PROPOSAL TITLE: Effective Broadband solution for bridging the digital divide - A pilot project for Community based Internet Service Provider and Services

Proposed By: Centre for Information and Communication Technolgoy for Development **(ICT4D)** Nepal and Nepal Research and Education Network **(NREN)**

Submitted To : Asi@Connect

INTRODUCTION

ICT applications and deliverables are playing a vital role in the enhancement of "informed" community. The use of ICT facilitates scalable, inclusive and integrated approaches, which is critical in every development process. Proper use of ICT is not only for cost-effective and timely tracking of any achievement of development goals but also for facilitating collaboration between the different stakeholders.

Each country has to define its own path forward, based on its unique social, economic, political and cultural context. However, a key question always remain to answer is how can the enabling role of ICT in economic processes and social development be enhanced most effectively. The proposal that we are developing will try to find key answers on what will be the approaches and key ingredients required to facilitate ICT application and to deploy appropriate technology for developing a knowledge based society.

Digital divide is not just a division between those who have access to Information and technology and those who are deprived of technology, but its impact has been much felt as marked differences in socioeconomic factors. Studies have found that while the gender gap in computer and Internet use is closing over time, the socioeconomic and racial gap is growing.

The proposal, which is based in WP6 - develop robust infrastructure for Internet access to underserved rural and remote locations will be complementing with WP5 to setup relevant platforms to identify and operate major applications and collaborate with concerned government and local community for wider social benefits.

ABOUT THE APPLIER

Centre for Information and Communication Technology for Development (ICT4D)

Centre for Information and Communication Technology for Development, is based on a radically innovative concept – an ICT Not-For-Profit company. Under the registration number 138966/072/073, the Certificate of Incorporation of Company was accredited to us by the Office of Company Registrar, Ministry of Industry as a NOT DISTRIBUTING PROFIT COMPANY. We started our operation after we received the PAN Number on October 15, 2015.

Our team has worked on many development and ICT related projects over the past 25 years. However, recently we noticed that the profit motivation of consultants leads to various conflicts of interests during any given project life cycle. To avoid a similar type of situation within our own organization and to rededicate ourselves to bringing about true change for rural and underprivileged communities, we decided to create a not-for-profit organization, **Centre for Information and Communication Technology for Development (ICT4D)**. Such an organization will focus mainly delivering citizen oriented IT and Telecommunications services

which will concentrate on poverty alleviation, disaster management and rehabilitation, and rural development. We believe in self-sustainable growth after the initial seed funds are placed. Hence, the business and social models must not only confluence to ensure long term growth, but also resonate in consonance with each other, under public private partnership model.

We are an eclectic group of professionals who have been cognizant of various local customs, social constraints, bureaucratic indecisions, political flux, geological barriers and regional interests which have plagued our nation for the past innumerable decades. Despite these concerns, we believe that an opportunity has arisen to serve our nation by enhancing the granularity of our focus, i.e. the individual Nepali. Our organization will foster ICT infrastructure and service delivery applications. We will serve stakeholders ranging from central government agencies to the individual, unaffiliated citizen.
As social entrepreneurs, we are dedicated to serve our customers under the aegis of the Private-PublicPartnership (PPP) model. We are **not** just another NGO/NFP community member. We **are** the community that we serve. We believe in a collaborative model where the local government and communities actively participate and support 'their' initiatives. We believe our role is to provide external assistance in their endeavours within the cradle-to-grave project ownership paradigm.

We believe that the effective application of ICT within Nepal's development domain space will create an ecosystem where equality, liberty and empowerment of each individual will be inevitable. With an excess of decades of cumulative professional expertise, our team has been involved in the various phases of project development from policy making, ICT architecture, mitigating social development barriers, strategizing marketing campaigns, etc. We are conscious of the various potential pitfalls and not oblivious to the archetypical 'time-to-market' limitations. Our collective, wide ranging and dynamic experience is our mojo and our strength. Our slogan reflects our values and commitment – ICT for Development and Empowerment.

Nepal Research and Education Network (NREN)

Established in 2007, **Nepal Research and Education Network (NREN)** is an agency dedicated to provide highspeed Internet links between research and education institutions in Nepal. This is a national backbone of high-speed network dedicated to interconnect national educational and research institutions among one another and with peer research and education networks of nearly all industrialized countries in the world and all countries in South Asia. This network operates at 100Giga bits per second within the country and connects to other international institutions over a dedicated 45Mbps link (which can be upgraded any time the demand exceeds this capacity). This will allow researchers to upload and download data at a speed that had never been possible before in Nepal over commercial networks. Consequently use of Internet for research and education had been severely limited in Nepal. NREN network is, therefore, a network platform for transforming education and research in Nepal.

This is a non-commercial network developed to accommodate vast amounts of data that students, researchers and educational institutions need to transfer and to accelerate the development of research and education. Imagine downloading a HD video of a lecture in one second at no cost by a student from any university or college of Nepal. That would be thousands of times faster than any commercial network at home or office but would be available for free to Nepalese students and researchers. NREN will be one of fundamental conditions for proliferating research and innovation in Nepal, for attracting global researchers to Nepal, and for developing digital economy in Nepal.

Nepal is now home to a dozen research institutions, ten universities, more than 1000 colleges and more than ten thousand schools. Imagine connecting those institutions to above mentioned high speed network where

a student can download a textbook from a national NREN library in less than a second. Imagine the saving in time and money for a student and for the country that spends a huge amount of money in taking textbooks to far-flung places of Nepal. Imagine, Nepalese scholars gaining qualifications through multimedia-based distance learning. Imagine Nepalese researchers working in international projects, and imagine millions of Nepalese youth working in foreign countries engaged in furthering their education and training. Imagine minimizing Nepal's brain-drain and engaging diaspora scientists and academics engaged in research, education, and economy of Nepal. Imagine engaging our students, teachers and researchers with experts throughout the world for the purpose of improving living standards in Nepal. Imagine advancement of higher education in Nepal and revival of our national institutions, which are now struggling to a great extent. Imagine universities, colleges, hospitals, libraries, research and scientific centers, and government agencies across Nepal being connected to one another. Imagine NREN as a great enabler of education, health, agriculture, environmental, scientific, and innovation programs in Nepal.
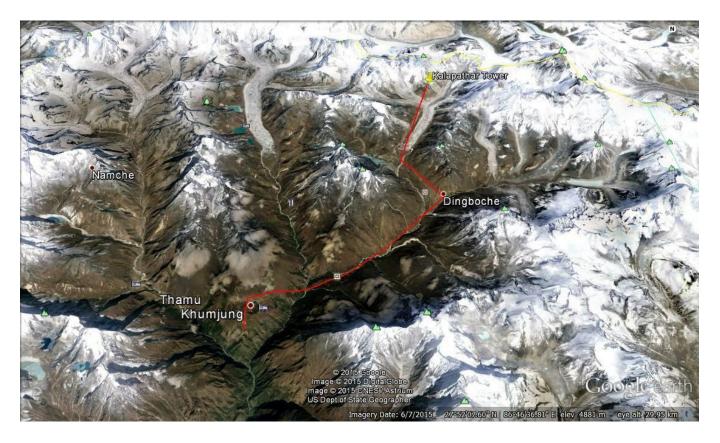
Started by connecting Nepal to Trans Eurasia Information Network (TIEN), Internet2 of USA, pan-European DANTE/GEANT and other international networks, NREN is poised to connect millions of Nepalese learners to millions more in other nations. NREN is using a model that has been successfully proven around the world and building expertise, technical knowledge, training and opportunities for collaboration in the country.

THE PROJECT AREA

The project area lies in Solukhumbu District of Nepal. It consits of sub-regions - Solu and Khumbu. Khumbu sub-region most lie in high altitude and has diverse culture with difficult terrain. However, it's one of the most attractive tourist place in the World with snowcapped mountains. It is also one of the notable hiking trail in the world. Due to its geography, it is one of the most challenged place for development activities. Hence, the place is chosen by our group for enhancing activities which not just focus on establishment of robust infrastructure but also implement of applications to serve the underserved communities.

The proposed network (google map attached) intends to extend fiber from Namche Bazaar situated at 3400 meter (the gateway to Mount Everest) to Kala Pathar situated at almost 5800 meters. The network passes through major villages of the trail which not only provides shelter to the tourists but also plays a vital role in the development of the region, both culturally and economically. Since the proposed network backbone passes through Lobuche, we also aim to connect EVK2CNR Pyramid Laboratory / Observatory project, one of the environmental research projects in the highest altitude (http://www.evk2cnr.org). The network will reach almost 500 households and provide value added services over IP like tele-medicine and online learning and education. This will be achieved by connecting the local schools and hospitals with their counterparts in urban areas.

The proposed area is part of Sagarmatha National Park which hosts the world famous Mount Everest and its trekking route. Without proper broadband connectivity, the communication is being hindered time and again due to the harsh geological and climatic conditions. Hence a robust backbone is thought to sort out all communication related problems. The only means of communication today is either through satellite phone or disturbed GSM network both with limited data rates. The coverage of GSM network is not consistent with network and power back-up issues in such remote location. We also need to seek support from the local community which will be one of the major stakeholder in this pilot project. Since the project aims to run in public-private-partnership model, it signifies the importance of all local stakeholders, not just for the setup purpose but also for the longer term sustainability as well as operation and maintenance of the project.

The project will surely make the value of this innovative solution globally known through visitors, trekkers, climbers and journalists because the project takes place along with world's most famous mountain trail. This could help cause a chain effect worldwide for closing the digital divide, with appropriate applications and solutions, in a quick and ultimately affordable manner.

With the success of this project, the proposer aims to expand the network to other part of the Khumbu Region too. The current project area is selected in order to provide quality service in lieu of harsh climate and difficult geographical conditions. The proposer proposes that such network must be expanded upto Lukla and then to Sallery (District Headquarter) and link up with state owned east west fiber highway in Ghurmi. Such network not only acts as north-south optical highway but also easily setup network with the Country's capital city. The current broadband is provided either through the wireless network or GSM network.

OBJECTIVES AND DELIVERABLES

The prime objective of the proposed project is to build a robust network in the underserved areas in publicprivate partnership model. The network will be designed in such a way that it creates a platform to connect concerned stakeholders from government to local community. Since the proposed network will be deployed in proper Himalayan region with various climatic conditions, it will be valuable for any research team who are studying global climate change and its affect.

In order to be more specific on the outcome of the project, following guiding principles will be followed:

1. People centric approach to setup broadband infrastructure and to provide solutions for ICT requirement of a community.
2. Create a knowledge base society contributing to awareness of climate change and its impact;

3. ICT based knowledge sharing platforms, development of appropriate ICT-based tools and sustainable projects; and
4. Developing effective Regional Information System
5. Assist researcher on data related to Climate change and glacier lakes which lie in the proposed project area which can contribute significantly to global warming
6. A self-sustained project which will be run by the community itself.

In order to summarize:

Objective	Deliverables	Targeted Community
To provide broadband Internet services to rural communities.	a. State-of-the-art technology in broadband like FTTH or TVWS will be used to provide IP connectivity to rural communities. b. Communities will be selected based on their eagerness and willingness to provide local support. c. A basket fund will be created in order to seek participation from the community, local government, ICT4D, NREN and Asi@Connect	The local community and relevant governmental, non-governmental agencies working in the proposed project area

To leverage the use of ICT tools for human development. This shall include, but not limited to, telemedicine, remote online education, and egovernance based services.	a. Study local community needs and help them to setup an appropriate technology and technical assistance framework. b. Design suitable applications and help them use ICT tools for effective management. c. Help the local government to implement egovernance mechanisms. Improvement of life standard of communities along with income. d.	The local community; local government; health and educational institutions Central government as a case study
To seek research opportunities and publish findings	a. It's a long term and ongoing process b. Carryout research activities on the need of the local community where the pilot project will be implemented. c. Study on how technology can be effective in	Donors and all relevant development parts of the country
	upbringing of livelihood of the common people and contribute to the national development index d. to assist scientists and researchers to provide online data on climate change and glacier lakes in the proposed project area	

OUTCOME

The major outcome of the project is expected to be boosting a concept of formation of information society to cater the ICT need for development process. Hence, the knowledge network with relevant authorities, researchers, experts and communities will :

OUTPUT	EXPECTED OUTCOME	TIME BOUND ACTION PLAN FOR

contribute to collaborative approaches for setting up broadband infrastructure for application and relevant services, as per the community need	☐ involvement of whole community ☐ active participation to establish and implement broadband network	• participation of a member from each household to form user committee • connecting whole community • a pilot project based in public-private partnership model
Usage of broadband infrastructure and its relevant services to help to boost social, educational and economic status of the community meaningful cooperation on the effective usage of ICT to share and learn	☐ consensus or common voice in development process ☐ building knowledge network ☐ generating income from the broadband infrastructure	• connecting schools and hospitals for knowledge network and for various applications • Usage of OTT services to generate income • Reliable and affordable Internet to serve tourists
synergized action among the policy makers to formulate better policies for proliferation of broadband services, based on the local need	☐ proven example for the usage of broadband service for local development process a test bed to ☐ formulate action plans for other similar areas Replication of the project in ☐ similar geographical conditions	☐ Documentation of lesson learnt to incorporate in Broadband Action Plan of Nepal
an online test bed for scientists and researchers to get realtime data on formation of glacier	☐ Serve to setting up of loggers and servers to fetch realtime data	• Online data for Meteorological stations • To support Research
lakes and its formation pattern to its threat to the people living in the project area to the downstream. The data will also be helpful on to study climate change in the Hindu Kush Himalayan region which is contributing to global warming	☐ Network to support online monitoring system for the community and experts to forecast possible disasters	Institutions and Scientists with realtime data

PROPOSED PROJECT PARTNER

Project Partner	Support Areas / Responsibilities
Asi@Connect	• Co-ordination among International donors, if required • Facilitation in creating basket fund for financial support to the proposed project • Facilitation in Monitoring and Evaluation of the proposed project
Relevant fiber manufacturing company	• To support to enhance technical knowledge to the concerned community and ICT4D as per the requirement • To support with affordable equipment
Centre for ICT4D - Nepal and US / NREN	• Study and analyses the requirement of the project area by developing questionnaire and relevant tools; • Come-up with further action plan required for effective co-ordination and implementation of the project and its partners; • Assist to design and implement network and applications; • Monitoring and Evaluation of the proposed project • To explore further financial support and to create a basket fund for the proposed project with other donor agencies and relevant organizations for further expansion • for overall implementation of the project as per the findings and outcome of the baseline survey • co-ordination with relevant government agencies
Local Community at VDCs in the proposed project area	• Support in study and analysis of the requirement • Support in operation of the proposed project • Support in sustainability of the proposed project • Support the project financially, wherever applicable

Local government in the proposed project area	☐ Support in study and analysis of the requirement; ☐ Financial contribution in the basket fund ☐ Support in operation of the proposed project ☐ Support in sustainability of the proposed project ☐ Support in implementation of e-government ☐ Monitoring and Evaluation of the proposed project
Central government Ministries	☐ Financial contribution in the basket fund ☐ Support in sustainability of the proposed project ☐ Support in policy formulation, if required ☐ Effective co-ordination with concerned Ministries as per the requirement of the project and Nepal Government policies

WORK PROCEDURE (Methodology) AND MILESTONES

Since the project is proposed in public private partnership model, different stakeholders' contribution and involvement make it a unique project, being implemented and operated by the community itself.

In order to pursue the project, concerned government authorities will be involved at all levels. As the first leg of the project, a baseline survey will be carried out in order to analyze the current social, economic and technical situations of the project area. A detailed household surveys by the prescribed team will be carried out accordingly. Based on the finding and outcome of the survey, the team will further work on the implementation of the proper technology along with relevant applications, required by the Community.

Sustainability of the project is always a key issue to make it successful in a longer term. The proposal will also outline the identification and involvement of the local relevant stakeholder and help them to initiate to support the project. The team, thus formed, will be made accountable for operation and maintenance of the project. For this purpose, we have envisioned that the local governing body will be setup by inviting representative from District Development Committee, Village Development Committee, local Youth Clubs, local education centre and relevant organizations.

In addition to the above workflow or methodology, following intervention points have already been identified. However, the intervention points are proposed based on the experience of the team and do not reflect any on-going activities in the project area.

- Network Operation Centre will be established in Kathmandu and Namche

- A hub center will be established in each strategically important place for broadband services and link will be designed accordingly.

- Each school and health institutions in the village development committee will be connected in star topology network for broadband services and subsequently to the required communities

- Setting up of online server to monitor climate change and for glacier lakes

BENCHMARKS FOR WAYFORWARD

This section highlights major detail steps to be taken after the finalization of the project. Such benchmarks are based on the work procedure and milestone and are designed based on the experience of the team. Any change in the benchmarks must be approved by the Steering committee after being recommended by the user committee to the Management Committee.

- Identification and confirmation of stakeholders at local level and have MOU
- Necessary approval from Ministry of Information and Communication Technology and Nepal Telecommunication Authority
- Formation of Steering Committee for forthcoming responsibilities and required government approvals
- Design communication templates and reporting mechanisms
- Report on requirement analysis and approval from the Steering Committee
- Design questionnaires for SWOT analysis of the project area
- Site Survey of the project area for requirement analysis
- Creation of basket funds
- Formation of Management Committee
- Formation of User Committee at VDC level
- Develop required information systems
- Develop procurement processes and delivery mechanisms
- Layout of Infrastructure
- Develop applications
- Develop training programs
- Prepare operational readiness
- Provide project evaluation criteria
- Packaging the project deliverables
- Assess the Acceptance from User Committee

SUSTAINABILITY OF THE PROJECT

In order to ensure the sustainability of project and its smooth operation and maintenance after the support of Asi@Connect, following steps have been taken into considerations. However, the steps are subjected to the approval from the relevant community.

- the local community may come forward to ensure the sustainability of the operations;

- The local community will be participating in the pilot project in terms of labor and other required local resources which supports their strong participation in the proposed project;

- During and after the completion of the project, the local business community will come forward to help to make the project sustainable thereby undertaking business modalities of the proposed project. Such business initiative will be very useful for the operation and maintenance of the project too.

- The local authorities will be providing access to lay the fiber and to erect tower (if necessary) to host the network.

- Later in the phase, the network will be connected to the national backbone by utilizing the local resources and Internet access will be made available. Such initiative will have higher impact on the sustainability of the project.

- The local schools and other development partners will be taking initiative to run the project under PPP model which is again another business model for the sustainability of the project.

- As positive feedback spreads to other villages and regions, it will increase demand of networking services or e-governance or any other relevant services. We envision that it will not be limited to G2C, but rather G2B and/or B2B at all level.