
Presentation

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NEPAL
--- Handling Available Resources Responsibly ---
Case Study of a Renewable Energy Project with a Remote and Poor Mountain Village in the Nepal Himalayas

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NEPAL
Nepal’s Stage of Development

1. Nepal opened its doors for the world only in 1953
2. Nepal still counts among the least developed countries.
3. Population: 26 Mio. 88 % in rural, remote mountain areas.
4. Average annual population growth 2.6%.
5. Overall literacy rates: 40% - 60% in cities, but in the remote mountain areas 4% - 20% for both, women and men.
Nepal’s Stage of Development

6. The average income per head per year is 30 US$ - 260 US$.
7. 85% of Nepal’s people have no access to electricity.
8. Annual per capita electricity consumption (2001) 66.7 kWh.
9. There is a clear relationship between poverty and access to electricity, and poverty levels increase the more remote and difficult to access the communities live.

Nepal’s National Electricity Grid (based on NEA 1998)
Nepal’s Stage of Development

10. Nepal's technical feasible potential hydroelectric power capacity is estimated with a total of 83,290 MW, with 42.133 MW estimated to be technical economical.

11. Nepal's installed total electric generating capacity (end of 2003) is 590 megawatts (MW), of which 90%, or 533 MW is hydroelectric, representing 1.26 % of Nepal's technical feasible potential, and the remaining 57 MW from 3 diesel generator mini-grids.

12. Average of 300 sunshine days a year, and daily average solar insulation of 4.5 – 5.5 kWh/m².
13. Development, through Governmental / INGOs / NGOs has taken place in Nepal only in the last 20 years.

14. Realistically, development is a VERY steep uphill trek.
Nepal’s Stage of Development

Demands a Holistic working approach, addressing the

• Social
• Physical
• Mental
• Spiritual

Needs of the people in sustainable ways

• Social: We are created as individual beings, in fellowship with others.
• Physical: We have a body which needs food, health care, rest.
• Mental: Being able to think clearly and make rational decisions.
• Spiritual: To strive for fellowship with our Creator
How does Kathmandu University can take part in the need for holistic development . . ?
Through relevant class room teaching

Including practical topics in the curriculum such as:

- Smokeless Metal Stove
- Drinking Water System
- Light in the homes
- Pit Latrine
- Community health
- Mental health
Keeping a high academic level for the students.

Including academic Topics in the curriculum such as:

- RETs: hydro, solar energy, wind, biogas
- Combustion processes
- Waste water treatment
- Filter and pressure tank systems
Including appropriate and relevant student research projects, installed in the local communities, such as:

- Smokeless metal stove
- Solar water heater
- Solar drier
- Solar photovoltaic self-tracking frame

For the present and future generation
Kathmandu
Alt. 1’337 m.a.s.l
Lat. 27° 42’ North
Long. 85° 22’ East

Nepalgunj
Alt. 120 m.a.s.l
Lat. 28° 03’ North
Long. 81° 38’ East

Simikot, Humla
Alt. 3’000 m.a.s.l
Lat. 29° 58’ North
Long. 81° 49’ East
Through the Kathmandu University (KU) RDC Unit (Research Development & Consultancy), research projects are implemented in the remotest parts, in partnership with the poorest mountain communities of Nepal, in Humla.
There is no road to Humla, in fact only a 15 days trek will bring you to Humla. The alternative: With a small Twin Otter to fly in a most adventurous flight over and between the Himalayan mountains and valleys up to Simikot (Humla), where in 2003 the KU-RDC High Altitude Research Station was established.
At 30 ° North lat., 81 ° 49’ East long., at an altitude of 3,000 meter (9,443 feet) above sea level, lies the KU-RDC High Altitude Research Station (HARS) in Simikot.

It is here that the research project prototypes are first installed and tested, re-designed and improved, before they find their final destiny and application in the local communities.
The remote and impoverished mountain communities’ needs demand particular requirements from technologies

1. Technologies must be appropriate, suitable, and apt for a particular situation, and for a particular people group.
2. Sustainability comes before efficiency.
3. Technologies need to be contextualised, to be accepted by the community, to build a strong ownership.
4. They need to aim for better living conditions, to raise the living standard of the people.
In all research and projects, the people are in the center of our interest, and the applied technologies are to serve them.
A typical village in the high altitude areas. In close clusters, to save precious agricultural land, people build their homes.
Some of the research projects applied
Chauganphaya Village
Lat. 30° North, 81.77° East, Altitude 2643 m

Karnali, Nepal’s longest River

3 Days walk to Tibet

Chauganphaya Village
Lat. 30° North, 81.77° East, Altitude 2643 m
Chauganphaya Village in Humla NEPAL
(Latitude 30° North, Longitude 81.77° East, Altitude 2643 m)

What is Needed?
• Light
• Stove
• Pit Latrine
• Drinking Water
Chauganphaya Village in Humla NEPAL
(Latitude 30° North, Longitude 81.77° East, Altitude 2643 m)

What is Needed?
• Light
• Stove
• Pit Latrine
• Drinking Water

Village situation in 2003:
• 62 homes, and 365 peoples
• No house had light
• All homes cooked on open fires
• No home had a toilets
• All drank dirty river water
WLED (White Light Emitting Diodes)

With Solar Energy Powered

75 Watt Solar PV Module

1 Watt Power Consumption

For up to 20 Homes with 3 WLED Lights
Central village located 300 W\textsubscript{R} Solar PV system with a self-tracking frame.

Central battery bank with battery charger and discharger.

Battery bank in local made wooden box, well insulated.

1 Watt WLED, enough for reading.
No Smoke - Less Firewood

Smokeless Metal Stove in the Home
No Smoke - Less Firewood

Open Fire Place, the Homes Full of Smoke. The Daily Firewood Consumption is as high as 30 kg – 50 kg, and the Health of Women and Children is in great danger.
No Smoke inside Homes through a Smokeless Metal Stove. Daily 40% - 50% less Firewood Consumption. Great Improved Health Conditions.

Open Fire Place, the Homes Full of Smoke. The Daily Firewood Consumption is as high as 30 kg – 50 kg, and the Health of Women and Children is in great danger.
No Smoke - Less Firewood

Smokeless Metal Stove in the Home
No Smoke - Less Firewood

Open Fire Place, the Homes Full of Smoke. The Daily Firewood Consumption is as high as 30 kg – 50 kg, and the Health of Women and Children is in great danger.
1. Improved Health
2. Improved Hygiene
3. Cleaner Walking Paths
4. Cleaner Fields
5. Cleaner Rivers
1. Improved Health
2. Improved Hygiene
3. Cleaner Walking Paths
4. Cleaner Fields
5. Cleaner Rivers

For healthy Families
The Smokeless Metal Stove and the Pit Latrine are Inseparable

1. Each stove is subsidized
2. To get the subsidy a Pit Latrine is built
3. Pit Latrine Training
4. Families provide local materials
5. Cement, Siphon and HDP Pipes provided
Each Pit Latrine is checked

If the Pit Latrine is in use and the Quality approved

The Subsidy for the Smokeless Metal Stove is provided
The Smokeless Metal Stove and the Pit Latrine are Twins
Pure and Clean Drinking Water

In close partnership with the local community the drinking water system is defined, and planned.
Pure and Clean Drinking Water

Where the pipes have to go through, where the water taps have to be, are issues decided by the community. The whole system is built together and enjoyed together . . .
Pure and Fresh Drinking Water

To have participated in the building of the own village drinking water system increases also the interest to keep it maintained and running.
Pure and Fresh Drinking Water

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A Family of 4
Light, Stove,
Pit Latrine, Water
Chauganphaya Village in Humla NEPAL
(Latitude 30° North, Longitude 81.77° East, Altitude 2643 m)

Each of the 63 homes has now 3 WLED Lights, powered by a central village located 300 W Solar PV system with a self-tracking frame and underground cabling, a smokeless metal stove, a pit latrine, and access to clean and fresh drinking water.
Can it be Sustainable . . . ?

Technically . . .
Economically . . .
Socially . . .
Environmental . . . ?
Questions which Need to be Asked and Answered Satisfactory . . . ?

1. Have the needs of all Stakeholders been met?
2. Is it the best mix of energy and technology: Least-Cost - Preferred by the Community - Sustainable?
3. Have the Local People Participated from the Start?
4. Has the local Community defined the “Rules of the Game”?
5. Have local people be appropriately trained for competently Operation and Maintenance?
6. Has Sustainability be considered before Efficiency?
7. Have new Activities and Opportunities been created?
8. Have the overall living conditions improved?
Where do YOU... stand in our world.
From which home you come from is not relevant as long as you are willing to share your resources and your know how, and are ready to work with compassion, dedication, integrity and love, to share your live at the side of the needy and poor . . .
... you start out on the right track, according to the Creator's Father heart.
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