The construction was completed before schedule and under budget.

Delhi experienced phenomenal growth in population in the last few decades: from 1.47 million in 1951 to 16.3 million in 2011. The number of vehicles increased from half a million in 1991 to 7.2 million in 2011. The City's geographical coverage also increased considerably.

The deliberations by experts on the type of mass transit that will address Delhi's transportation problems started in 1969-70. In 1984, Master Plan of Delhi 2001 recommended a multi-modal transport system comprising of 200 km of light rail transit system, 10 km of a tramway, an extension to the surface rail system and extensive road network. A feasibility report of integrated multi-model mass rapid transport system completed in 1990 became a major milestone in the development of Delhi's mass transit system. In 1991, Government of National Capital Territory of Delhi decided that the mass transit system would be constructed in phases. The construction of the first phase, a 55.3 Km long section of the commuter railway system, Delhi Metro, was scheduled to be complete in March 2005. For funding, the government formed a company with a Chairman and five full-time Directors. A unique feature of the company was that it had equal equity participation by the Central Government and the Government of the Territory of Delhi. This was the first company of its kind- equal equity partnership between two governments -in India. By forming this company, the Central Government and the Government of the Territory of Delhi surrendered their power to run the Company to its Board of Directors. The company's Board of Directors

had full power to manage it.

The main factors behind the success of Delhi Metro are:

1. Political will to implement the project
2. Technocrat leading the company with accountability and responsibility
3. No political interference
4. The unique structure of Delhi Metro Rail Corporation as a company
5. Firming up of funding plan and sources to fund the entire cost of the project
6. Fast and on the spot decisions
7. Full Support by all the urban local bodies
8. Belief in three pillars of strength: knowledge, integrity, and punctuality

DMRC completed Phase-I and Phase-II of metro network and is currently working on Phase III and Phase IV as detailed below.

1. Phase-I – 65 km. Cost US \$ 2.5 billion. Completed in September 2005, seven years and three months (2 years & 9 months ahead of schedule).
2. Phase-II – 125 km. Cost US \$ 4.3 billion. Though double the length of Phase -I, Phase II was completed in half the period taken by Phase I, and five months ahead of schedule. Phase-II was completed by October 2010. Both the Phases were completed without cost overruns.
3. Implementation of Phase -III started in February 2011 and 106 Km is already commissioned with the total network on date as 296 Kms.
4. Balance 82 Kms of Phase - III is under advanced stage of implementation and likely to be commissioned by the December 2018. The Total cost of Phase III will be 7.8 billion US \$.
5. Delhi Metro proposal for implementation of 104 km of metro network in Phase- IV with its completion date as March 2023 is under active consideration of the Government. Today, Delhi Metro network is one of the fastest developing network in the world except of China. Delhi Metro has shown, in Sharma's words, Where there is a Will, there is a Way

Roads and Airport (Birendra Bahadur Deoja): In the last 62 years, from 1956 to 2018, life expectancy in Nepal rose from 34 years to 69 years. The country's literacy rate increased from about one percent to 89 percent; per capita GDP rose from about \$46 to about \$866. Although overall the numbers look impressive, the rate of development is inimical compared to that of other countries in the region. Nepal remains one of the least developed countries in the world.

This is primarily because the government has consistently failed to deliver large infrastructure projects in time and under budget. If Nepal's development pace is to match with that of other countries and meet people's development aspirations, there is no substitute for an accelerated economic development. Accelerated development will require effective and efficient transport infrastructures.

Nepal's impediments to accelerated development are mountain barriers and mind barriers. The Kathmandu Nijgadh Expressway (KNE) and Kathmandu Kulekhani Hetauda Tunnel Highway( KKHTH) and Nijgadh International Airport (NIA) can be the engines of development.

The delivery of mega projects run into problems because government policies covering the entire life cycle of a project, from planning to project procurement to construction management are unclear and confusing. For example, The NIA will not be fully functional until KNE is completed. The scheduling of these two projects must be coordinated. But very little thought appears to have been given to the scheduling issue.

The KNE is technically very complex. It includes high cut slopes; high bridges and tunnels. There is nothing to ascertain that the complexity of the project was considered when the responsibility for its design and construction was given to Nepal Army. The project is estimated to cost US\$1 Billion. It is unclear how it will be financed. Quality has always been a serious problem in Nepal's construction. It is unclear how the quality of this project- from design to construction- will be monitored.

The government has signed a concession agreement with Purbahadar Bikas Company(PBC) to design and construct KKHTH. But there is little progress in this project because PBC has to date been unable to raise finance. Their difficulty is compounded if the KNE is made toll free. When KNE and KKHTH were planned, clearly very little homework was done and none of these issues were considered.

What the mega projects lack is visionary planning; clear financing and suffer from legal impediments.

The estimated cost of NIA is 1.0 to 1.5 billion. If Public Private Partnership or Build Operate and Transfer approach is to be adopted, existing BOT act will need amending. The PPP/BOT approach will need government support for equity, VGF or soft loans.

KNE, NIA & KKHTH need about \$3000 million in 5 yrs i.e. \$600 million (Rs. 60 billion) per year. Does the government have the capacity to spend so much money?

The 14th Plan lacks bold and concrete provisions for accelerated delivery of high impact infrastructures.

To remedy the present quagmire with mega projects, the government needs a dedicated High-level Steering Committee of eminent persons for each project and the entire project period to enable one-stop decision making. It needs highly committed, ethical and efficient knowledgeable supervising agency to monitor the project. Its core capacities must be significantly improved to reduce the risks of overdependence on consultants contractors.

Road Safety (Tharka Sen): Road safety means a fair share of road and risk by all users to make roads safe and driving enjoyable. Road safety has six strategic pillars -Road safety management; Post accident management, safer mobility, safer road users and, safer vehicles.

Nepal's traffic accident data is dismal. Between 2001 and 2013, there were a total of 95,902 crashes; 100,499 injuries and 14, 512 deaths- average 1209 deaths per year. The World Health Organization estimates road traffic crashes in Nepal 17 per 100,000 population- 13 deaths daily.

The solution to solve this problem is to aggressively start a traffic education and Road safety program. NRNs have the capability to provide such education. The NRNA and the Government of Nepal(GoN) have signed an MOU to improve Road Safety in Nepal. NRNA has provided a book on Road safety which addresses issues on Nepal Roads and provides a remedial solution. The dialogue with GoN has to continue and GoN must start aggressively implement the recommendations in the report.

Madhu Sudan Acharya(Public Transport): The public transportation system in Vienna, Austria provides a model that Kathmandu could adopt to improve its chaotic public system. Vienna public transportation is clean, efficient and integrated. It is managed by an integrated Transport Authority. It is recommended that:

1. GoN establish a Kathmandu Valley Integrated Transport Authority with legal and contractual provisions similar to that of Vienna City Public Transportation Management.
2. Enact appropriate laws, regulations with the assistance of experts
3. Start working with large bus companies first.
4. Initiate long-term Land use and Public Transport Master Plan working together with other line ministries/departments

The recommendations provided here are based on this reports the author's interpretation of the presentations made during the symposium. A list of selected key observations from each speaker is provided in the beginning as context to the conclusions and recommendations that follow.

Despite the variation in the type of infrastructure on which each presenter spoke, there was unanimity in their assessment of the problems in project delivery and recommendations on

how it could be improved. An attempt to capture their assessment and their recommendations follow the list of key observations.

Key observations made by the speakers:

1. Rent seeking and License Raj type project management is debilitating
2. Some of the donors imposed conditionality are not in Nepal's interest
3. Per unit cost of hydropower generation in Nepal may not be competitive to make energy export a marketable resource
4. The government needs a competent institution to forecast its hydropower needs. The data provided by the government are inconsistent and confusing
5. Government agencies work in isolation, thus creating confusion. Policy makers, hydropower developers and people at large in Nepal seem to have several misunderstandings about the hydropower resource of the country
6. Hydropower development needs to be based on sound analysis of market demand for power and integrated assessment of hydropower resources basin-wide
7. Electricity demand forecasting has to be done by a credible agency with the participation of experts and stakeholders
8. The secret of Delhi Metro's success is
  - extensive homework at project development stage
  - An independent organization, headed by a technocrat, free from political interference heading the corporation; one-stop decision making
  - Political will to do it right
9. Engineering construction can be carried out without turning the environment into a dust bowl e.g Kathmandu during Melamchi Pipe laying
10. The government should support Trenchless Technology to reduce environmental impact and traffic disruption during pipe laying
11. Nepal's economic development will not be possible without megaprojects
12. Megaprojects lack visionary planning; clear financing and suffer from legal impediments
13. The government needs a dedicated High-level Steering Committee of eminent persons for each project and the entire project period to enable one-stop decision making.
14. The government needs a highly committed, ethical and efficient knowledgeable supervising agency to monitor projects. Its core capacities must be significantly improved to reduce the risks of overdependence on consultants contractors

Reasons for Poor Delivery of projects:

1. Lack of homework and due diligence in all project development phases from conceptualization to the selection of consultants and procurement of construction contractors
2. Often ambiguous projective objectives

3. Lack of consultation with experts in different stages of project development. The consultation must start from project conceptualization stage to the completion and monitoring of project performance
4. People with no knowledge of a project's complexity making decisions, critical for the success of the project, on an ad hoc basis
5. Political interference/rent-seeking through the project's life - from project's development and during construction
6. Lack of commitment from political leadership to do the right thing
7. Lack of political will
8. Lack of accountability
9. Lack of detailed risk assessment and risk sharing mechanism in contracts;
10. Awarding construction contracts before the land required to construct (the project land) is owned by the government
11. Convoluted decision-making process;
12. Laws which inhibit project managers to make decisions
13. Government's very weak knowledge base and inability to provide adequate oversight;
14. Inconsistency in the government's decisions in everything from project scheduling to contractor selection to contract management
15. A culture which does not encourage learning from mistakes
16. Lack of respect for knowledge and
17. Lack of suitable government structure staffed with appropriately experienced personnel to provide oversight to megaprojects

## **Recommendations**

A convention like this cannot provide specification recommendation on changes required on specific laws to make project quality and delivery more efficient. Some general recommendation made by various speakers are summarized below. It is recommended the Government set up committees of recognized experts and stakeholders to look into details of laws that need to be amended; new laws that need to be legislated and to recommend management structures which will address the critical observation listed above in this section and recommendations summarized below.

1. Develop project identification; procurement and delivery structures where the government; the market and civil society work in harmony
2. Stop political interference in project development and management
3. Stop rent-seeking and license raj management style
4. Do not reject alternate views/recommendations off hand
5. Work with experts and stakeholders
6. Develop enough in-house capabilities to reject irrational conditionalities from donors
7. Set up a credible agency to forecast the country's hydropower needs and development strategy

8. Consider adopting trenchless technology in all urban pipe laying projects and support the development of local expertise in TT
9. Develop committed knowledgeable project oversight agencies and
10. Support and encourage one-stop decision making

*Coordinators: Dr Arun Timalina ( IOE, Tribhuvan University, Nepal), Mr Naresh Koirala (Nepal Library Foundation, Canada)*

### 3.8 New Frontiers in Physical Sciences and Prosperity

In this session, two invited talks, three contributed talks and three rapid fire talks related to different faculties of physical sciences such as Physics, Chemistry, Biology, Mathematics, Biophysics, Biotechnology and Physical Science-based Entrepreneurship were presented. The paper presenters were international scientists, NRNA scientists, scientists from national universities and research centers, and graduate students from overseas and Nepal. Presentations were focused on highlighting current state of Physical Science Education, Research, Application and possibility of developing industrial applications in Nepal versus developed countries. Esteemed panel members gave their input on status of physical science education and research in Nepal, barriers to conducting world class research in Nepal and role of NRNA knowledge experts in making difference in Nepal.

#### Summary and Recommendations

1. We learn from international experience that physical science education and research are the foundation of the prosperity achieved by developed nations. Developed countries allocate significant amount of continued funding to run competitive physical science education and research programs. Nepal's allocation of resources is not sufficient enough to support a competitive research environment in our academic institutions.
2. Government of Nepal might not be able to establish sophisticated laboratories since it has other obligations towards poorest people of the country. Nepal needs to explore other available resources.
3. Academicians and researchers can tie themselves up with international research opportunities provided by research institutions such as International Center for Theoretical Physics (ICTP), Italy. Nepal can also take advantage of international scholar exchange programs available for researchers from developing countries.
4. NRNA experts working around the globe are eager to help Nepal to fill the gap in physical science education and research. Government of Nepal needs to build a mechanism to facilitate and encourage transfer of diaspora expertise to Nepal. NRNA should also build a knowledge-focused platform to bridge between diaspora experts and Government of Nepal.
5. Physical science-based research and its industrialization is far-fetched for Nepal in the current model of research. Prosperous Nepal is almost impossible in the absence of application-oriented research. To make any progress in this direction, world class research and entrepreneurship education is a must.

#### Plan of Action

1. Help increase funding in physical science education and research

2. Update physical science education and research model in collaboration with NRNA scientists
3. Encourage Nepali scholars to participate in international scholar exchange programs provided by institutions such as International Center for Theoretical Physics
4. Expand the networking and collaboration already started with NRN scientists
5. Introduce entrepreneurship-based curriculum in Nepali Universities and increase partnership with the industries to transform academic research into applied science

*Session Chair: Prof Tirtha Raj Khaniya (VC, Tribhuvan University); Session Moderator: Prof Narayan Adhikari (Tribhuvan University); Paper Presenters: Prof Fernando Quevedo (International Center For Theoretical Physics, Italy), Prof Bhadra Man Tuladhar (Kathmandu University, Nepal), Bishal Sitoula (Norwegian University of Life Science), Dr Tara Sigdel (University of California, San Francisco, USA), Dhaka Ram Bhandar (Justus Liebig University Giessen, Germany), Dr Madhav Prasad Ghimire (Tribhuvan University), Mr Nashir Ahamad (Indian Institute of Technology, Kanpur, India), Mr Deependra Parajuli (University of Natural Resources and Life Sciences, Vienna, Austria); Panel Discussion Members: Prof Fernando Quevedo (The Abdus Salam International Center for Theoretical Physics (ICTP), Trieste, Italy), Prof Suresh raj Sharma (Founding vice-chancellor, Kathmandu University, Nepal), Prof Bhadra Man Tuladhar (Former Registrar, Kathmandu University, Nepal), Prof Lalu Poudel (Head, Central Department of Geology, TU, Nepal), Prof Rajani Malla (Former Head, Central Department of Biotechnology, TU, Nepal), Dr Tara Sigdel (University of California, San Francisco, USA); Poster Presenters: Mr Bhojraj Bhandari (Department of Physics GoldenGate International College, Kathmandu, Nepal), Mr Deepak Pandey (Central Department of Physics, Tribhuvan University, Kirtipur, Kathmandu), Mr Dinesh Kumar Yadav (Tribhuvan University), Mr Mukunda K.C (Department of Physics GoldenGate International College, Kathmandu, Nepal), Mr Rajendra Prasad Koirala (Tribhuvan University), Ms Nirmala Adhikari (Tribhuvan University), Dr Saran Lamichhane (Tribhuvan University), Ms Sashi Nepal (Tribhuvan University), Mr Shyam Prakash Khanal (Tribhuvan University); Coordinators : Dr Hari Dahal (American Physical Society, USA), Prof Narayan Adhikari (Central Department of Physics, Tribhuvan University)*

### 3.9 Social Security and Good Governance

The current provision of social security in Nepal is not enough. The social security schemes are in primitive stage with only basic features. Old aged citizen allowance, single and widow allowance, disability support allowance, child protection grant, education scholarship for Dalit, people with disability, Karnali Zone marginalized and conflict affected children, maternity protection facility, Karnali employment program, allowance for endangered ethnic/indigenous group and elderly citizen health check-up/treatment programme are some to mention. Good governance, welfare governance, rule of law, inclusive governance, accountability and transparency help social security to sustain in the long run.

#### Summary

This session focused on social security (social security perspectives of Nepal as keynote speech, social security policy of Nepal and resource management for social security in Nepal), Prime Minister employment program, causes and consequences of poverty in Nepal, role of NRN for economic empowerment of Nepali women, planning local governance with thinking globally and acting locally, and Nepal medical exchange program.

Social security (SS) schemes include: Social Insurance (pension and gratuity, provident fund, citizen investment trust, insurance for disability, maternity leave, work related injury, sickness and survivors' benefits); Social Assistance (cash transfers, in-kind transfers, primary health care and basic education) and; Labour Market Interventions (employment programs, community infrastructure works, vocational training, child labour elimination program).

Nepal spends only 2.2 percent of GDP in social security. In South Asia, only Pakistan spends less than Nepal in social security. There are 31 Fundamental Rights in Part 3 (Article 16-46) of Nepal's constitution among which 11 are Social Security Provisions. Public sector employees who have completed service of 20 years (16 years for army personnel) get pension in Nepal. Public sector employees and some of the private sector employees get gratuity. In Nepal, 50-60 % of the social security covers only the retirement benefits. According the population census of Nepal in 2011, the age of population in Nepal below 35 years is about 70%. This means gradually huge population will reach as receiver of old age/ retirement benefits (pension, allowances, medical insurance etc.) and the current scheme may not sustain. The Government has started Health Insurance Program (First Phase, 3 districts-Illam, Baglung, Kailali and 25 districts in second phase and gradually universally).

Individuals involved in unorganized sector like farmers, laborers and self-employed persons will also be gradually streamlined in social security. A provision will be made that would prevent social security beneficiary to get double benefits (Budget Speech, 2018/19). The government has recently promulgated a legislation and started a social security plan in private sector which requires huge resources. Elderly population will place strong pressure

on both the social security and medicare programs in near future. Therefore, we need to shift from current non-contributory system (pay as you go system) to contributory system (funded system).

## **Recommendations**

1. Make comprehensive social security policy covering social security of private sector, foreign migrant workers and employees from informal sector.
2. Implement performance-based pay system and non-permanent contract employees in public sector.
3. Implement activities (rule of law, transparency, accountability, control of corruption, peoples' awareness and participation, right to information, global local linkage and learn from best practices from abroad) to maintain good governance.
4. Achieve sustainable social security through job creation from public and private sector
5. Shift from non- contributory (pay as you go) to contributory system.
6. Make strong institutions to implement social security plans.
7. Ensure social participation with solidarity of stakeholders and focus on labour market interventions.
8. Make well designed and cost effective comprehensive policy framework/ regulatory framework with impact/outcome evaluation mechanism.

## **Plan of Action**

### **S.N/Recommendation/Activity/Time Frame/Implementing Authorities/Indicators**

1. Make comprehensive social security policy/Make comprehensive legislation/2018/19 (FY 2075/76)/Ministry of Labour, Employment and Social Security/ SS for private sector/informal sector, Universal health insurance, SS of migrant workers
2. Implement performance-based pay system and non-permanent contract employees in public sector/Amend Civil Servant Act and rules/2018/19 (FY 2075/76)/Ministry of General Administration and Federal Affairs/Performance based pay system, Service contract and contract employees in lower level of public sector
3. Implement activities to maintain good governance/Good practices in daily activities of public sector including civil service, public enterprises and private sector/2018/19 (FY 2075/76)/Government Ministries, Government Agencies, Public Enterprises and Private Sector/Efficient government, Efficient Public Enterprises, Efficient private sector
4. Achieve sustainable social security/Job creation in public and private sectors through increased investment/At the earliest possible/Government Ministries, Government Agen-

- cies, Public Enterprises and Private Sector/ Increased employment opportunities and Increased number of peoples getting social security
5. Shift from non-contributory (pay as you go) to contributory system/Amend civil service act and rules and also other related laws/At the earliest possible/Ministry of General Administration and Federal Affairs and other concerned agencies/Contributory system in both public and private sector
  6. Strengthen institutions/Make comprehensive legislation in social security/At the earliest possible/Ministry of Labour, Employment and Social Security/Efficient laws and Efficient employees close to people
  7. Ensure social participation with solidarity of stakeholders/Make comprehensive legislation in social security/At the earliest possible/Ministry of Labour, Employment and Social Security/Support from civil society, Support from trade unions
  8. Make well designed and cost effective comprehensive policy framework-regulatory framework/Make comprehensive legislation in social security/At the earliest possible/Ministry of Labour, Employment and Social Security/Cost effective service, Regulation for mal practices

*Chair: Dr Som Lal Subedi (Former Chief Secretary, Government of Nepal); Moderator: Dr Damaru B. Paudel (Ministry of Foreign Affairs, Kathmandu, Nepal); Presenters: Mr Prakash Dahal (Joint Secretary, Ministry of Labor, Employment and Security), Mr Krishna Hari Baskota (Former Secretary, Ministry of Finance), Dr Damaru B Paudel (Under Secretary, Ministry of Foreign Affairs, Nepal), Dr Shiva Hari Dahal (ACAS (Asia Conflict and Security) Consulting George Mason University), Mr Baburaja Maharjan (NRNA NZ founding president), Ms Indira Tripathi (NRNA NCC, USA), Mr Bibek Kumar Pandit (Kathmandu University), Dr Kush Raj Shrestha (Royal Darwin Hospital, NT, Australia); Coordinator: Dr Damaru B. Paudel (Ministry of Foreign Affairs, Kathmandu, Nepal)*

### 3.10 Sustainable Energy

A team of academics and professionals around the globe gathered in Madhavi Hall of Hotel Soaltee in Kathmandu Nepal on October 14, 2018 at 11:00 AM to present their views and experiences on the topic of Clean Energy Production within the symposium of Sustainable Energy.

It was a part of three-days long First Non-Resident Nepali Association (NRNA) Global Knowledge Conference organized by NRNA in partnership with the Government of Nepal (GoN).

The major attendees were the officials from Nepal government, senior members of universities and research institutions, leaders, accomplished international, national and NRN experts and students.

The objectives of the symposium were:

1. Identify initiatives taken by the government of Nepal in renewable energy production.
2. Discuss benefits of renewable energy and challenges faced by the industry and consumers.
3. Share the international views of the clean energy technology and implementation of the technology in Nepal.
4. Existing infrastructures for renewable energy and future prospective in Nepal.

These objectives were consistent with the objectives of the Convention that aimed to bring experts from Nepal, Nepali diaspora and international community together to share their experiences and prepare an action plan to help Nepal move towards a knowledge-based economy.

#### Summary

The following distinguished invited and contributed speakers shared their views, knowledge, and experiences through presentable materials in the symposium.

1. Profile of Renewable Energy (Mr Ram Prasad Dhital, Former Executive Director, Alternative Energy Promotion Centre (AEPC)): Mr. Dhital shared the profile of renewable energy in Nepal revealing research data with potential of 3,000 MW wind, 3,930 MW solar and 42,000 MW hydropower as major clean energy resources in Nepal. He outlined the framework of renewable energy experience, government policies being as a major contributing factor and waste to energy, mini-grid network and rural demand

as renewable energy opportunities ahead. He provided a prioritized energy mix for energy security in Nepal.

2. Energy Security and Hydropower Development Issues (Prof. Ram Manohar Shrestha, Emeritus Professor, Asian Institute of Technology (AIT), Thailand): Prof. Shrestha laid out the energy security and hydropower development issues in Nepal. In current context in Nepal, petroleum import bill exceeds total export revenue seriously impacting the national economy. Dr. Shrestha reveals a projection of a significant growth in oil consumption with oil import to double during 2015-2030 and triple during 2030-2050 under high GDP growth scenario with increase in hydropower generation capacity for which a significant investment in hydropower is needed. Similarly, net energy import dependency will decrease in 2050 with significant reduction on greenhouse gas and local pollutants. Besides, there will be significant electrification of road transport that would require adequate provision of charging facilities.
3. Current Practice of Electric Power Distribution (Mr Surya Lamsal, Senior Engineer with New York State Power Authority and a PhD candidate of Urban Infrastructure Systems in New York University): Mr. Lamsal shared industry experiences with current practice of generating, transmitting and marketing electric power in the western world. Mr. Lamsal identified the need of electric power in coming days to be reliability and sustainability-driven for which a significant investment is needed in production and delivery. Developed nations with century-long exercises have gone too far in centralized grid. While they are returning back to local, micro and macro grids to capture renewable energy resources and empower consumers, developing nations like Nepal have a benefit of reduced-path to get to the point of sustainable energy goals. He emphasized the need of Nepal Government to capture NRNA expertise to use proven technology for the guaranteed benefit of Nepal in energy infrastructure.
4. NRNA Initiative Ujyalo Nepal (Dr. Badri KC, General Secretary, NRNA): Dr. KC introduced the NRNA initiative Ujyalo Nepal that was established with a purpose of helping Nepal reduce electricity consumption through energy efficiency program. The goal of the project is to replace 10 million conventional bulbs with LED lights in FY 18/19 which is equivalent to saving 300 MW with others economic and environmental benefits.

Immediately following the presentations, the panelists summarized their views of clean energy production in Nepal and brainstormed the topic together with the participants and moderators with current challenges and possible solutions.

The participants actively engaged in Q/A session with the panelists on the following issues:

1. How NRNs can participate and contribute to the clean energy production in Nepal.
2. How NRNs will benefit from sharing their knowledges, experiences, skills and investment strategies in Nepal.

3. How the policies, when they are formulated, are implemented on the ground.
4. How these brains will communicate and collaborate with GoN authorities. What challenges exist in communication and how they can be mitigated.
5. How complicated it is to adopt a new technology in Nepal.

## Recommendations

Based on the knowledge shared through the paper presentations, panel members' input, and the participants' questions and expert's answers, the moderators came up with the following conclusions and recommendations:

1. Develop sustainable human resources in Nepal to manage emerging technology related to sustainable energy.
2. Make action-oriented policy in research and develop a policy directed database of possible renewable energy projects.
3. Develop a long-term energy plan and with transparency within development and implementation.
4. Prepare a think-tank within NRNA and GoN for knowledge sharing and immediately initiate communication.
5. Develop a roster (database) of energy experts in various disciplines and share that database with the think-tanks of NRNA and GoN.
6. Infill generation gap by engaging youths for technology in sustainable energy and knowledge transfer. Adopt university-level link and study program.
7. Start a balanced approach in creating energy from mixed renewable energy resources such as solar, wind, hydro, biogas etc. Prioritize the technology of Waste to Energy as an immediate action as it is highly applicable in Nepal.
8. Develop partnership with international industries to establish entrepreneurship and manufacturing facilities to produce smart appliances, electrical parts and tools and develop manufacturing capabilities within the country supporting other economic benefits.
9. Use smart engineering for efficient energy generation, transmission and distribution and usage. Use smart grid technology focusing into community microgrids and resilient transmission and distribution system.
10. Reduce consumption of electrical energy by adopting efficient appliances and equipment and smart usage.

*Panel members: Surya Lamsal, Prof. Bhim Prasad Shrestha, Prof. Sunil Lohani, Ram Prasad Dhital, Prof. Ram Manohar Shrestha, Dr. Badri KC (Panelist); Coordinators: Dr Ambika P Adhikari (City of Tempe, and Arizona State University, USA), Dr Subodh Sharma (Kathmandu University, Nepal)*

### 3.11 Technology Transfer and Innovation

The symposium sessions were held under two different categories 1) Opportunity in innovation and technology transfer and 2) Emerging technologies and investor perspectives. There were altogether 4 invited and 10 contributory and 4 posters presentations.

In the first session of opportunity in innovation and technology transfer, the presentations focus was on the challenges faced by local bio industries in Nepal. Shikar biotech described the market of antibodies manufacturing and validation in Nepal and enormous opportunities that lies ahead for any company working in this sector. They also described their genetically manipulated sample testing using Crispr/Cas9 technology in Nepal. The presentation on poultry industries highlighted challenges faced by the industries in terms of vaccination, manufacturing and supply of feed, market opportunities and quality control procedures. Government support to industry in terms of funding and R&D work was discussed as a priority for this industry to be sustainable and competitive for both local and overseas market. Medical tourism concept was also presented and described the benefits of this industry to both food, agriculture and biomedical industries. The session also presented a case study of a diaspora scientist success story perspective overseas and willingness to contribute and return to continue research in Nepal. The cancer research perspective in the context of Nepal and described the initiatives from organisations like Centre for health and disease studies (CHDS), Nepal Applied mathematics institute of research (NAMII), Phutung research centre (RiBB) and Centre for molecular dynamics (CMDN) to secure funds and collaboration with Nepal research alliance (NRA) to boost research capacity building. Despite clinical focus on cancer treatment, support to cancer research is lacking in Nepal and collaboration and funding were considered necessary. Likewise, the affordable easy to use and field-based technology to test food quality, pharmaceutical products, water and pesticide products discussed the necessity to meet growing needs which exiting conventional methods in operation are not able to meet. The techniques (PADS) based on calorimetric titration using combination of colour indicator and image analysis was developed by Kathmandu institute of Applied sciences.

Plastic waste management and their concept from landfill to Road fill described their technology of a prototype composure products of polymer, bitumen and waste and results of their trial products from real road conditions. The technology is attractive and cost effective and claim to have provided improved strength and durability and cost effective (NRs 5750/100 meter) and looking for next stage of manufacturing and commercial viability. E-governance presentation discussed steps necessary in implementing the technology and considered essential to improve inefficiencies and requires education, capacity building and continuous upgrading of technology for successful implementation.

In the second session, Emerging technologies and investor perspectives, Stem cells technology and industry perspective in Nepal was presented. The future technology is driven by

regenerative and personalized therapies for heart disease, liver, kidney and diabetes using stem cells so a need of such a technology is crucial. Invitrix therapeutic institute showed willingness to collaborate to help transfer and coinvest in Nepal.

Nepal poor perception about the significance of patenting innovation and products cost Nepal a huge loss and the need to conduct workshop and seminar on intellectual property of research was necessary to create awareness and mentoring to both academia and industry in Nepal.

The pollution effect on overall health especially eye pollution discussed lack of any research and urgent need for a collaborative research with Eye hospitals was considered as a priority.

Another presentation discussed the importance of high end multicriteria decision making (MCDM) analysis and analytic hierarchy process (AHP) technology and its relevance to Nepal. Nepal active participation in AHP related research and application to bring its benefit to Nepal was discussed.

Biotechnology Society of Nepal (BSN) discussed the role of professional association in linking researchers, sharing information and the status of biotechnology research in Nepal. The BSN highlighted their various activities such as talk program, bulletin, database, DNA day celebration but funding constraints as the major road block to their research-based activities.

Expert databank, mentoring and internship opportunities linked to short- and long-term project was also discussed. NRNA USA initiative on science, technology, innovation and knowledge (STIKT) highlighted their activities mentoring and internship activities in USA to young researchers.

## **Summary and Recommendation**

1. NRN entrepreneurship through start-up companies by returned diaspora community is on rise in Ag, Biotechnology and Natural products
2. Such start-up companies need strong support by NRNA and Government
3. Prepare a database of these entrepreneurs and established industries
4. Establish an entrepreneurship hub under NRNA Nepal Science Foundation Trust
5. Patent database is weak and a separate Patent conference with NRNA and GoN and Industries needs to be organized
6. NRNA Ag advisory Committee to work closely with MoA and submit a collaborative project proposal

## **Plan of Action**

1. NRNA to prepare a database of start-up and organize a follow up meeting with them
2. Integration of professionals working in Nepal start-up into SKI database
3. Identify niche areas to develop a joint collaborative projects proposal
4. Establish joint innovation fund with GoN
5. Establish an Innovation hub
6. NRN partnership and support mechanism to professional associations
7. Initiate Global scholar exchange and visiting scientist program
8. NRNA representation in S&T bodies

*Presenters: Dinesh Kumar Gautam (Probiotech Industries Pvt. Ltd.), Hom Bahadur Basnet (Nepal Poultry Entrepreneurs Forum), Sudhakar Jayaram (Medicity Hospital), Ravindra M Sapkota (Shikar Biotech, Kathmandu, Nepal), Yogan Khatri (University of Illinois, USA, Research Fellow, Life Sciences Institute, University of Michigan, USA), Rajendra Prasad Pangani (Department of Surgery, City of Hope National Medical Center, Duarte, CA, USA), Basant Giri (Center for Analytical Sciences, Kathmandu Institute of Applied Sciences), Bimal Bastola (Green Road Waste Management Pvt. Ltd), Varun Amatya (Nepal), Habib Torfi (Invitrx Therapeutics, CA, USA), Rishi Ram Chapagai (Boston International College, Chitwan, Nepal), Daman Ghale (Nepal Eye Hospital, Kathmandu, Nepal), Mr Shashi Bhattarai (Knowledge Holding International), Kishor Vaidya (University of Canberra, Australia), Nabin N Munankarmi (Biotechnology Society of Nepal (BSN), Nepal), Pashupati Pandey (NRNA, NCC, USA); Coordinators: Dr Raju Adhikari (RMIT University, Australia), Dr Rameswor Adhikari (RECAST, Tribhuvan University, Nepal)*

## 4 Reports on Focussed Sessions

### 4.1 Agro-Food Innovation Supercluster

In 2015 the world population was 7.2 billion. It has been projected to reach 9.6 billion by 2050. Innovators across the globe have identified the ways to compensate such feeding needs. The global initiatives witnessing that medicinal and aromatics plants and creatures are going to be major components of protein, food supplements, health products, sanitary products, and textiles raw materials of next generations. That has the great economic growth potential to Nepal. Nepal is the homeland of about 7000 plants several value-added creatures that has great potential to contribute for innovations needed for next generations. Nepal is situated between India and China with market proximity of world half population where in India there are huge demands of vegetarian (2/3rd population) and herbs product and in China (above 60%) the demands for food with insects and herbs.

Nepali diaspora has skills and experience to link Nepal potential with real opportunities to grab the upcoming changing market demands created by changing circumstances. The first symposium to uncover a possibility of formation of diaspora backed consortium of large and small companies, cross-sectoral industry organizations, post-secondary institutions, and government agencies committed to a system based farm to fork approach in energizing innovation in holistic Agri-Food commercialization potentials was conducted in the capital of Nepal. There was an active participation from NRNA think tanks, foreign delegates, governments level think tanks including minister of agriculture and animal, chamber of commerce and the representatives from most stakeholders under the scope of innovation superclusters. The estimated delivery potential during the idea inceptions of the agro-innovation supercluster project was minimum \$30 M in tangible economic benefits with 300,000 new jobs in the new area and over 70,000 self-employment opportunities by 2025.

#### Summary

The brief disclosure in regard to idea inceptions and immediate benefits of diaspora backed agro-food innovation supercluster formation initiatives a white paper was presented about the current status of Nepal, existed gap, a potential for improvements and expectation from NRNA. Briefcase studies and interpretations on how that outcome can be linked with Nepalese context were highlighted. Specific examples of current and next generations potential of Nepal in medicinal and aromatic biomass, ayurvedic biomass and others biomass including rubber, jatropha, and insects plants were explored while citing the need and sustainability of initiating diaspora backed Agro-based Innovation Supercluster in Nepal that was critically discussed among high-level panel discussions.

During the discussion and interactions, participants were agreed that a diaspora backed

incubations centres were of the urgent need of the country. The discussion has uncovered the need for further networking in a wider context, core team formulation including a representative of the government, NRNA think tank, FNCCI and subject other stakeholders including provincial governments and partners. For that, at the start, a national level policy formulation and endorsements from the government of Nepal was encouraged. After the national level policy formulation and endorsements, the implementation schedule anticipated was finding appropriate implementation module with participation and contribution of identified partners and stakeholders, engaging direct and indirect beneficiaries in a consortium of large and small companies, cross-sectoral industry organizations, post-secondary institutions, and government agencies. Afterward, initial node is expected before initiating to invite global incubators and players to review in-country development and establishment of their footprints. That could institutionalize or link knowledge & partnership bridges among foreign laboratories, technology transfer offices, incubators and research intuitions with local academic institutions, researchers SMEs and stakeholders for sustainability.

The diaspora backed agro-innovation supercluster was expected to participate in encouraging schools and higher studies to upgrade (estimated minimum 60 years' old body of knowledge based ) academic content so that body of knowledge of higher and technical studies align with local market needs. Encourage to networked among academic and commercial intuitions including government agencies with diaspora backed Innovative Incubators. Seed the ideas to develop clusters and superclusters. Identify and depute or link diaspora with appropriate knowledge and experiences to link local expertise with overseas through the virtual return.

## **Recommendations**

NRNA headquarters need to discuss and agree that there is a need for national-level policy formulation and endorsements from the government of Nepal. And need to officially request to form such policy and forming a core team including the representative of a government, NRNA think-tank, FNCCI, and subject other stakeholders including provincial governments and partners to initiate the proposed actions.

1. The government of Nepal needs to formulate a national level policy and endorse forming a core National Team as requested by NRNA.
2. NRNA need to coordinate for the initial arrangement of start-up capital through stakeholders and partners contributions and participation.
3. The Team should allow working independently on their own accord to deliver the anticipated results.

## **Plan of Action**

1. Proposal realization and acceptance by NRN ICC – as soon as possible

2. Made official Request to Government of Nepal to Formalize policy and Team - TBD
3. Facilitate Team to take active parts for action plan and schedule - TBD

*Chair: Hon Mr Chakra Pani Khanal (Minister of Agriculture and Livestock Development); Modertors: Mr Bikash Bidari Ms Manju Chhetri; Presenters: Mr Yogendra Kumar Karki and Mr Shanker Sapkota (Joint Secretary Ministry of Agriculture Livestock Development / Information Officer), Mr Narayan Ghimire (Food Scientist Flavorist, Flavorcan Inc. Canada), Mr Tilak Bhandari (Institute of Rubber Jatropha Research-Nepal); Panel Members: Dr Dev Bhakttta Shakya (Ex Director Agro Enterprise Center Nepal), Mr Hikmat Thapa (Senior GM Dagote Group Africa), Dr Matina Vaidhya (Department of Food Quality Control), Dr Poorna Kanta Adhikari (President, Institute for Conflict Management Peace and Development (ICPD) Kathmandu) Mr Shekhar Golcha (Senior VP, FNCCI); Coordinators: Mr Mahabir Pun (Chairman, Nepal Innovation Center), Mr Narayan Ghimire (Food Scientist Flavorist, Flavorcan Inc. Canada)*

## 4.2 Returnee Professionals, Scholarship and Research Funding

### Summary and Recommendations

1. Either in establishing world-class research laboratory or building a scientific carrier, or transferring the expertise earned while in aboard, are having difficult part in Nepal due to limited resources and traditional administrative mechanism.
2. Hundreds of returnees in each year with their experience need to be utilized by the government to encourage them to work for economic development of Nepal. Not only, Nepal government has an understanding to provide loans for their own business in relatively low rate, but also collaborative economic zone can be established.
3. Group training, collaborative work among like people with their experience need to be done. Financial and technical assistance will be provided for returnee works.
4. NRNA of respective country can coordinate with Nepali migrant workers with their earned skills/academicians, experts to establish a relationship to the government (of resident and also government of Nepal) let them back to Nepal to work of their own.
5. During this global conference, NRNA in collaboration with labor ministry has an understanding to open training centers in all seven provinces and also conduct telemedicine from aboard.
6. A formal mutual committee among NRNA and labor ministry will be formed to address the urgent issues of migrant workers such as legal issues aboard, pension for migrant workers, establishment of shelters particularly for woman.
7. There are several scholarship provision from in and outside of country (such as UCG, DAAD fellowship, NFP, JSPS etc., however, there is not much binding on their return to the origin of their country for the contribution in return of the scholarship.
8. Lower priority in science and technology from the government of Nepal is unacceptable by experts. Collaborative research funding from “research Funding agencies/government” can be established through NRNA and provided to the really needy people with certain commitment for service to the country. It helps to deviate from “Brain drain” to “brain gain”.

*Presenters: Prof Narayan Adhikari (Tribhuvan University), Mr Prajwal Rajbhandari (Research Institute for Bioscience Biotechnology), Dr Rabindra Prasad Dhakal (Faculty of Technology, Nepal Academy of Science and Technology), Ms Merina Ranjit (COO, Chaudhary Foundation), Dr Pratik Adhikari (Manmohan Memorial Institute of Health Sciences, Kathmandu, Nepal), Mr Binod Ghimire (Returnee Farmer from Israel), Mrs Pasma Dahal Jha (Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH), Dr Deepak Kumar Khadka (University Grants Commission, Sanothimi, Bhaktapur, Nepal), Ms Kabita Thapa (German Embassy), Ms Sunita Gurung (Australian Embassy), Mr Ranjan Prakash Shrestha (European Union), Mr Saurav Dhakal (Netherlands Embassy), Mr Nahendra Prad-*

*han (Russian Alumni), Mr Umed Pun (Nepal JSPS Alumni); Coordinators: Dr Devi B Basnet (Medytox, Inc., South Korea), Dr Nabin Aryal (Aarhus University, Denmark)*

### 4.3 Innovation and Private Investments

In this session, three presentations were made, one each by international speaker, NRNA member and a twin entrepreneur from Nepal. Main objective of this session was to try to bring innovators and potential investors on the same platform. The objective was only partially met, but we are hopeful that we will be able to expand on the current experience in the future.

#### Summary

1. International innovators, entrepreneurs and investors are interested in the Nepali market. They are actively identifying business opportunities and Nepal should invite them to innovate and invest in our local market.
2. NRNA innovators are interested and capable of establishing start-up companies in Nepal that can have impacts in both national and international markets. We need to explore possible collaborations with international, NRNA and local investors to bring new ideas into fruition.
3. Innovators in Nepal are developing products that are suitable for Nepali market and can find interest in the international market as well. To scale their production up, they need additional funding. To bring them in international market, they need international marketing. NRNA entrepreneur can play crucial role on both fronts.
4. We need to develop a mechanism and platform through/in which innovators and investors can brainstorm new projects and implement them.
5. Innovators can not work together unless there is a strong intellectual property protection in Nepal. GoN needs to revamp its infrastructures to ensure intellectual property rights in Nepal.

#### Plan of Action

1. NRNA should create a platform where innovators and investors from both international and national markets can collaborate.
2. Encourage NRNA members to start working on collaborative projects with Nepali innovators.
3. Encourage GoN to strengthen its intellectual property protection agencies.

*Presenters: Ms Hanna Yim (Strategy and Policy Planning for Development Programs Department, Korea International Cooperation Agency (KOICA)), Dr Tara Sigdel (University of California San Francisco), Ram Prasad Rimal and Laxman Prasad Rimal (Technology Sales Pvt. Ltd.); Coordinator: Dr Hari Prasad Dahal (American Physical Society, USA)*

## 5 Organizing Committees

### Chair

- Mr Kumar Panta, Non-Resident Nepali Association, Germany
- Dr Hem Raj Sharma, the University of Liverpool, UK

### Member Secretary

- Dr Hari Dahal, American Physical society, USA

### Nepal Government's Liaison Officer

- Dr Damaru B. Paudel, Ministry of Foreign Affairs, Kathmandu, Nepal

### Advisory Board

- Dr Ambika Adhikari, Arizona State University, USA
- Prof Bhagawan Koirala, Institute of Medicine, Tribhuvan University, Nepal
- Prof David Gellner, University of Oxford, UK
- Dr Dinesh Bhujju, Nepal Academy of Science and Technology, Nepal
- Dr Drona Rasali, Provincial Health Services Authority, Canada
- Er Ganesh Shah, Nepal Science Olympiad, Nepal
- Dr Kayo Devi Yami, Former Chief of NAST Science Faculty, Nepal
- Prof Kedar Bhakta Mathema, Former VC, Tribhuvan University, Nepal
- Mr Mahabir Pun, National Innovation Centre, Nepal
- Prof Michael Hutt, University of London, UK
- Mr Naresh Koirala, Nepal Library Foundation, Canada
- Dr Pramod Dhakal, NRNA Academy, Nepal
- Dr Raju Adhikari, RMIT University, Australia
- Dr Shobhakar Dhakal, Asian Institute of Technology, Thailand
- Dr Yub Raj Pokharel, South Asian University, New Delhi, India

### Session Coordinators

- Dr Dinesh Raj Bhujju, Nepal Academy of Science and Technology, Nepal (Science and Technology Policy)

- Dr Shobhakar Dhakal, Asian Institute of Technology, Thailand (Knowledge-based Economy)
- Dr Raju Adhikari, RMIT University, Australia and Dr Rameswor Adhikari, RECAST, Tribhuvan University, Nepal (Knowledge and Technology Transfer)
- Mr Khagendra Dhakal, King Mongkut's University of Technology, Thailand (Role of Nepali Diaspora for Development Policies)
- Dr Drona Rasali, Provincial Health Services Authority, Canada and Dr Keshav Adhikari, IAAS, Tribhuvan University, Nepal (Agriculture and Food Security)
- Dr Moti Rijal, Tribhuvan University, Kathmandu, Nepal (Disaster Risk Reduction)
- Dr Pramod Dhakal, NRNA Academy, Nepal and Dr Tejendra Pherali, University College London, UK (Education)
- Dr Maheswar Rupakheti, Institute for Advanced Sustainability Studies, Germany, Dr Durga Poudel, University of Louisiana at Lafayette, USA, Dr Puru Shrestha, USA (Environment Pollution)
- Mr Keshab KC, Nepal Rastra Bank, Nepal and Mr Ranjeet Mahato, Neapolis University Paphos, Cyprus (Financial Policy and Investment)
- Dr Archana Amatya, IOM, Tribhuvan University, Nepal and Dr Binod Shah, Albert Einstein College of Medicine, New York, USA (Health Education and Policy)
- Dr Arun Timalina, IOE, Tribhuvan University, Nepal and Mr Naresh Koirala, Nepal Library Foundation, Canada (Hydropower, Transportation and Utilities)
- Dr Hari Dahal, American Physical Society, USA and Narayan Adhikari, Central Department of Physics, Tribhuvan University, Nepal (New Frontiers in Physical Sciences and Prosperity)
- Dr Damaru B. Paudel, Ministry of Foreign Affairs, Kathmandu, Nepal (Social Security and Good Governance)
- Dr Ambika P Adhikari, City of Tempe and Arizona State University, USA and Dr Subodh Sharma, Kathmandu University, Nepal (Sustainable Energy)
- Mr Mahabir Pun, National Innovation Centre, Nepal and Mr Narayan Ghimire, Flavorcan Inc., Canada (Agro-Food Innovation Supercluster)
- Dr Devi Basnet, Medytox Inc., South Korea and Dr Nabin Aryal, Aarhus University, Denmark (Returnee Professionals, Scholarship and Research Funding)

## Management Committee

- Mr Kumar Panta, Vice President, NRNA
- Dr Badri KC, General Secretary, NRNA
- Mr Ram P Thapa, Patron, NRNA
- Dr Hemanta Dabadi, CEO, NRNA Secretariat
- Mr Shreeram Ghimire, Secretariat liaison



## **Non-Resident Nepali Association (NRNA) Secretariat**

**Baluwatar, Subarna Shumsher Marga**

**POB 1189, Kathmandu, Nepal**

**Tel: 977-1- 4426005; 4411530**

**Email : [admin@nrna.org](mailto:admin@nrna.org)**

**URL: [www.nrna.org](http://www.nrna.org)**