

A woman wearing a red shawl and a patterned sari is crouching in a rustic kitchen, focused on cooking. She is using a traditional wood-burning stove (chulha) with several metal pots and a kettle on top. The kitchen has a simple, functional appearance with a wooden floor and a window in the background. The text is overlaid on the image in a large, bold, red font.

**ASSESSMENT OF RENEWABLE
ENERGY INTERVENTION
POSSIBILITIES
IN
KARNALI DISTRICTS**

**By Dr. Govind Raj Pokharel
Mr. Ram Pd. Dhital**

Outline of the Presentation

- Study Background
 - Scope of Works, Karnali, Energy Poverty and MDGs
- Existing Situation on RETs in Karnali
 - Inventory on technologies and institutions
- Key Issues
 - Subsidy, Sustainability, Market, Technology, Supply Chain, Loan and Finance, Awareness, Coordination and Linkages, Conflict, Disadvantages and Vulnerability
- RE Perspective Plan for Karnali
- Possible Roles of SNV, AEPC and Others

Scope of Work

- Prepare an inventory on the district wise pocket areas for feasible RE technologies;
- Prepare an inventory of potential institutions/organizations (based at district/regional and national level)
- Design and develop of overall RET development perspective plan for Karnali region.
- Define roles of different supporting and facilitating organizations involved in RE technologies for identification, dissemination, and capacity strengthening of local/regional actors.
- Provide basis for further proposal development to access financial resources

Methodology

- Literature Review
- Generation of Checklist
 - Supply and Demand Situation, Purchasing Capability, Institutional Involvement etc
- Field Observation
 - Nepalgunj, Surkhet
 - Jumla, Mugu, Kalikot and Dolpa (District Headquarters and some selected clusters)
 - Humla-Secondary Information from SNV District office
- Data Analysis and Report Preparation

Few Indicators in Karnali

Districts	Total HH	Electricity Getting HH	Fuelwood using HH	Development Budget NRs.	Regular Budget NRs.	Access to Safe Drinking Water	Literacy Rate %
Dolpa	6,210	36.63%	99.50%	2,724	5,242	36.70%	34.66%
Jumla	16,909	24.78%	99.80%	999	2,023	74.50%	32.41%
Kalikot	19,800	2.88%	94.30%	861	1,701	48%	37.51%
Mugu	8,903	24.04%	99.60%	1,800	2,990	55.30%	27.79%
Humla	7,500	36.55%	99.80%	2,347	2,671	64.50%	26.62%

Energy Poverty and its Causes

Energy poverty

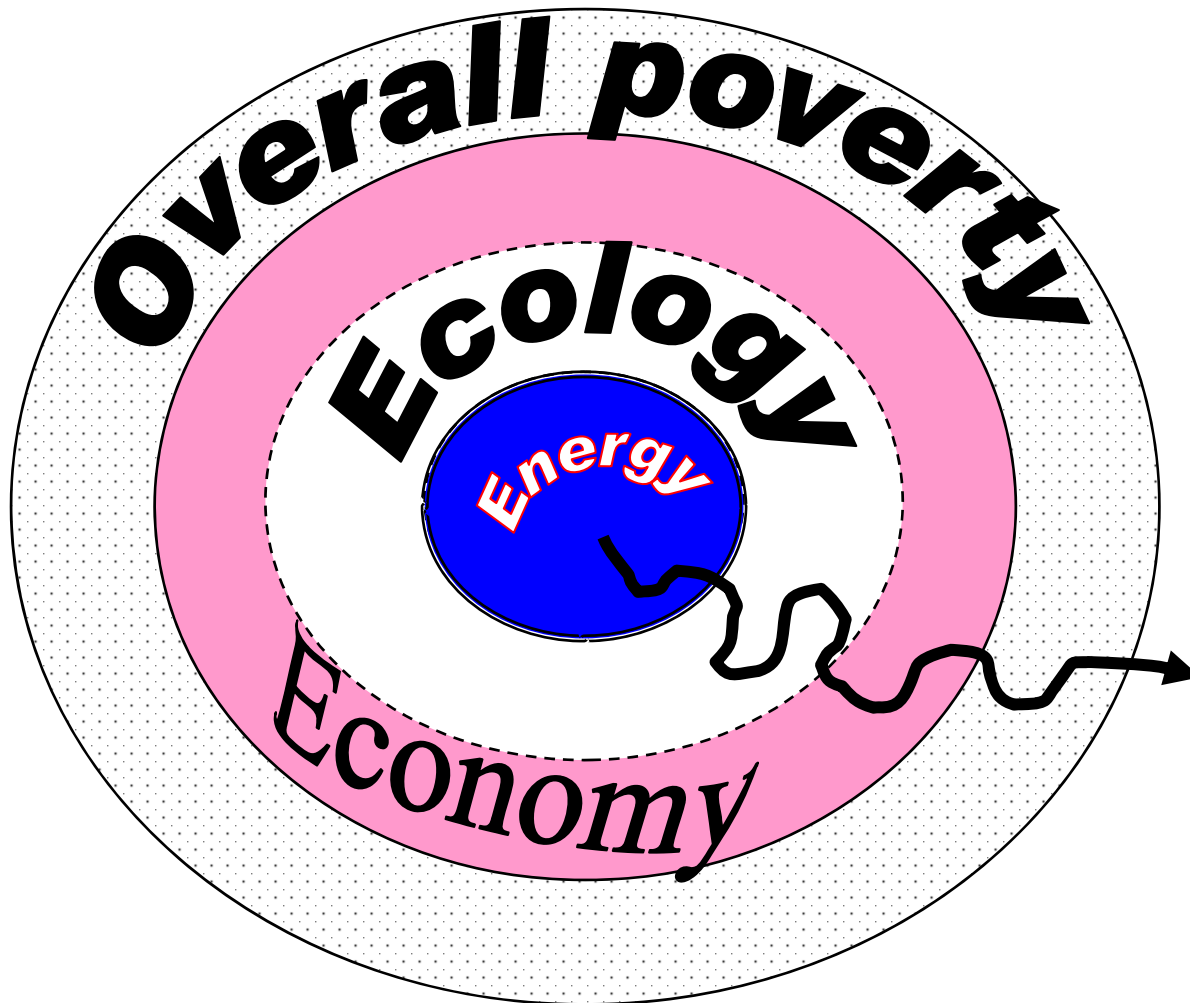
- *A state of insufficient energy resources for basic living*
- *A state of primitive use resources- causing several impacts*

Causes

- *Lack of Resources/Technology/Capital/ Policy*
- *Political as well as social marginalization despite resources*
- *Lack of institutions that support every aspects to accomplish the tasks to meet energy needs*

Source: Pokharel (2006)

Energy and Overall Poverty in Karnali



Energy is the nucleus of poverty, especially in the rural areas of Nepal. Energy poverty, lack of clean energy leads to ecological poverty, i.e. deforestation, primitive art of excessive use of primary energy, etc. Ecological poverty leads to economic poverty causing lower agriculture production, economic impacts due to climatic catastrophes, etc. Then, economic poverty leads to overall poverty making pathetic human living standard: illiteracy, poor health system, poor infrastructure like schools, hospitals etc.

Energy Poverty and MDG Linkages in Karnali

S.N	MDG	Energy issues
1	Eradicate Extreme Poverty and Hunger	Halving hunger will not come about without energy for more productive growing, harvesting, processing of local food, herbals
2	Achieve Universal Primary Education	Children will not study at night without adequate light
3	Promote Gender Equality and Empower Women	Women spend much time on grinding, pressing mustard and walk long distance to collect fuelwood and inhale fumes and CO, CO ₂ and other toxic gases from fuelwood burning
4	Reduce Child Mortality	Karnali's greatest child killer, acute respiratory infection, will not be tackled without dealing smoke of fuelwood in the rural hamlets

Energy Poverty and MDG Linkages in Karnali

5	Improve Maternal Health	Improving health and reducing death rates will not happen without energy for the refrigeration needed for clinics, hospitals, and vaccination campaigns
6	Combat HIV/AIDS and malaria and other diseases	
7	Environment Sustainability	Deforestation will not be reduced without efficient technology and clean energy. Clean water will not be pumped or treated without energy.
8	Develop a global partnership for development	No effective communication among the different stakeholders is possible without energy

Poverty Alleviation thru Energy in Karnali















- Saving after switching to clean energy (in Kalikot a HH uses more money than a HH in Kathmandu on energy)
- Generating employment by Energy System (manufacturing, production, operation and maintenance)
- Generating Employment by Energy based end-uses (Ghatta owner, Bakery, Sawmill, Poultry, etc)
- Thru value addition on local product which can be sold in the market (herbal processing)
- Promoting 'tourism market'

Energy Expenses and Income in Karnali

% of expenditure on energy	22.34
Average Income	10,867
Expenditure on Energy	2,728
Dry cell in pairs	2.20
Kerosene (Liter)	3.23
Rate per kg	4.91
Average Fuelwood consumption (kg)	373.67
Average Family Size	8.27

From random interview with 37 people in 4 districts

Energy Resources & Technology in Karnali

End-uses	Non Renewable	Renewable			
	Kerosene	Biomass	MHP	Solar Thermal	Solar PV
Cooking/ Boiling					
Lighting					
Heating					
Agro-processing		—			
Comm.& industrial use					

Supply and Demand





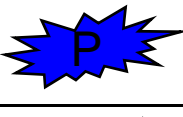
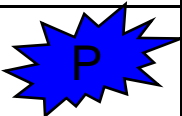
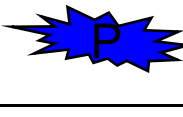


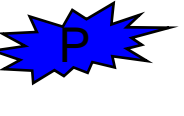

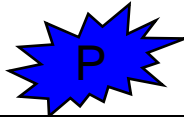

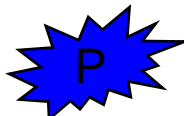
Supply

- Forest: Community forestry
- Water Resources: Thru different Technology
- Solar: Thru PV and Thermal technology
- Biogas: Thru dung from animal farming

Demand

- Cooking (Mainly biomass)
- Heating (Mainly biomass)
- Lighting (MHP, SHS, Biomass)
- Agroprocessing (MHP)
- Commercial and Industrial Use (Biomass, MHP, Solar)

Future Energy Resources for Karnali

End-uses	Renewable				
	Biomass	MHP/ IWM	Solar Thermal	Solar PV	Biogas
Cooking/ Boiling					
Lighting					
Heating					
Agro-processing					
Comm.& industrial use					

Main Findings in Karnali

- **Subsidy Issue**

- The subsidy or '*help*' to promote RET is needed.
- Capacity to pay is low as compared to higher price of RET systems (due to high transportation cost), which hindering the dissemination of moderate cost technologies in this region
- NGOs, DDC officials, private sectors, and users are in the opinion that without subsidy it makes no sense to start activity on RET.
- Few HH have both electricity from MHP and subsidized SHS, which is duplication of subsidy.

Sustainability Issue

- Sustainability of RET system was major concern
- Back up technical support is lacking, Maintenance aspect of RET system is not incorporated in the promotion and development program
- Financial sustainability aspect was forgotten
- Reliability of the supplied RET systems are poor
- Environmental consequences of disposed batteries will be alarming if proper modality of recollection is not developed in time.
- Discontinuation of subsidy, SHS market collapsed, so back up support difficult
- Fuelwood supplying forest is waning very fast

Market

- Non-transparent and unfair market price as seen in SHS, also hindering the access of poor people to RET. Exploited people's valuable savings and earnings.
- Lack of very basic information and knowledge on RET among the users. People know only SHS system not the capacity of PV panel, Batteries, etc.
- Cheap white LED distributed instead of CFL of SHS.
- No reliable long term supplier/installer
- Private sectors like Radio, TV, Watch repair shops, local blacksmiths are also not properly tied up with RET technologies, who have permanent supply linkages with their parts and components suppliers in Nepalganj, Surkhet and other cities in Terai.

Technology and Resources

- Streams of almost all small rivers and rivulet are used by traditional water wheels to grind cereals there by reducing the drudgery of women and children in one side, on the other side creating income for Ghatta owners.
- However, these potentials are not being utilized to generate more power or electricity.



Technology

- Few villagers have accepted metallic ICS (Models developed by UMN and by Alex Zand) to some extent.
- ICS reduces indoor smoke and warm indoor space thereby improving the living conditions and reducing the respiratory diseases.
- Not fuelwood efficient as assumed by designers and RET experts.
- Improvement Needed to make fuel-efficient retaining current functions or adding more functions.



Technology

- Intervention on the design of bulky parts of RET system and its components is needed, i.e. Welded IWM runner.
- Selection of appropriate technology for specific application (end-use) is also major activity for making RET system sustainable.
- Where plenty of falling water is available and indigenous water wheels are operated, installing SHS, which needs almost 20-30% of its investment cost within next five years for battery replacement, is not wise selection if alternatives are available and feasible

Supply Chain and Networking

- Lack of market chain and network and entrepreneurship skills is visible from the lack of development of peltric sets and IWM.
- Locals who have intuitive and entrepreneurship skills could be trained to fill this vacuum and to ensure the balanced and quality supply and demand of RET. The local technical service providing centers (Watch, TV, Radio repair and maintenance centers) are to be motivated for training and tied up with RET activities.

Credit and Finance

- MFIs can distribute subsidy and loan to the perspective RET user/owner (i.e. IWM or Peltric set)
- The perspective RET installer has to go through a six days training program and get a certificate known as *Micro Enterprise Certificate (MEC)*. With MEC and project proposal, RET installer can have a loan up to 30 thousands. This could be efficient, effective & transparent mechanism.
- If local supply chain is developed there is chances of goods exchange in district head quarters (e.g. SHS with herbs)
- DDC and VDC as well as INGO, NGO are also supporting

Awareness and Planning issues

- Awareness level among the GOs, NGOs and local representative is very negligible regarding RET and its application. Sensitization and awareness programs (e.g. Orientation, demonstrative exhibition and planning workshops) urgently needed in the districts.
- Lack of vision, planning concept, long-term thinking towards sustainability of RET development is clearly visible in interaction and discussions with local stakeholders.
- Proper RET planning concept has to be incorporated into capacity building programs as well as district level planning.

Coordination and Linkages of Development Activities

- Coordination among different supporting and implementing organizations still to be improved
- Percentage and amount of subsidy and implementing modalities are not uniform and it is making a bit confusing environment among the beneficiaries. People compare one program to other.
- RET could be made an component of several other development program, education, irrigation, health, agriculture, etc.

Conflict, Accessibility and RET

- Limited movement of few NGOs and GOs and other institutions was hindering to have updated information and status of demand and supply more precisely.
- Conflict could have been minimized or accessibility of development workers could be enhanced through RET, as rebels were willing to provide better access to development workers if they are supporting RET development work
- RET could work as catalyst for CBO mobilization for integrated development

Dalit and Backward society and RET

- Mason, Iron works (blacksmith), installation works can be done by local dalits as they have traditional skills and to enhance these skills minor investment needed.
- Conflict could be minimized through RET, as Dalits will be self employed and earnings will be enhanced. This will also provide better access to other sectoral development
- RET could work as catalyst for Dalit mobilization for integrated development

Regional Level Suppliers

- Surkhet and Nepalganj are the main supply center.
- ***MANIKEJ URJA is developing*** “Tukimara”, micro wind home system made of plastic and wooden blades, Pico Hydro system, IWM, SHS, SWH in Surkhet.
- Low wattage white LED AC lamp (1-5 watt), suitable for pico hydro and IWM based electricity-supplying systems.
- *Rijwon Engineering Udyog and other private sectors (manufacturer and suppliers)* in Nepalganj are producing/manufacturing RET components, e.g. water turbine, and metal stoves
- Karnali is the main market for their products and these private sector are relying on RET for their 20% of business incomes.

Role of SNV in the Promotion of RET

- **First Stage:** Sensitize DDC, NGO and local institutions on RET. The local partners are to be sensitized and trained on RET information dissemination aspects and on software as well as hardware application aspects
- Building the capacity of local NGOs, Institutions relevant to RET sector development
- These NGOs will then organize workshops, seminar or sensitization programme in respective districts to different stakeholders. This will create demand and motivate interested and responsible institution to take necessary actions on RET.

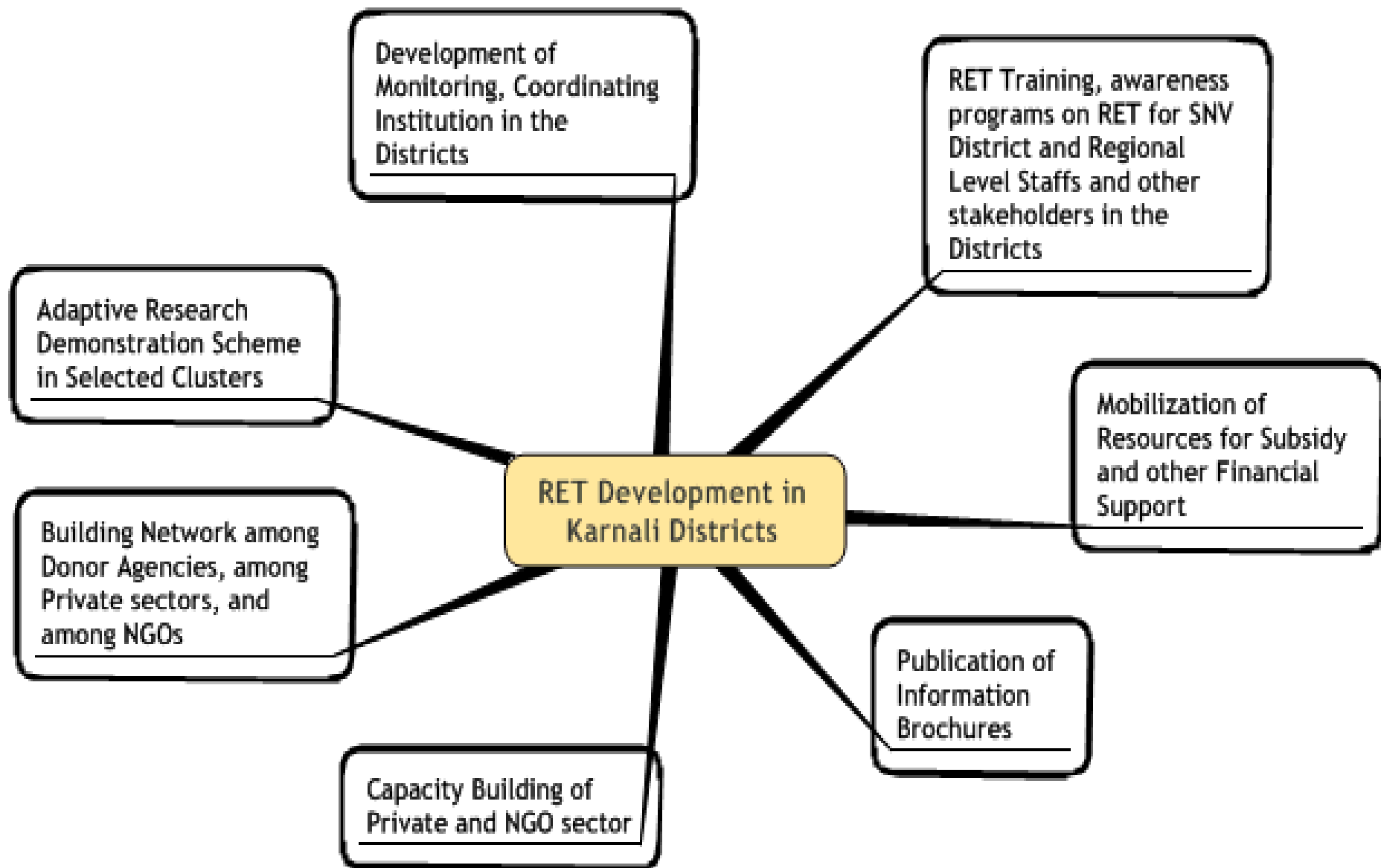
Role of SNV in the Promotion of RET

- Facilitating the development of stakeholder's network (private sector, NGOs, INGOs and GOs and regional suppliers of technology and resources) at district and regional level
- **Second Stage:** Mobilize resources from other development agencies and enhance networking for collaborative activities in RET. This is very important task and has huge potential in the districts.
- Mobilizing appropriate subsidy on RET through appropriate channel like AEPC.

Role of SNV in the Promotion of RET

- Facilitating to develop an RET promoting institution inside DDC (e.g. Energy Development Section)
- Initiating some R & D activities as a part of adaptive research mainly to reduce the cost of technology, enhance the reliability, improve performance efficiency, increase the transportability and demonstrate the technology.

RET Development Activities in Karnali



Tentative Support fund for Hardware

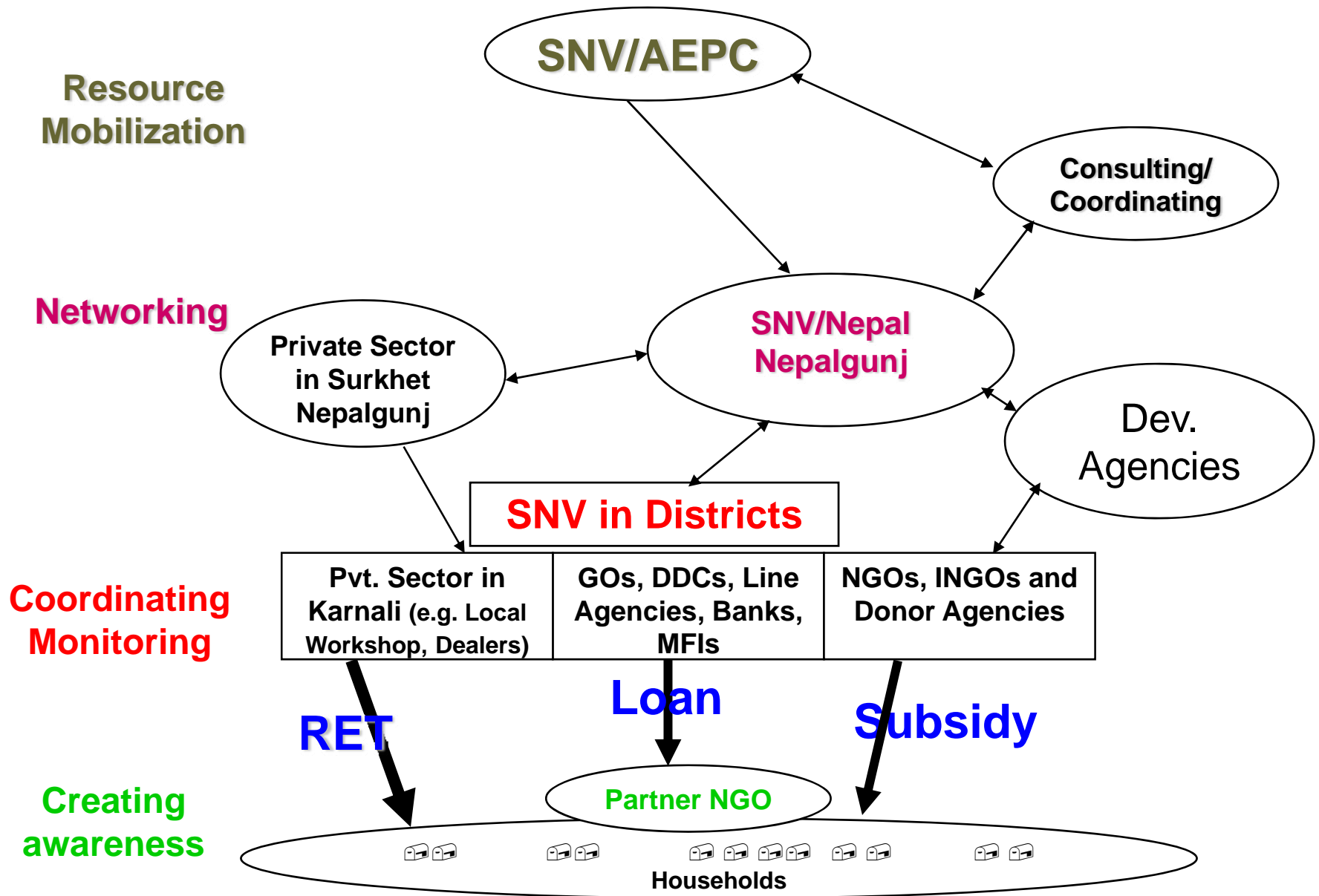
(for 5 Years)

Technology	Benefiting HH	Subsidy Fund Needed Rs.	Subsidy Rate per HH
MHP/IWM	35,615	195 Million	6,850
SHS	11,872	143 Million	12,000
ICS	14,831	45 Million	3,000
Biogas	500	6 Million	11,500

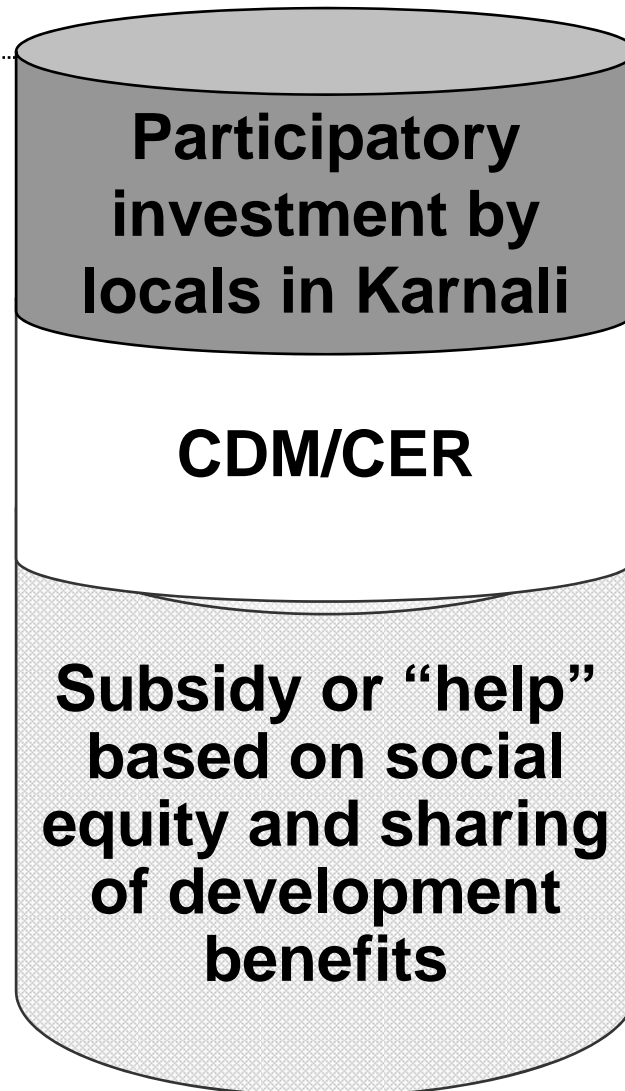
40,839 HHs, Rs. 389 Million, Rs. 9525/HH

1 KW MHP for 40 HHs, 60% remaining HHs get electricity from MHP/IWM, 25% from SHS, 1% HH from Biogas and 25% HH for ICS

Possible Promotion Roles



Resource Mobilization for RET



RET project cost in Karnali

Future Ahead

- More technical focused study, mainly adaptive research type in collaboration with district level stakeholders
- Interaction with district and regional level stakeholders focusing mainly on network building, collaborative activities and finding of this study
- Need to mobilize resources for the special subsidy for Karnali region through AEPC or any appropriate channel
- Coordinate the publication of awareness creating materials (partly could be incorporated in adult education and similar educational program)
- Facilitate local partners and other agencies to incorporate RET promotion program in their development activities

Thank You Very Much

