Creating SMILES – building the Nation

… a dream

… or a reality

as described by five young people in Nepal

Göteborg November 15, 2009

In the autumn of 2008 I visited the village Hemja in Nepal. I went there to work as a volunteer in a school for a few months. It was a time full of new experiences, fantastic cultural and nature encounters and moments, but above all, it was a time filled with meeting a lot of strong, loving and friendly people. It is the people from a country in poverty, but people with the same thoughts and feelings as everywhere, the same dreams about love and happiness, a prosperous future and a better life.

One of all I met is a young man, Santosh Poudel. A few days before I was to leave Nepal he told me about his dream. The dream **Creating SMILES – building the Nation**. Santosh' dream made a deep impact on me. You may think his words are big and the dream is just a dream, but really, the needs for realizing it are pretty basic, totally possible to carry out if only resources and knowledge are there. Since I got back to Sweden we have had frequent contacts with the help of the technology Santosh wants to spread in the rural villages of Nepal and we are working to make the dream come true. In this compendium you will find the visions, ideas and actions taken by the passionate and competent young people of Nepal who want to make a difference in their country. The first steps to make a dream into reality are taken. Do you want to join us on the road?

With warm regards,

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Creating SMILES – building the Nation

It's about changing the nation and making a difference… Science, Engineering and Technology combined with the Social and Economical perspectives of the human lives will indeed create smiles and build the nation.....

SMILES is a rural based project managed by a Non Governmental Organisation (NGO) called **Help Himalaya** (http://www.helphimalaya.org.np/**,** the website is under reconstruction**).** The main objective of SMILES is to introduce and implement the combination of technology and socio-economical interventions that may lead to an increased living standard for the people in the rural villages. More than 80% of the people in Nepal live in rural areas and out of them 42% under acute poverty line. Due to the political instability in Nepal, no solid policies and plans have been formulated to reduce poverty. Few NGO:s and International NGO:s working in Nepal have been able to make significant results in eliminating poverty. We believe communication technology within the reach of the poor and minority people is the most important tool that can bring significant change in the socio-economic status of the people. But technology itself is not sufficient to uplift the living standard of the rural people. We must participate in some more sectors that have direct impact on poor people's living like rural electrification, education, health and sanitation and community entrepreneurship. **SMILES** is thus an integrated project targeted to bring significant change in the socio-economic status of the poor people living in the rural and hilly areas in Nepal.

Santosh Poudel
Hemja -1
Pokhara
Kaski District
Nepal 2009-05-23

To whom it may concern

Project: Creating SMILES – Building the Nation

Some words about myself

In the first place, whatever people may call me, I am not just a daydreamer at all. I do have dreams and I am a daydreamer as well, but I do have a strong belief to accomplish them. To the people around me who have given me the different names; overconfident, overambitious and many more, what I want to tell is that in my opinion, there is only a small difference in being overambitious and trying to achieve something desperately. With a lot of talking and no work you are just a day dreamer and nothing more. But with less talking and more work you are an achiever. Born on the 16th of May 1986, I have never seen myself as anything else but a simple guy trying to live up to his dreams. Right now I am a student of electronics and communication engineering studying in the 3rd year of the four years bachelor exam.

Now I want to tell you the most important thing straight from my heart. This is the reason why I am in front of you all. I am from Nepal, the country that used to be the peaceful and the beautiful Himalayan country moving towards development. Now, the fate has changed. After the past years of painful internal conflicts, the country has been pushed backwards into the darkness of doomed economy, increasing poverty and deteriorating human rights records. During the past decade, people were forced to leave their homes, jobs and properties. Many hundred thousands of the students left their studies incomplete and many families lost their earning members. These misfortunes have created serious threats in the development of the country. Apart from these, being an underdeveloped nation, Nepal has always faced a hard blow to the steps towards the development. Particularly in Nepal, government and decision makers are facing serious challenges in order to meet the ever increasing needs for the basic facilities. Government has formulated different plans and policies but because of the uneven landscape and political instability the efficiency of the formulated plans and policies has been very low. Difficulties in transportation have prevented places from developing and acquiring even the minimum sets of facilities.

As an educated citizen and an equally responsible student, I have always believed that the youths are the prospective leaders and the future of the country. Now it is our turn to start something from our side. We have to be optimistic and work towards the prosperous future of the country. We have to do something to find out the solutions for the problems that our country has been facing.

Finding my commitment

I found the answer to the question "what can I do for my country?" when I went to work as a research volunteer in the remote villages in Myagdi district in the Himalayan region. I have worked and seen how the computer knowledge we gave to the people in the rural villages attracted them towards education and we increased the computer literacy in the villages by up to 40%. I have seen how simple e-commerce software has increased the incomes of the people from a few hundreds rupees to thousands. I have seen how the knowledge of the internet that we gave to a 61 year old villager helped him to chat with his son working in an Arabian country. His smiling face when he got in touch with his son struck me hard. This made me interested in how I could work to combine technology and socio-economic aspects of rural lives in favour of people living in the remote areas in my country. The study visit resulted in a paper "Applications of Wireless Communication in the Upliftment of the Rural Livelihood: A case study of rural villages in the Myagdi district of Nepal". This paper was successfully presented in a congress in Punjab, India, this year.

From my own life experience and with the experience of my study in Myagdi I have drawn the conclusion that the engineering and technology today is a suitable way to fight against the domestic challenges and the topographical hindrances and to create the prerequisites needed for the development of education and health care in the rural village, the two crucial factors for an improved survival rate, increased number of job opportunities and sustainable village life. The existing orthodox way of living followed by poverty in the rural villages is today confronted by the prosperity in the cities and in the developed countries. A possibility for increased prosperity in the village can most likely be initiated and sustained by modern but simple technology. I believe that the introduction of technologies will give the opportunities to start various socio-economical community development projects with direct or indirect support by the technology itself. These projects with different aims will open up a variety of chances for substantial and sustainable incomes for the villagers in a country like Nepal, where more than 80% people live in the remote villages. Thus, the combination of technology and socio-economical interventions may lead to an increased living standard for the people in the rural villages. In the country where more than 50% people still live under the poverty line, it can help the government to implement new plans and policies as well as provide the villagers with basic rights to information, education and health care as well as enhancing the employment market.

I believe in longing for something desperately and doing accordingly. Thinking equally of others and sharing what you gain. With high unemployment rate and ravenous poverty prevailing in my country I have a dream to create thousands of jobs, a long time it may take, and serving my fellow people. Anyone with interest to contribute to this my dream, please step forward and let me get to know you. All actions that can be taken in favour of my dream are deeply appreciated.

Description of the project

Thus, at this phase, I am proposing a plan. To begin with we will choose a remote place in Nepal with no electricity, no roads and no other basic infrastructures. After that, we will be working step by step in the following ways:

1. Using wireless technologies to provide internet, VOIP telephony service and telemedicine facility.
2. Studying the feasibility of micro hydroelectricity projects and installing generators accordingly.
3. Using solar panels and wind turbines to generate electricity wherever feasible in the absence of hydroelectricity. No 2 and 3 making **SMILES** into a green energy project.
4. Helping local schools to build infrastructure to upgrade them from primary schools to secondary schools and introducing computer education (computers) to increase the number of students and with the main aim to increase the literacy percentage.
5. Encouraging local people to focus the community to handle all the facilities we can bring to the place.
6. To find out the possibilities of introducing the village as a potential tourism destination and urge local people to invest in various infrastructures needed (hotels, lodges, tea houses, resorts, etc.); such that it can be the source of sustainable economic growth. (If individual investment is not possible then it can be made through the community.)
7. Helping local people to uplift the rural livelihood by supporting the agriculture.
8. Promoting small scale industries based on local resources and agriculture products. E.g. making jams, juices, pickles, carpets, match sticks, stationary products, meat processing, local handicrafts and finding national and if possible international markets.
9. Combining the concept of e-banking and microfinance (Bangladesh's Nobel Prize Winner's concept) and develop in the community.
10. Starting local newspapers communicating national and local news, for local product advertising and awareness programmes.
11. Providing various kinds of training like technical to handle wireless technology and computers, training needed for starting small scale industries etc.
12. Working in coordination with various organisations to provide basic health facilities and medicines.
13. Each and all projects should run in an environmental friendly way.

Please, share your knowledge and opinions on this project with me.

Yours sincerely,

Santosh Poudel

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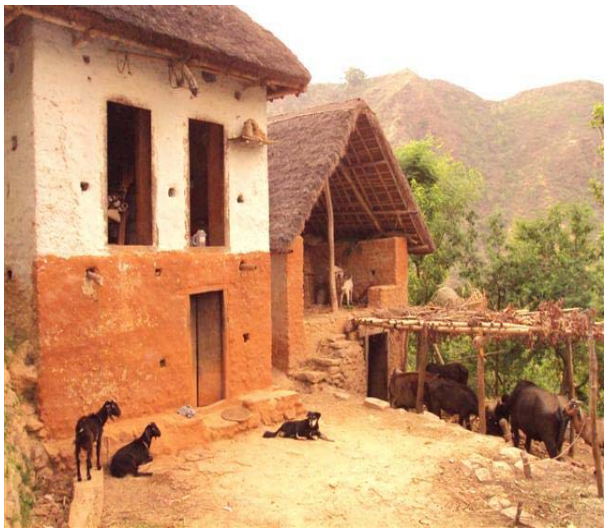
Kalimati, the first SMILES village

Kalimati is a small village with a population of about 1 200 inhabitants. It is located in Jhanga-Jholi Ratamata Village Development Committee (VDC) of Sindhuli district, one out of 75 districts in Nepal. It is situated in hilly regions, 95 km southeast of Kathmandu, the capital of Nepal.. The surrounding villages are far away and can only be reached by walking up and down hill from Kalimati. Some years ago people had to walk two days from the nearest town called Banepa (26 km fro Kathmandu) to reach Kalimati. Recently a road has been constructed with the aid of Japan government that touches the nearest village Jhangajholi Ratamata. This is about one and a half hours walking from the village Kalimati. In order to reach Kalimati village from Kathmandu the route is this: Kathmandu to Banepa (26km), from Banepa to Nepalthowk (54 km black topped) then about 15km gravelled road to reach Jhangajholi Ratamata. In Jhangajholi Ratamata there is a village market where villagers come from the numerous places in the higher hills to buy their daily needs of rice, oil, sugar, kerosene (for kerosene lamps) and clothes. There are a total of 75 houses in the village. Several ethnic groups are represented, mainly Brahmins, Janajatis (minority groups) and Dalits. Most of the people are Hindus and only a few are Christians. There has been harmony between all the ethnic groups. Some local feasts and socio-cultural functions occur all the year and all the people participate to celebrate. Most of the people live in joint families. The average number of children in a family is four.

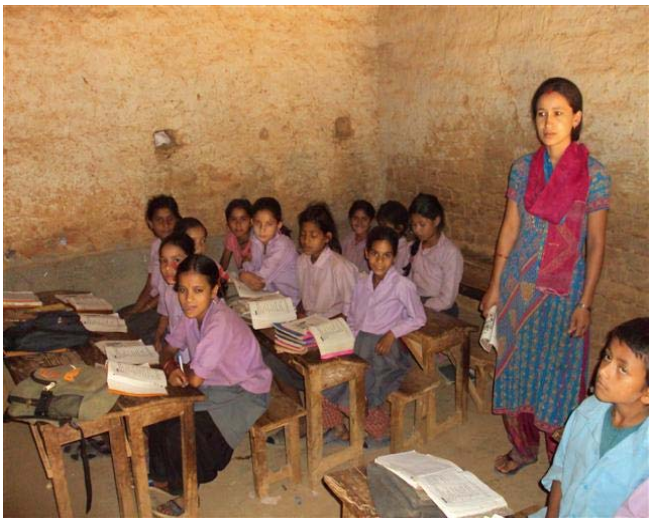
On the basis of economic standard, people of Kalimati village can be grouped in two classes. First kind, who are capable of generating income to maintain simple village life come under middle class people which are about 70%. However, their economy do not allow them to send



their children to the town or to the cities for higher secondary education. The next kind that composes of about 30% of the population is under the poverty line and they have to work very hard to get sufficient food twice a day. Many of these people have a small area of land but the harvest taken from it will not feed them more than about 3 months. The main crops grown in Kalimati are rice, maize and potato. People here are not commercialized and they don't earn money from the crops grown. Still most of the villagers use a barter system. Every people of this village, as the normal Nepali village life style, keep cattle like buffalo, cows and goats. So, their daily life is spent with cutting grass and fodder to feed the cattle. This task is generally undertaken by females, whereas males just spend their times either by playing cards, drinking alcohol, gossiping or roaming around the markets. Most of the youths have gone to Gulf countries to earn money. This is the story of all villages of Nepal.

Education in Kalimati

The village are not enough aware of the importance of education. The only primary level school (grade 1-5) which was established about 47 years ago is still primary and has not been upgraded. This primary school can be reached by the small children of that village and surrounding villages by walking at the most 45 minutes from their homes. After completing the primary level, they have to walk even one hour more to reach the secondary level school (i.e. up to grade 10). So many children drop out of school. Those who continue to study up to grade 11 and 12 do not get any kind of job and head towards Gulf countries to earn their living. There is no spirit in these people that good higher education can change their life. Most important thing to note is that no villagers are capable of incurring higher education of cities. This is why most of the parents still feel happy to see their children working in the fields rather than to see them going school.



Water supply

No tap water.
Washing is done in the stream.

Health and Sanitation

Few villagers can afford to build toilets. There is a majority of villagers for whom food, clothes and shelter are more important than a toilet. In my opinion, there is a lack of awareness among the villagers about health and sanitation.
"If everyone can go carrying leaves to stool early in the morning in the field (generally they chose a secret place where they stool regularly) then why to spent on such nonsense thing! Better buy rice or maize or grain for animals; had I got money that could build a toilet I would repay my loan." This last point fits me too. When I take some money home, then I feel that loan payment should be kept at first priority though I am aware and educated. Improper sanitation and lack of balanced diet has led to many communicable diseases. Many children suffer from malnutrition. The only health centre that we have (it is governmental) at one and half hours walk is not equipped and reliable. It doesn't have required quantity of medicine nor any qualified health care staff. So, people have to travel to the city hospitals to cure disease. Those who can afford may do, but for poor, it is only the god who can cure. My grandpa (mother's father) died of diarrhoea 5 years ago. (When Santosh and I had gone to my village last time, my uncle had been in bed for 7 days. He was having high fever and was taking just paracetamol as a medicine. In this way, proper diagnosis, doctors and medicine have been beyond the reach of common people for as long as I know.

An ill man carried to the doctor by his friends

Rural Electrification

There is no electricity in the village. It may take many years to access national electricity grid to our village. Some people, however, who can afford have bought solar panels to light bulbs and to operate radio and televisions. But almost 90% villager use kerosene for illumination after dark. The studying children suffer the most. They cannot give their time to study. I have my own hard experience. We cook food over the open wood fire and due to wood's smoke we

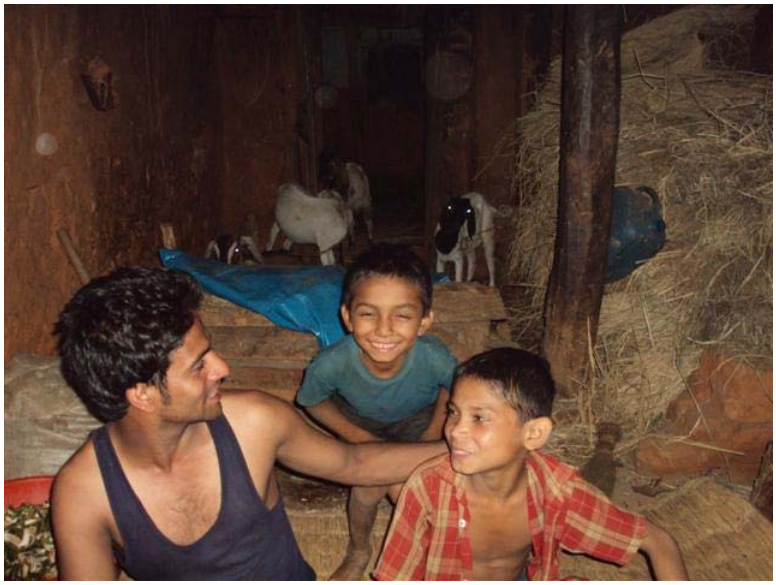
always have eyes red with tears. I remember when I stay in front of the kerosene lamp for studying; tears used to roll down my reddish eyes and I could not keep study going.
So, the precious evening time before sleep is just wasted, rather than being used to some more important works.

The government of Nepal has launched an elderly literacy program especially for women. Women who are willing to study have to gather up with their kerosene lamp to study.

Women's situation

All the economic transactions and important decisions are limited to males. Almost all the women above 30 are illiterate. They fear or hesitate to come in front of the society. Mostly they pass their days in doing domestic works, like rearing children, looking after cattle and working in the fields.

Sibjan's mother, Januka Chaulagain, sharing food. One of the strong and persistent village women.



Sibjan with children in Kalimati

CONCLUSION

Kalimati village and the people of Kalimati are backwards in every aspects of development like education, health, communication, sanitation and women empowerment. And this is an example of thousands of villages in Nepal, where people are hoping for some magic to happen that can turn their hard and suffocating life turn into a little bit more comfortable life.
These are the primary steps to be taken to change the colour of Kalimati and its people.

1) First of all, **connecting Kalimati to wireless Internet Networking**.

a) It solves most of the problem of education, health and communication. With access to internet, villagers can access health facility within their reach through telemedicine approach.
b) They can communicate with their sons and relatives who are working abroad by chatting (in computer) or talking over VOIP.
c) Computer labs with internet facility can help students broaden their knowledge and help them peep out the outer world of information and knowledge.
d) Villagers can use internet facility to read online news and get updated with the world events.
e) Villagers can use internet facility to sell their goods with e-commerce technology.
f) The wireless internet network can be easily relayed and replicated to other villages.

2) The second step is to **support and promote community entrepreneurship**. Like setting up local level industries like making different goods and articles out of paper, making jams out of fruits, opening candle factory or promoting tourism industry. However, seeking the market for the products is most important. This creates job-opportunities for the whole village and a means to earn money. It keeps them busy and makes them feel responsible towards the community development.

3) **Sanitation**: Building toilets for the villagers with full of subsidized scheme on the basis of the economic standard of the villagers is of great importance to decrease the amount of communicable diseases and to in the long run decrease the mortality rate among small children.

4) **Rural electrification**: This is the most important thing. To help villagers out of dark we can start micro hydro projects to generate electricity from the stream named Bhitte Khola (Bhitte River) that flows near to the village. The micro hydro power can be complemented by solar panels.

5) **Education :** the primary school (Shree Binayak Primary school) that have remained for 47 years should be upgraded continuously to lower secondary (up to grade 8), then to secondary level (up to grade 10) and then up to higher secondary level with computer lab setup. The teacher's salaries that the school pays from its local resources are so pathetic so some teachers salaries (who are not paid by government) should be increased to the government scale level. Since the teacher student ratio is also miserable, some teachers should be recruited. In order to encourage students scholarship quotas can be created.

Described by Sibjan Chaulagain, son of the village

Sibjan on the green hills of Kalimati

The Pilot Phase

We wanted to try the **SMILES** team as to our ability of working together. We decided to take some very practical measures within our reach as explained by Santosh Poudel:

For the Pilot Phase we decided to work in the field of rural electrification and health and sanitation. Talking about the former one, it is one of the main objectives of **SMILES**. For this purpose we will work in the beginning with the solar panels/photovoltaic and our initial idea is to start the procedure of rural electrification by donating two solar panels to the houses that run the adult literacy classes in the project's base village Kalimati. We have seen that people and mostly women go to attend the classes during the night time taking kerosene lamps with them. The night time is preferred for the classes as they get busy with their work in their farm during daytime. It is our aim to make the local people participate actively to run the facilities that **SMILES** will bring to this village. For the very purpose it would be easy if we can find people literate, beginners they may be. So, it is our fundamental duty to aid them in their learning process. In a sense people may call it a long term plan, in which we are preparing base for the project. But, the main objective of the project under the energy generation is to light the electric lamps in every house in the village.

Also mention worthy is the fact that we will promote alternative energy sources for the electrification and we will stick to the point that all the technology involved will deal with the renewable sources of energy.

Why renewable resources of energy?

We believe that renewable energies are the ideal solution for rural electrification in developing countries:

- Renewable for rural electrification are more efficient than conventional energies and grid connection
- Renewable reconcile sustainable economic development with the fight against climate change

Reliable and affordable electricity is a basic condition for self sustained economic development. Under the rural electrification **SMILES** will provide solutions which will empower the poor and help the environment. It speaks with one voice about rural electrification with renewable energies.

Sanitation

The next thing in our pilot phase is to build a toilet in the village. During our first site visit we were puzzled when we could not see the toilets in the village except in a few houses. They were of course owned by the land lords in the village. We could find stools alongside the road in most of the places. It is my own experience and I also had to go into the maize field.

So, a toilet will mark the beginning of our work in the field of health and sanitation. Talking in general for the future, it is our aim to transform and take the village to that point of time when each and every house in the village will have a toilet.

Results of the Pilot Phase

Two solar panels are installed in two schools. The light is there. The toilet has been finished the very recent days and will offer the best sanitation facilities in the village. The villagers have been deeply engaged from the very first sight of the **SMILES** team, when carrying the panels and the batteries to Kalimati, until the finalizing of the toilet. Now they are asking for more work to do. The **SMILES** team has proved to be an efficient and hard working team in this first trial. We are especially happy to have a young woman, Neelu Shrestha, in the team. She will in herself be a good ideal and inspiration to the girls in the village. Following is the personal report from **Surya Thapa** after completing his first mission in **SMILES**.

Solar panels on their way!

While panels are coming the daily work is done as usual.

As a start of our project **SMILES**, the team has made a visit to Kalimati again with some new faces in that region like me, Surya Thapa and Dhirendra Kumar Chaudhary. This is the first visit of mine.

Kalimati is one of the remote villages in Eastern Nepal, in Sindhuli district. In this visit I found that it is a compulsion of people in that area to go either Banepa or Kathmandu for better health services, for better educational services and for other services as well.

In this time we got some material with us for the purpose of schools in Kalimati village and in Siudibar village. We took two solar panels and two batteries as well as switches, lamps and other accessories required for lighting in school. The material was purchased from Lasersun Energy P. Ltd Kathmandu, which is one of the established organizations in the field of alternative energy resources in Nepal.

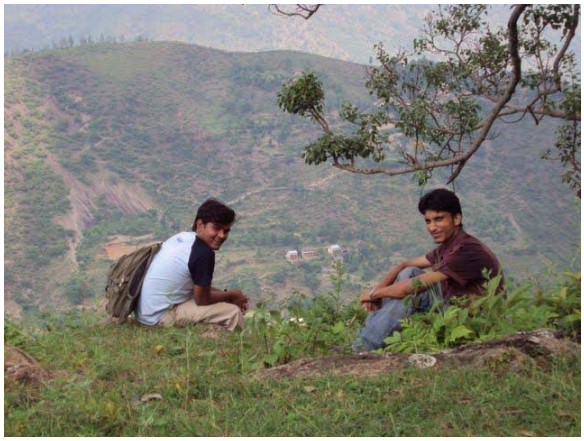
Binayak Primary School

We installed these panel and all other required accessories for lighting in the presence of the school staff and all the local villagers to the Binayak Primary School in Kalimati and to the Shree Primary School in Chilaunekharka. This is our first effort to promote the quality of education they provide and to rise up the infrastructure of school to be maintained. Along with this we think about adult literacy evening classes held in the schools where we have donated the lighting system. On doing so the school can make good utilization of this material in society along with improving to its educational quality and it can play a good role in society not only to the students but also among the adults. We think that the adult literacy campaign will be beneficial to the people who are under the shadow of illiteracy. After this program, it is our wish that villagers will change their way of thinking, that they will follow the path of good health and, will of developing good habits and improve the educational and socio economical lifestyle

Parts of the SMILES team with the school staff

From the school staff and other villagers we found good response on our project and they became optimistic towards us. They help us in assembling the lighting system in school and we successfully established the lighting system in Binayak Primary School. They also made a commitment for its protection and use for the betterment of school and village in written form. They also promised us to provide space for an adult literacy campaign and be ready to help in any needed situation.

The first light is lit



Dhirendra and Santosh are taking well earned rest

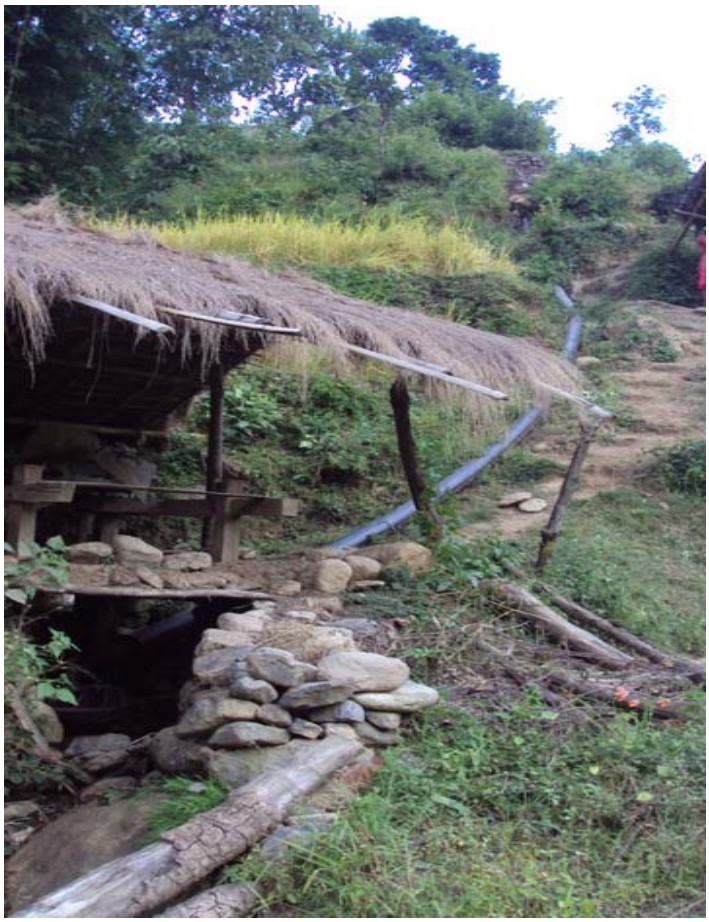
Health and sanitation is one target of the work of **SMILES**. Due to this reason we took the first step towards it by constructing a toilet letting all interested villagers take part of the work. On doing this I found the real test of group work. We constructed it in Sibjan's home and tried to make the people aware about health and sanitation. We explained that using toilets may relieve them from many health problems like typhoid, cholera and many other infectious diseases. We hope this will inspire the villagers to increased awareness and the building of more toilets.

From this visit I got the chance to know the people in Kalimati very closely and I became familiar with their lifestyle. It helps me to know Kalimati very well and the socio-economical and other aspects of people in that region. I got the chance to meet many local people who are really worried about the betterment of their village, like Netra Chaulagain, Bir Bahadur Waiwa, Krishna Chaulagain and many more. This experience of mine was really courageous and served as a milestone for **SMILES.**

First actions towards a toilet

Now only the roof and the door are missing. The builders seem to be content.

SMILES Rural Electrification: Proposed Micro Hydro Project



Proposed site for the micro-hydro

We have spent some time searching for a suitable spot in the Bhitte River nearby the village Kalimati to construct a micro-hydro. The generated electricity is to be used for the electrification of the local school and the houses in Kalimati.

After some initial surveying and interactions with the villagers we have finally chosen an appropriate spot for our proposed micro-hydro. A general community meeting was organized where almost a hundred villagers from Kalimati and the neighboring villages were gathered. In the meeting the villagers expressed their willingness to help and participate in any community development program that **SMILES** launches. Moreover, they were thankful to **SMILES** for our initiation to generate electricity in the village from the local river. All the villagers agreed on our choice of the site and all of them filled in the application form provided by us. It was brought by **SMILES** from Resource Management and Rural Empowerment Centre (REMREC), a division under Alternative Energy Promotion Center (AEPC). The meeting concluded in forming a micro-hydro consumer committee of 13 members to assist the construction of the micro-hydro project.

Run under the purview of the Ministry of Environment Science and Technology, AEPC is an organization devoted to the development and promotion of renewable and alternative energy technologies in Nepal. It provides substantial subsidy for the construction of small scale hydro

projects that have the primary objectives to benefit the people living in the rural villages of Nepal. Under AEPC, REMREC monitors such activities in Sindhuli and some other districts.

Since we are working to benefit the local community we are convinced that our decision to work with AEPC is justified as it will help us to find the required funding needed to generate electricity from the river. REMREC will do the initial surveys and estimations to work out the procedures to obtain subsidy from AEPC. As per information in the initial consultation with REMREC we are likely to receive a subsidy of NPR 125,000 per kilowatt of electrical power generated. Remaining costs will be funded jointly by **SMILES**, the local Village Development Committee and the District Development Committee.

Immediate next Phase Work: Pilot Phase II

Background

SMILES is a rural based project managed by an NGO called Help Himalaya (http://www.helphimalaya.org.np/,). The main objective of SMILES is to introduce and implement the combination of technology and socio-economical interventions that may lead to an increased living standard for the people in the rural villages of Nepal. It is a pleasure to let you know that **SMILES** has been selected to be featured at the Clinton Global Initiative University Annual General Meeting, 2010.

The pilot phase of **SMILES** was launched in September 2009. Though a small budget, it was a landmark in the field of energy development and sanitation. 40 watts solar panels were installed in two different schools and a toilet was built in the remote village, Kalimati, Sindhuli District, Nepal. It has given us profound results. Specially, the weak students who are residing around the school utilize their leisure evening time (after their day of schooling and household job) for tutoring in the classroom, under the bright light we donated. The adult literacy classes at night will also be using it. The single toilet that we built is assisting three households. The areas that were seen filled with stools some months ago are now turning grassy green and fresh. This change has obviously left other villagers thoughtful, calculating on the difference in having a toilet. With this positive and inspiring feedback, we wish to move to next phase. This would be called Pilot Phase II. In this phase, we will be focusing on computers and computer education. We want to provide the schools with computer labs and computers. The school teachers, students and the villagers will be given basic computer courses. We will develop two standard softwares for the use of the school children and the villagers. One of the softwares will be aimed at helping the students to read and write English words and sentences. The other one would help to train the villagers who are illiterate to write in Roman (writing Nepali words in the English alphabet). This is because initially it would be easier for the villagers to learn the English letters only rather than the words and use these letters to write Nepali words. This will be useful in e-mail correspondence with relatives living far away.

Specification

The computer education program will be initiated in two different schools, Binayak School of Kalimati and Chilaunekharka School of Chilaunedada. Both of the schools were each supplied with a 40 watt solar panel during the Pilot Phase I. A computer lab will be constructed in each of the schools. Each school will have two desktop computers with LCD monitors consuming less energy, and two 85-watts solar panels to run the computers.

A teacher form each school will be given basic computer training by **SMILES** and when comprehensible assigned to spread the gained knowledge to colleagues, students and villagers.

The softwares will be chosen from a competition **SMILES** will organize inviting various engineering colleges in Pokhara. The winners will have a grant. The winning softwares will be selected as standard device of **SMILES** for giving computer classes to the students and the local villagers in the rural villages of Nepal.

Estimated Budget for Pilot Phase II

Items	**Quantity**	**Rate (NPR)**	**Amount (NPR)**
Computer lab room (4*6 m2)	2	50,000	100,000
Equipment			
Desktop computer	4	35,000	140,000
Computer table	4	1,000	4,000
Solar panels, 85 watts each	4	40,000	160,000
Software competition program			
Award amount	2	5,000	10,000
Program organization	-	-	5000
Computer training			
Training	2+	1,500	3,000
Miscellanoeous Expenses	-	-	10,000
TOTAL AMOUNT			432,000

Application of Wireless Communication in the Upliftment of the Rural Livelihood A Case Study of Rural Villages in Myagdi District of Nepal

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Abstract:

This paper presents the overview of the 5 different villages of the Myagdi district located in northern Nepal with the total population of 5,500 to show the effectiveness of using the communication tools to transform the rural villages in the mountainous part of the country to the villages that are constantly motivating the individuals to develop the nation. This paper elaborates the steps involved in the wireless infrastructure setup required to bring the rural villages within the communication nexus and the dramatic change that has been possible in the socio-economic status of the villagers using the modern electronics communication technology. Furthermore, through this paper, we are trying to analyze the social and economic changes the technology has brought along. Moreover, this paper presents the feasibility of using the Wi-Fi technology as the highly acceptable communication tool in the upper hilly regions due to its low cost, its ease of deployment and the tremendous convenience that wireless networking offers, especially in the topographically garnered remote villages. With an Internet Service Provider (ISP) in the nearest city, internet connection has been established in many such remote villages, by setting up access and clients (IEEE 802.11 b/g) and antennas in the high hills in the Line of Sight (LOS) and technical applications like voice over internet protocol (VOIP) telephony, telemedicine, e-commerce has been launched along with. 61 villages of 12 districts in Nepal are connected using this technology.

Based on the site visit, questionnaire and the filtered data, it is found that computer literacy percentage less than 1% before wireless infrastructure setup has now increased to 15% to 40% in these villages depending on social and economic status of the villagers. The increase in computer literacy has encouraged villagers to use the wireless technology in various income generating programs like yak farming, hotel management, community cyber, cheese factory, *lokta* processing paper industry. The effectiveness of the communication tools is highly correlated to the variables like the no. of overseas workers, agricultural production, the no.

of skilled manpower to operate the technology and the awareness among the villagers. More than 90% of the people use VOIP followed by the internet. More than 60% of the income source being remittance in these villages, one possible communication with a person working in foreign country by post in a month before wireless setup has now increased up to 20 times in a month. At last this paper concludes that wireless communication can be most effective in uplifting the socio-economic status of the remote people if employed creatively.

1. Objectives:

a. *Technical objective:* To study the effectiveness of the wireless technology used to disseminate the basic communication facilities to the people in the topographically garnered rural hilly region.

b. *Socio-economic objective:* To study the combinatorial perspective of the technology with the socio-economic aspects of the rural livelihood.

2. INTRODUCTION:

Due to the uneven arrangement of the landscapes it has been a mundane fact to find that the total land coverage of the earth can be divided into different parts. Some parts are plain with low altitude and some are at relatively high altitude. In the underdeveloped and the developing nation the hilly region has always been like a hard blow for the steps towards the development. Particularly in Nepal, government and decision makers are facing serious challenges in order to meet the ever increasing needs for the basic facilities in the rural hills. Government has formulated different plans and policies but because of the uneven landscape, the efficiency of the formulated plans and policies has been very low. Difficulties in transportation have prevented these places from developing and acquiring even the minimum sets of the facilities.

This paper presents an overview of the ways in which one can use present day electronic technology to help the people understand the outer world and change them accordingly. Crawling of the rural villages' form the orthodox ways of living and the accompanying poverty confronting the local's lives towards the prosperity and the support that the communication has provided is the main issue that address in this paper.

3. METHODOLOGY:

Wireless projects that aims at empowering the remote places with the communication facilities and uplifting the living standard of the local people with either direct or indirect support from used technologies can be divided into two halves to understand the rationale involved in connection the villages to the outer world and to search for the possibilities of the income generating programs.

We have elucidated these two parts as given below:

a) Technical infrastructure setup

b) Socio-economic conceptualization

3.1 Technical Infrastructure Setup:

The setting of a Linux Server in Pokhara, a major city near the site marked the beginning of connectivity to rural villages to the internet. At first D-link 900 AP access point were used for the testing trying to connect a village called Nangi to Pokhara (the nearest city with an ISP) using the ordinary TV satellite antenna. The antenna was installed on the rooftop of a house to Pokhara and connected to the radio by modifying its built-in antenna. The major problem then was the hilly range stretching between Pokhara and the village. As a solution, a hill named Mohare 10,800 ft (3,320m), which was in the hilly range was taken to setup a relay station. A tree on the hill was used as a relay tower initially using D-link access point, a normal 8-foot TV dish antenna as the reflector and a one liter measuring can as the feed. The same tree is still used as the "relay tower" with different antennas and radios. A 50 W photo voltaic panel with 40 amp-hour rated12V storage battery here used to as the source of power supply. In the Nangi village a client was setup using TV dish antenna pointing towards the relay station. Finally the data transfer ratio of the radio was set to 2mbps and a satisfactory connection was established between the village and the ISP. Afterwards using the relay station1, different villages were connected accordingly and 2nd relay station was setup at Khopra. For VOIP, copper and fibre infrastructure was shared with Nepal Telecom. The Wifi (IEEE 802.11b/802.11g) radios used were of different brands; Smart bridge, Total, Deliberant, Senao, Backhaul Canopy etc. The output ports of the switch were distributed over VOIP, main computer server, telemedicine and to other access points to connect other villages. Nepal telecom Till this date 61 villages of Myagdi, Kaski, Parbat, Makwanpur, Dolakha, Palpa, Bhajang, Rasuwa, Nuwakot, Gorkha, Baglung and Khumbu region have the network spread through the places.

3.2 Socio-economic aspect empowering conceptualization

The connection thus established in the rural villages opened up the whole raft of possibilities of the ideologies with which we can turn the way of living of the local people upside down.

To begin with we started with the inspection of various community development projects that have been started with the direct help and the projects that have been receiving some sort of support that the technology installed in the villages. These projects which were first introduced to work as the economic backbone to maintain the wireless technology has opened up the plethora of chances of substantial income.

Furthermore we decided to find out whether the modern communication technology can be used as the tool to provide and equip the local people with the basic rights such as right to education, right to news etc., we believed that the communication technology can be most effective when it can bring people closer and make world a small place to live, rather than a wide spread exotic place. These topics were addressed as the potential social part of the rural lives.

In compliance with the earlier mentioned objectives, the whole work was carried out in different steps:

3.3 Preliminaries:

The name of the village where the study would be conducted were finalized, information on the permanent features like the bridges, pathways, location of various projects and schools were taken, corresponding with the various people were also carried out.

3.4 Field work and data collection:

The efficiency of different facilities brought by the wireless technology a questionnaire was developed. Based on questionnaire, we extracted various information that would serve our objective. Interactive session with technicians and people involved in various community development projects were also conducted.

3.5 Post Field work:

On the basis of field work, available Primary and secondary data further analysis was carried out and various pertinent graphical overviews were developed accordingly.

4. DATA ANALYSIS AND FINDINGS:

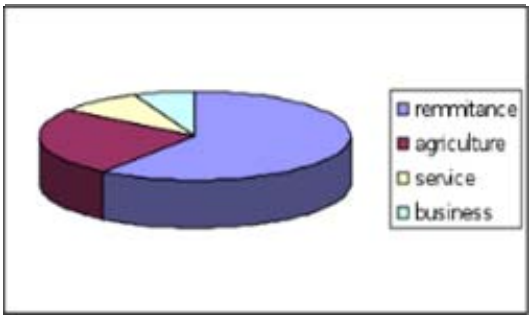
The overall technologies and income generating activities were found to exist can be grouped under following heading:

4.1 Communication Perspective:

The data obtained in 5 villages reveals the fact that almost 60% income source is by remittance followed by 24.6% by agriculture. The finding follows that at least 20 times communication with the relatives employing in foreign country is being possible now through VOIP and internet (in a month); before; the same scenario showing only one possible communication through post.

4.1.1 VOIP:

We found 90% of the people using this service in those villages which have only VOIP as means of telephony service whereas in some villages, the VOIP users are less as there is telephone facility using VSAT.



40%

6.4%

9%

24.6%

Fig: 1 Average Source of Income of the Villagers

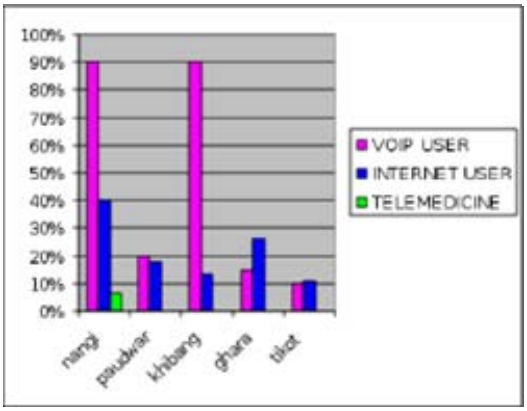


Fig: 2 various Technology beneficiaries in %

4.1.2 Email/Internet:

There can never be more satisfaction when we can find in a country with such a low computer literacy rate and in such a remote place, 60-year old man pressing keyboard and "chatting"(in his own word) with his son in Arabian country using internet. Villagers and students are mostly seen busy in sending emails to their relatives, chatting, and reading national and international newspapers and journals. Moreover, teachers search for the appropriate study materials in the internet. There has been tremendous increase in the computer literacy rate in the past four years; now it has almost reached about 40% of the total population in some villages and again the rate is still going to increase. It sounds interesting when we elucidate the fact that the rate was less than 1% few years back.

villages	total population	computer literate before wireless infrastructure setup	computer literate after wireless infrastructure setup
Nangi	780	8	312
Paudwar	2250	11	400
Tikot	720	4	100
Khibang	750	8	200
Ghara	900	9	105

4.1.3 Telemedicine:

The telemedicine has been popular in the village, Nangi, and it is in trial in some villages. There have been 40 cases treated in this village (i.e Nangi) with telemedicine. Few years back, people had to walk a whole day to consult a doctor and now they are very happy to find a doctor in front of them with very little or no effort on their behalf.

4.1.4 Ecommerce:

Promotion of the local business the concept of e-market, 'Haatbazzar', has been introduced where people can put their saleable products in the internet for sale. Buyers can search for the various needed things and even animals such as buffaloes, goats, chickens, rabbits etc. Still, not popular yet in the village but can, if the number of the communication centers are increased and villagers are commercialized.

4.2 Socio-economic Perspective:

The villagers are incorporating many income generating programs with the help of this wireless communication: the powerful tool in finding markets. Fish farming, duck farming, rabbit rearing have been very popular in these villages. Similarly, making juices out of rhododendron and jams of different fruits, planting *lokta* and *argheli* and making paper out of these and cheese industry have created different job opportunities.

Rearing yaks at the height of 4,000 m height would have been never been so easy job without radio link setup in this place. Yak farmers use internet to relay information to the administration about the

number of yaks, their health and accept online application for Yaks' blood drinking festival. Any immediate helps and aid have been possible through VOIP phone and internet.

Another important infrastructure that has benefited from the technology includes hotels and camping grounds built in different hills. These hotels and camping grounds that are owned by local schools were conceptualized along with the entrance of the technological development to act as the source of income. The technology has helped in bringing foods and commodities, getting information about the arrival of the guests and facilitates the guests with phone and internet facilities.

5. CONCLUSION:

In summary, after the study, we can conclude that the communication above the topographical hindrance can be the most effective and the powerful tool in uplifting the socio-economic status of the people of a country like Nepal living in the mountainous remote villages. The wireless communication system is one such tool that can be creatively and proficiently operated giving the 'folk touch' to suit one's need. To the country where more than 50% people live still under the poverty line, the aforementioned technology can be used to provide the communication facilities to the local people. This can help in deploying the plans and policies of the government and equip the villagers with the basic rights such as the right to information and the right to education, and beside that enhancing the earning capacity.

6. ACKNOWLEDGEMENTS:

We would like to remember those names that provided us various data and helped us to perform the study:

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Tek Bahadur Pun, Pradip Pun (Tikot Secondary School, Tikot)

Sun Bahadur Pun, Nirmal Pun (Khibang)

Bhakta Baruwal (Ghara)

Thammaya Pun, Gam Bahadur Pun (Paudwar Higher Secondary School, Paudwar)

Jas Bahadur Pun, Hom Bahadur Pun (Khopra Yak Farm and Hotel)

and the villagers

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Notes on wireless infrastructure setup

This phase is one of the most important parts of the project. The base village for **SMILES** is Kalimati located in the Jhangajholi Ratmata VDC, Sindhuli district in the central development region of Nepal. For this purpose we will be using various wireless devices, a network server associated software and power generation at the relay stations, as at the various proposed relay stations there is no electricity available.

Devices that may be used

- 2.4 Ghz 802.11b radios of different brands
- 5.7 GHz BH-20 Motorola radios with reflectors
- Wireless antennas
- Panel antennas
- Omni directional antennas
- Routers
- Wi-Fi to PSTN phone adaptors
- Poles, cables, switches and other device as needed
- The internet service can be taken from an ISP provider “World link” located in the town Banepa in Kavrepalanchok district.

Network server setup

A network server in Banepa will facilitate network management and will provide a number of services to the network users. The operating system for the networking can be chosen between Microsoft and Linux. Microsoft is easy to use since more people are trained on using this operating system. Linux can be chosen for the high quality open source software included. The server can run various softwares that will provide services to the users and facilitate the network management.

Facilities that will be provided to the local people

- Internet
- Email
- VoIP telephony service
- Telemedicine
- E-microfinance (must be tested and proven effective before full fledge operation)
- E-commerce

Access to the internet services will be given through computers and laptops. Similarly, internet telephony equipment will be used for the VoIP and high resolution internet cameras will be used for the telemedicine facility.

Setting up the network

A long range signal transmission must have a strong and reliable network backbone. For this purpose 5.7 GHz Motorola backhaul canopy radio can be used. The price is high but a quality service is rendered and furthermore signal interference is substantially reduced. Connection to the local areas may use Ethernet radios at 2.4 Ghz from various manufacturers. These radios offer low cost and compatibility with devices from other manufacturers.

The first relay station will be at a hill in Dhulikhel. This station will receive the signal from the server setup at Banepa and will relay the same signal to the hill Timal danda in Kavrepalanchok district. From the site visit we have concluded that these two hills fall on the line of sight.

Timal danda will be the second relay station.

The hill of Chapakhori will be the third relay station.

From the hill of Chapakhori the signal will then be transmitted to the hill named Thulodanda in Sindhuli.

Each of these stations acts as a relay station and hence it will be more reliable if we can use the Motorola backhaul canopy at these places.

Suggested power generation for the relay

- Solar panels
- Solar charge controllers
- Wind generators
- Bicycle generator
- Trojan gel\Deep cycle batteries
- Inverters

Finally…

The next step will be to find the resources making it possible to continue the work started in **SMILES**. This will be a challenge crossing the borders of many countries. We are convinced this is a project that is possible to run, and no stones will be unturned in search of solutions to fulfil what was originally a dream of one young man.

If you want to contribute in any way, please contact anyone in the **SMILES** team.

With love and our warmest wishes for you,

The **SMILES** Team