Community Mobilization and Energy as a Tool for Development - Impact of Rural Energy Programme in Nepal -

submitted by

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i

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Table of Contents

| Abbrev | iationsi | İ |
|---------------|---|------|
| List of | Tablesi | v |
| List of I | Illustrations | / |
| Techni | cal Units | /iii |
| Summa | ary | 1 |
| Zusam | menfassung | 5 |
| <u>Chapte</u> | r 1 Development of Nepal | |
| 1.1 | Introduction | Э |
| 1.2 | Understanding of "Development" | 11 |
| 1.3 | Development in Nepal | 17 |
| 1.3.1 | Nepal's Efforts | 17 |
| 1.3.2 | Where is Nepal now ? | 26 |
| 1.4 | Development for Nepal: a Vision | 32 |
| 1.5 | Hypothesis and Significance of the Study | 40 |
| Chapte | r 2 Research Structure | |
| 2.1 | Basic Information of the Project | 42 |
| 2.2 | From Hypothesis to Research Design | 43 |
| 2.2.1 | Antithesis through Comparative Studies | 43 |
| 2.2.2 | Study Objectives and Research Design | 54 |
| 2.3 | Research Method: Mixed Methods Approach | 56 |
| 2.4 | Methodological Structure of the Research | 59 |
| 2.5 | Limitations of the Research | 32 |
| <u>Chapte</u> | r 3 The Country and the Project | |
| 3.1 | Country Data at a Glance | 64 |
| 3.2 | The Programme | 79 |
| 3.2.1 | Rural Energy Development Programme (REDP) | 79 |
| 3.2.1.1 | Background | 79 |
| 3.2.1.2 | Why choosing REDP? Paradigms and Objectives | 79 |
| 3.2.1.3 | Promotion Strategy | 33 |
| 3.3 | Community Participation and Mobilization | 37 |
| 3.3.1 | Interpretations | 37 |
| 3.3.2 | Community Mobilization of REDP | 92 |
| 3.3.2.1 | Six Principles | 92 |

| 3.3.2.2 Process of REDP Community Mobilization | .94 |
|--|-----|
| 3.3.2.3 Real Participation by Community Mobilization | 99 |

| Chapte | er 4 Research Area and Resea | ch Questions |
|--------|------------------------------------|-----------------------|
| 4.1 | Inception | |
| 4.2 | Sample Size and Survey Design | |
| 4.3 | Key Indicators | |
| 4.4 | Research Areas | |
| 4.4.1 | Description of Research Village 1: | Pinthali (Kavre)115 |
| 4.4.2 | Description of Research Village 2: | Piughar (Tanahun) 123 |
| 4.4.3 | Description of Research Village 3: | Ghumlekh (Tanahun)125 |
| 4.4.4 | Description of Research Village 4: | Taman (Baglung)128 |
| 4.4.5 | Description of Research Village 5: | Sarkuwa (Balung)130 |
| 4.4.6 | Description of Research Village 6: | Arman (Myagdi)132 |

| <u>Chapte</u> | er 5 Research Findings | 133 |
|---------------|---|-------|
| 5.1 | Functional Institutions | 134 |
| 5.1.1 | Grass-root Organizations and Leadership | 134 |
| 5.1.2 | Organizational Capacity Building | . 139 |
| 5.2 | Technological Changes | . 146 |
| 5.3 | Skilled Human Resources and Local Capacity Building | . 150 |
| 5.4 | Economic Empowerment | . 159 |
| 5.5 | Environmental Benefits | . 168 |
| 5.5.1 | Activities | . 168 |
| 5.5.2 | Health, Hygiene and Sanitation | 169 |
| 5.5.3 | Energy Consumption | 174 |
| 5.6 | Social Transformation | 182 |
| 5.6.1 | Impact on Education | 182 |
| 5.6.2 | Workload of Women | 185 |
| 5.6.3 | Socio-Political Profile of Women's Position | 193 |
| 5.7 | The Village of Pinthali (Part 2): The Peak Phase | . 198 |

Chapter 6 Conclusions

| 6.1 | The Village of Pinthali (Part 3) | 203 |
|-------|----------------------------------|-----|
| 6.2 | Testing the Hypothesis | 206 |
| 6.2.1 | Achievement of Project Goals | 206 |

| 6.2.2 | The Hypothesis | 210 |
|---------|---|-----|
| 6.2.2.1 | Testing on Findings | 210 |
| 6.2.2.2 | Proof of Hypothesis against Vision of Development | 217 |
| 6.2.3 | Reviewing the Vision of Development for Nepal | 221 |
| | | |
| Glossa | rv | 226 |

| Bibliography | |
|--------------|-----|
| Declaration | 242 |
| Annexes | |

Annex 1: Baseline Survey Forms used by REDP in 1996/97

- Annex 2: Household Questionnaire (English)
- Annex 3: Example of Household Survey
- Annex 4: Rural Community Questionnaire
- Annex 5: Organizational Capacity
- Annex 6: Socio-Political Profile of Women's Position
- Annex 7: Access to and Control of Resources
- Annex 8: Nepal Country Data
- Annex 9: UNDP HDR 2005- Country Fact Sheets

Abbreviations

| ADB/N | Agricultural Development Bank of Nepal |
|-----------|--|
| AEPC | Alternate Energy Promotion Centre |
| BPPT | Ministry of Research and Technology |
| BSP | Biogas Support Programme |
| CBS | Central Bureau of Statistics |
| CEF | Community Energy Fund |
| СМ | Community Mobilizer |
| СО | Community Organization |
| CRT | Centre for Rural Technology |
| DDC | District Development Committee |
| DDC: REDP | District Development Committee: Rural Energy Development Programme |
| DEA | District Energy Advisor |
| EFG | Energy Functional Group |
| EUR | Euro |
| FFG | Forestry Functional Group |
| FG | Functional Group |
| FNCCI | Federation of Nepalese Chamber of Commerce |
| FO | Functional Organization |
| GDP | Gross Domestic Product |
| GNI | Gross National Income |
| GNP | Gross National Product |
| GOPP | Goal Oriented Planning Workshop |
| HBS | Heinrich-Böll-Stiftung |
| HDI | Human Development Index |
| HH | Household |
| HMGN | His Majesty's Government of Nepal |
| HPI | Human Poverty Index |
| HRD | Human Resource Development |
| hrs | hours |
| ICS | Improved Cooking Stoves |
| ILO | International Labour Organization |
| IMF | International Monetary Fund |
| INGO | International Non-governmental Organization |
| IRDP | Integrated Rural Development Programme |

| KMI | Kathmandu Metal Industries |
|--------|--|
| LPG | Liquefied Petroleum Gas |
| MHDS | Micro Hydro Demonstration Scheme |
| MHFG | Micro Hydro Functional Group |
| MHP | Micro Hydro Plant |
| MHS | Micro Hydro Systems |
| MOPE | Ministry of Population and Environment |
| NGO | Non-governmental Organization |
| NHDR | Nepal Human Development Report |
| NIC | Newly Industrialized Countries |
| NLSS | Nepal Living Standards Survey |
| NPM | National Programme Manager |
| NPC | National Planning Commission |
| NRs | Nepalese Rupees |
| OECD | Organization for Economic Co-operation and Development |
| Ph.D. | Doctor of Philosophy |
| PPP | Purchasing Power Parity |
| PSOs | Private Sector Organizations |
| R & D | Research and Development |
| REDP | Rural Energy Development Programme |
| RES | Rural Energy Systems |
| RESC | Rural Energy Service Centre |
| RET | Renewable Energy Technologies |
| SHS | Solar Home System |
| SOs | Support Organizations |
| SSMC | Survey of Socially Mobilized Communities |
| ТОР | Terms of Partnership |
| TPC | Trade Promotion Centre |
| TV | Television |
| UK | United Kingdom |
| UML | United Marxist Leninist |
| UN | United Nations |
| UNDP | United Nations Development Programme |
| UNRISD | United Nations Research Institute for Social Development |
| USA | United States of America |
| VDC | Village Development Committee |
| VND | Currency in Vietnam (dong) |

| WB | World Bank |
|------|---|
| WECS | Water and Energy Commission Secretariat |
| WTO | World Trade Organization |

List of Tables

| 1.1 | Transnational Comparison of Selected Economic Indicators in 1950s | 20 |
|------|--|---------|
| 1.2 | Real GDP Growth Rates | 24 |
| 1.3 | GDP by Sector of Origin | 24 |
| 1.4 | Transnational Comparison of Selected Indicators | . 26 |
| 3.1 | Economically Active Population | 66 |
| 3.2 | Literacy Rates 2003-2004 | 72 |
| 3.3 | Estimated Energy Consumption of Nepal (Mio GJ) | 78 |
| 4.1 | Names and Locations of REDP Districts | 101 |
| 4.2 | Household Questionnaire | 107 |
| 4.3 | Rural Community Questionnaire | 108 |
| 4.4 | Sample Distribution Parameters | 109 |
| 4.5 | Distribution of Sample Size | 111 |
| 5.1 | Organizational Capacity in Research Area after 5 to 6 Years of Impleme | ntation |
| | | 143 |
| 5.2 | Measures of Capacity Building under REDP | . 150 |
| 5.3 | Technological Interventions in Research Area | 152 |
| 5.4 | Human Resource Development in Pinthali Village | 154 |
| 5.5 | Human Resource Development in Sarkuwa Village | 155 |
| 5.6 | Electricity Based Enterprises in Sarkuwa Village | 163 |
| 5.7 | Environmental Activities under REDP | 168 |
| 5.8 | Main Diseases and Distance to Clinic in Research Area | 172 |
| 5.9 | Daily life of a Gurung Girl of Piughar Village | 185 |
| 5.10 | Daily life of a Gurung Boy of Piughar Village | 186 |
| 5.11 | A Daily Life of a Housewife of Pinthali Village | 187 |
| 5.12 | A Daily Life of a Male of Pinthali Village | 187 |
| 5.13 | Gender Division of Labour for Various Activities | 190 |
| 5.14 | Impact on Gender Strategic Needs | 194 |
| 5.15 | Impact on Gender Practical Needs | 195 |
| 5.16 | Access to and Control of Resources | 197 |
| 6.1 | Achievement of Project Goals | 207 |
| 6.2 | Achievement of Project Paradigms | 208 |

List of Illustrations

| 1.1 | Traditional Method of Rice Threshing by Animal Power in Nepal10 |
|------|---|
| 1.2 | Subsistence Agriculture as Main Source of Income and Occupation10 |
| 1.3 | Millennium Goals of Development by UN, WB, IMF, OECD 13 |
| 1.4 | Trickle-Down-Effect |
| 1.5 | Trade Imbalance of Nepal27 |
| 1.6 | India dominates Nepal's Economy 27 |
| 1.7 | Transnational Comparison of Selected Social Indicators in 2002 |
| 1.8 | Magical Pentagon34 |
| 1.9 | HDI and Energy Consumption38 |
| 2.1 | Net Value of Agricultural Production (all Households) 44 |
| 2.2 | Previous Daily Activities of Women (Hours all Households) |
| 2.3 | Present Daily Activities of Women (Hours all Households) 45 |
| 2.4 | Rural Electrification with High Investment in Vietnam |
| 2.5 | Solar Home System in a village of Laos |
| 2.6 | Participation of Women and Men in Development Group50 |
| 2.7 | Decision Makers for the Installation of Biogas Plant51 |
| 2.8 | Participation of Women and Men in Biogas Operation51 |
| 2.9 | Utilization of Saved Time without Community Mobilization52 |
| 2.10 | Utilization of Saved Time with Community Mobilization52 |
| 2.11 | Elements of Inquiry55 |
| 2.12 | Mandala |
| 2.13 | Research Design58 |
| 2.14 | Methodological Structure of the Research61 |
| 3.1 | Map of Nepal64 |
| 3.2 | Districts in Nepal65 |
| 3.3 | Projected Population of Nepal from 2001-202167 |
| 3.4 | Nepal's Population Density in Districts in 200468 |
| 3.5 | Human Poverty Index HPI in Districts in 200471 |
| 3.6 | Human Development Index HDI in Nepal 200474 |
| 3.7 | Sectoral Energy Consumption of Nepal in 2002/0375 |
| 3.8 | Consumption of Traditional Energy in Nepal |
| 3.9 | Consumption of Commercial Energy in Nepal76 |
| 3.10 | Residential Energy Consumption of Nepal by Source in 2002/0377 |

| 3.11 | Energy Wheel as Objective of REDP | 82 |
|------|--|--------|
| 3.12 | Promotion of Rural Energy Systems | 84 |
| 3.13 | Micro Hydro Demonstration Scheme (MHDS) | 86 |
| 3.14 | Six Basic Principles of REDP Community Mobilization | 92 |
| 4.1 | REDP Districts in 2005 | 101 |
| 4.2 | Research Districts | 103 |
| 4.3 | Research Questions | 105 |
| 4.4 | Map of Pinthali | 115 |
| 4.5 | Pinthali Village 1998 | 116 |
| 4.6 | Women Community Organization | 117 |
| 4.7 | Literacy Course | 118 |
| 4.8 | Pinthali MHP Installation and Construction | 120 |
| 4.9 | Villagers' Contribution with Transport of Building Material | 120 |
| 4.10 | Villagers' Contribution in Construction Activities | 121 |
| 4.11 | Final Construction of Water Intake for the Hydro Power | 121 |
| 4.12 | Turbine and Generator of Micro Hydro Power Plant | 122 |
| 4.13 | Map of Piughar | 123 |
| 4.14 | Map of Ghumlekh | 125 |
| 4.15 | On the Way to Ghumlekh | 126 |
| 4.16 | On the Way to Ghumlekh | 126 |
| 4.17 | Reaching at "Electrified" Ghumlekh Village | . 127 |
| 4.18 | Map of Taman | 128 |
| 4.19 | Taman Village | 129 |
| 4.20 | Map of Sarkuwa | 130 |
| 4.21 | Map of Arman | 132 |
| 5.1 | Meeting of a Women's Community Organization (CO) | 134 |
| 5.2 | Community Organizations (COs) in Research Area | 135 |
| 5.3 | Total Number of Community Organizations under REDP | 136 |
| 5.4 | Total Capital Formation under REDP | 137 |
| 5.5 | Knowledge and Awareness on RETs in Households in Research Village | es 146 |
| 5.6 | Information Dissemination about Technical Options in all Project Areas | 147 |
| 5.7 | Village Technician | 151 |
| 5.8 | MHP Operators Training | 156 |
| 5.9 | Lamapat Wood Carving | 157 |
| 5.10 | Income Generating Activities (Pre-phase and Peak phase) | 161 |

| 5.11 | Cumulative Investment under REDP | . 161 |
|------|--|-------|
| 5.12 | Income Generating Activities in Pinthali | . 162 |
| 5.13 | Remaining Income Generating Activities (After Project) | . 164 |
| 5.14 | Annual Investment under REDP | . 165 |
| 5.15 | Source of Income in Research Area | 166 |
| 5.16 | Use of Sanitary Installation in Research Area | . 169 |
| 5.17 | Safe Drinking Water in Pinthali Village | .170 |
| 5.18 | Management of Household Waste in Research Area | .171 |
| 5.19 | Village Healing Methods in Research Area | .172 |
| 5.20 | Dependence on and Use of Fuel Wood in Research Area | . 174 |
| 5.21 | Improved Cook Stoves | .175 |
| 5.22 | Types of Cook Stoves in Research Area | 176 |
| 5.23 | Annual Consumption of Fuel Wood and Cost per Household | . 177 |
| 5.24 | Use of Kerosene in Research Area | 178 |
| 5.25 | Consumption of Kerosene in Research Area | . 179 |
| 5.26 | Expenses for Kerosene in Research Area | . 179 |
| 5.27 | Electric Light replaces Kerosene for Cottage Industry | .180 |
| 5.28 | Use of Dry Cells in Research Area | 181 |
| 5.29 | Level of Education in Research Area (Female Population) | 183 |
| 5.30 | Level of Education in Research Area (Male Population) | 184 |
| 5.31 | Gender Division of Labour in Research Area | . 188 |
| 5.32 | Magar Girls in Taman Village Collecting Firewood | .188 |
| 5.33 | Traditional Grinding with "Janto" is Hard Work for Women | .191 |
| 5.34 | Electric Mill in Ghumlekh | . 192 |
| 5.35 | Teashop | 199 |
| 5.36 | Improved Irrigation | .199 |
| 5.37 | Improved Agricultural Productivity | . 200 |
| 5.38 | Inauguration of Cooperative | .200 |
| 5.39 | Village Furniture Workshop | .201 |
| | | |
| 6.1 | "Modernization" of Roofing Material as Status Symbol | .203 |
| 6.2 | The VDC Building bombed by Maoists | . 205 |
| 6.3 | Islands of Modernization as Entry Point of Economic Development? | .223 |
| 6.4 | The Cycle of Poverty | . 224 |
| | | |

Technical Units

| GJ | Giga Joule |
|----------------|----------------------------------|
| ha | hectare (10 000 m ²) |
| hrs | hours |
| hrs/person/day | hours per person per day |
| kg | kilogramme |
| km | kilometre |
| kW | kilowatt |
| kWh | kilowatt-hour |
| kWh/d | kilowatt-hours per day |
| Mio | Million |
| MW | Megawatt |
| MWh | Megawatt-hour |
| sqm | square metre (m ²) |
| toe | tons of oil equivalent (42 GJ) |
| VAC | Voltage of Alternating Current |
| VDC | Voltage of Direct Current |
| p.a. | per annum |

<u>Summary</u>

The dissertation is a research on electrical energy supply for rural areas of a developing country like Nepal. Traditionally, this kind of energy projects are planned and implemented under aspects of technology transfer without taking a more holistic perspective of social, cultural and economic impacts. Therefore, this dissertation aims at proving the hypothesis that energy might be taken as an entry point for a broader goal of sustainable development if it is used as a motivation for Community Mobilization.

The first chapter is a general introduction including an interpretation of "development" and definition of development problems from the author's perspective, followed by official definitions and theories on why development failed in the past with a reflection on the situation of Nepal.

The present situation in Nepal is politically, economically and socio-culturally worse than ever before. This leads to the author's vision for development in Nepal with:

- change in awareness,
- change of attitudes,
- change of situation by the people based on their own motivation and self initiative,
- fulfilment of basic needs and overcoming the poverty line,
- better education, social justice and equality.

In order to achieve these goals, suitable ways of Community Mobilization must be established in order to fight poverty and social inequality including gender discrimination. As a result, the hypothesis is formulated as:

For development of rural Nepal, "energy" is a tool for motivation and, in combination with Community Mobilization, it is a strategy for sustainable development.

In the second chapter, a detailed discussion on the methodology of the research, the relevant indicators and research questions for field questionnaires, interviews, etc. is carried out.

This provides the central issues of investigation:

- Is energy a suitable tool for Community Mobilization?
- Can Community Mobilization initiate sustainable development?

- What is the perception of target groups related to the development goals in the community?

- Which groups in the community are included and/or excluded from development?

In the third chapter, a project from Nepal with holistic approach, "Rural Energy Development Programme" is discussed and also compared with other development projects implemented without Community Mobilization. An "anti-thesis" with analysis of different projects and countries shows that projects without participation of the target group are normally not successful. In addition, the interpretation of Community Participation is analysed, showing different points of interests which not always correspond to "real" participation.

Thereafter, the project is evaluated with:



In the following fourth chapter, a presentation of the region, with detailed questions to be examined, is provided with key indicators. An attempt has also been made in the chapter to discuss an exemplary Village Community, in which the implementation of the project is pursued in more detail over several project phases.

The evaluation of data, analysis, interviews and selected examples are focussed in the fifth chapter. This most important evaluation is oriented on

- impact on living conditions:
 - work load for women
 - health
 - energy situation
 - education
- technical changes:
 - security
 - consciousness formation
 - local knowledge and abilities
- resources
- economic improvement
- social transformation:
 - self organization
 - socio-political position of women.

The hypothesis is examined in the final sixth chapter. The situation under different time phases is seen, which extends over a period of approximately 5 to 6 years. In the first project phase with emphasis on Community Mobilization, "energy" forms an important tool for motivation. This leads to a number of changes in the village communities particularly to self-organization, change in role of women, and organizational structures with Community Organizations and its administration including access to own financial resources and commitment in self-initiatives for the benefit of the community (e.g. cleanliness, water).

This process of change is a big step which was initiated from "outside". The question remains whether this process is sustainable and thus an inhomogeneous picture shows up. After the project phase of motivation was implemented with electricity as an entry point, the envisaged development process was achieved. Beyond that, a continuation of this process is not regarded as necessary from the point of view of the community: the living conditions and social changes were raised by a temporary self-initiative on a "higher development level". However, there again it stagnates. The new improved situation is accepted as the final goal and further self-initiated development process in the community is not guaranteed or cannot be expected.

The picture becomes more differentiated when the project is viewed from a "higher" perspective in connection with development as a number of phases from a traditional agrarian to (pre-) industrialized society: the project contributes to improve the livelihood in the rural side and by this helps to sustain rural development and to reduce rural exodus:

this supports the hypothesis. But the impact of the project can only be expected of limited duration and cannot turn round the trend of urbanization.

Simultaneously it is also pointed out that for "real" social development community mobilization and awareness creation finally must go further in order to also achieve political awareness (i.e. in the sense of Paulo Freire) so that the concerned can recognize their own situation, which can only be changed by themselves.

Finally, the answer to the question, whether the unbroken global trend to industrialized societies can be a perspective for sustainable development or not, this dissertation must remain open.

<u>Zusammenfassung</u>

Die Dissertation ist eine Untersuchung über den Einfluss von elektrischer Energieversorgung auf ländliche Bereiche in einem Entwicklungsland wie Nepal. Üblicherweise wird diese Art von Energieprojekten als Technologietransfer geplant und eingeführt, dabei weitgehend ohne ganzheitliche Perspektiven und ohne sozio-kulturelle und ökonomische Auswirkungen in Erwägung zu ziehen.

Deshalb soll die Untersuchung einen Beweis für eine Hypothese liefern, dass Energie ein Eingangspunkt für ein weiter gestecktes Ziel einer dauerhaften Entwicklung sein kann, wenn Energie als Motivationsansatz für 'Community Mobilization' genutzt werden kann.

Im ersten Kapitel erfolgt dazu nach einer generellen Einführung zuerst eine Definition von "Entwicklung" und eine Definition der Entwicklungsprobleme aus der Perspektive der Autorin.

Danach folgen die offiziellen Definitionen und Theorien mit einer Reflektion auf die Situation von Nepal und warum bisherige Entwicklungsarbeit keine Erfolge gezeigt hat. Die Situation ist zur Zeit politisch, wirtschaftlich und sozio-kulturell schlechter als je zuvor. Daraus leitet die Autorin eine eigene Vision für die Entwicklung in Nepal ab mit:

- Bewusstseinsänderung,
- Verhaltensänderung,
- Situationsveränderung durch die Menschen mit eigener Motivation und Selbstinitiative,
- Erfüllung der Grundbedürfnisse und Überwindung der Armutsgrenze,
- Bessere Erziehung, soziale Gerechtigkeit und Gleichheit.

Um diese Ziele zu erreichen, müssen geeignete Wege von Community Mobilization gefunden warden, um Armut, soziale Ungerechtigkeit einschließlich Gender Diskriminierung zu bekämpfen.

Dazu wird eine Hypothese formuliert mit:

Für die Entwicklung im ländlichen Nepal ist "Energie" ein Werkzeug für Entwicklung und in Verbindung mit Community Mobilization eine Strategie für dauerhafte Entwicklung.

Darauf folgt im zweiten Kapitel eine Betrachtung zur Methodik der Untersuchungen von der Hypothese bis zu den relevanten Indikatoren und Fragestellungen für Fragebögen, Interviews etc.

Daraus leiten sich die Kernfragen der Untersuchung ab mit:

- Ist Energie ein geeignetes Werkzeug für Community Mobilization?
- Kann Community Mobilization dauerhafte Entwicklung initiieren ?
- Wie ist die Wahrnehmung der Zielgruppen zu den Entwicklungszielen in der Community ?
- Welche Gruppen in der Community sind ein- bzw. ausgeschlossen von der Entwicklung ?

Es folgt im dritten Kapitel eine Beschreibung des Projektes "Rural Energy Development Programme" in Nepal, das diesen ganzheitlichen Projektansatz vertritt, sowie ein Vergleich mit Entwicklungsprojekten, die ohne Community Mobilization arbeiten. Eine "Antithese" mit Untersuchungen aus verschiedenen Projekten und Ländern zeigt dabei, dass Projekte ohne Beteiligung der Zielgruppe normalerweise nicht erfolgreich sind.

Dazu wird die Interpretation von Community Participation hinterfragt, die von verschiedenen Interessen geprägt ist und nicht immer einer "wahren" Partizipation entspricht.



Daraus wird der Projektansatz bewertet mit:

Im folgenden vierten Kapitel erfolgt dann eine detaillierte Darstellung der zu untersuchenden Region mit Details zu Schlüsselindikatoren und einer exemplarischen Darstellung der Projekteinführung über mehrere Projektphasen in einem Dorf.

Im fünften Kapitel erfolgt die Auswertung und Bewertung der Daten, Analysen, Interviews und ausgewählten Beispielen.

Die wichtigsten Bewertungen orientieren sich an:

- Einfluss auf Lebenskonditionen mit
 - Arbeitsbelastung der Frauen
 - Gesundheit
 - Energiesituation
 - Bildung
- Technische Veränderungen mit
 - Sicherheit
 - Bewusstseinbildung
 - Lokalen Kenntnissen und Fähigkeiten
- Ressourcen
- Ökonomische Verbesserung
- Soziale Transformation mit
 - Selbstorganisation
 - Sozio-politische Stellung der Frauen

Das abschließende sechste Kapitel überprüft dann die Hypothese.

Dabei muss die Situation unter verschiedenen zeitlichen Phasen gesehen werden, die sich über einen Zeitraum von etwa 5 bis 6 Jahren erstrecken.

In der ersten Projektphase mit Schwerpunkt auf Community Mobilization ist "Energie" ein wichtiges Werkzeug für die Motivation. Das führt zu einer ganzen Reihe von positiv zu bewertenden Veränderungen im dörflichen Gemeinwesen, insbesondere bei der Selbstorganisation, bei der Veränderung der Position der Frauen, die erstmalig eigene und gleichberechtigte Community Organizations gründen und verwalten einschließlich Zugang zu eigenen finanziellen Ressourcen, Engagement in Selbstinitiativen zum Wohle der Gemeinschaft (z.B. Sauberkeit, Wasser).

Dieser Veränderungsprozess ist ein großer Schritt, der von "außen" angestoßen wurde. Die Frage ist, ob dieser Vorgang dauerhaft (sustainable) ist: und hier zeigt sich ein inhomognes Bild. Nachdem die motivierende Projektphase mit Zugang zu elektrischer Energie etabliert war, ist aus Sicht der Community der angestrebte Entwicklungsprozess erreicht, darüberhinaus wird nicht unbedingt eine Fortsetzung eines Entwicklungsprozesses als erforderlich angesehen: die Lebensverhältnisse und sozialen Änderungen wurden durch temporäre Eigeninitiative der Gemeinschaft auf ein "höheres Entwicklungsniveau" angehoben, aber stagnieren dann. Die neue "bessere" Situation wird als eigentliches Entwicklungsziel angesehen und akzeptiert – eine weitere eigene Entwicklungsperspektive in der Community ist dabei nicht garantiert oder nicht zu erwarten.

Das Bild wird differenzierter aus einer "übergeordneten" Perspektive, die das Projekt im Zusammenhang mit Entwicklung als mehrphasigem Weg von einer traditionellen Agrarzu einer (vor-) industrialisierten Gesellschaft betrachtet: das Projekt liefert einen Beitrag zur Verbesserung der Lebensbedingungen im ländlichen Bereich und trägt damit zu einer dauerhaften ländlichen Entwicklung und einer verringerten Landflucht bei: dieses stützt die Hypothese. Aber der Einfluss des Projektes kann nur von begrenzter zeitlicher Auswirkung sein und kann den Trend zur Urbanisierung nicht umkehren.

Gleichzeitig wird aber auch deutlich, dass für eine wirkliche gesellschaftliche Entwicklung die Community Mobilization und die damit verbundene Bewusstseinsbildung letzten Endes darüber hinausgehen muss, um (im Sinne von Paulo Freire) auch politische Bewusstseinsbildung zu erreichen, damit die Betroffenen ihre eigene Situation erkennen können, da diese auch nur durch sie (die Betroffenen) selber verändert werden kann.

Letzten Endes muss die Frage, ob der ungebrochene globale Trend zur industrialisierten Gesellschaft selbst überhaupt eine dauerhafte Entwicklung ermöglicht, in dieser Arbeit offen bleiben.

Chapter 1 Development of Nepal

1.1 Introduction

For about the past 50 years, the international community is experiencing and experimenting on development collaboration. Earlier high expectations have not become realities – but the international efforts were also not at all meaningless. Searching for development interpretations and strategies is an everlasting process. The impacts and interdependencies of development are understood in a different way now compared to the 1960s when the international scenario had just begun.

The still growing world's population, the still growing global economy, the new countries in a take-off phase of industrialization, limited resources, and the still unchanged life for the majority of world's rural dwellers are new challenges for the international community.

In the beginning of this new millennium, the world faces new challenges of globalization and liberalization under the guidance of World Trade Organization (WTO) to achieve economic growth and to integrate developing countries in the global free trade market. At least, this seems to be the widely accepted interpretation of "development" these days. What can be seen in countries like China and India, as new global players, is a replication of the process of industrialization and capitalism, in the same manner as it began in Europe some centuries back with poor working conditions for the masses and exploitation of labour. But still, the majority of the population in these countries lives in rural areas and does not participate in this process - except that they migrate to the mega cities and try to have a bite from the development cake.

"Two hundred years after the emergence of the modern capitalist nation-state, and more than forty years into the reign of the myth of development, reality shows that the rule is the non-development of at least 130 countries and the exception is 4 newly industrialised countries (NIC) – Taiwan, South Korea, Singapore and Hong Kong.....In total the four represent a mere 2 per cent of the population of the misnamed 'developing world' " (De Rivero 2003, p.127-128).

Controversial questions in this context are – who defines what, how and for whom is development considered? How to initiate or implement development for those living in rural communities? And, what does development finally bring to the eyes of the "to-be-developed" group? Based on personal experience of the author in rural Nepal, the home country of the author, the definition, strategy, and perspectives of rural development

projects are taken to uncover exemplary answers by analysing the impacts of projects. An attempt is not made to formulate a new development strategy or "success-guarantee" strategy but only to point out options on how to achieve subjective betterment for the target group and objective betterment of the impacts of projects.



Illustration 1.1: Traditional Method of Rice Threshing by Animal Power in Nepal (by author)



Illustration 1.2: Subsistence Agriculture as Main Source of Income and Occupation (by author)

1.2 Understanding of "Development"

Defining "development" is a controversial discussion since decades – so, a final definition cannot be expected and won't be provided in this research. At least, the discussion on development should be taken as an attempt to understand why some parts of the world are more advanced in the fields of economy, infrastructure and basic needs supply compared to the rest of the so-called developing world. Problems in developing countries are manifold and defined in comparison to industrialized countries - from technical infrastructure to family planning and from illiteracy to poverty. All indicators are compared with the already gained status of industrialized and economically developed countries.

On the other hand, typical problems of the advanced countries like over-consumption of resources, social fragmentation of society and loss of social values etc. are not defined as development problems. Therefore, it can already be stated that the definition of development in this research is related to internationally accepted (although not fully reflected and orientated to sustainability) and selected indicators which are seen to be typical for problems in economically weaker non-industrialized traditional societies like that in Nepal.

Definition of development has undergone many changes: "In common parlance, development describes a process through which potentialities of an object or organism are released, until it reaches its natural, complete, full-fledged form......The development or evolution of living beings, in biology, is referred to the process through which organisms achieved their genetic potential.... It was between 1759 (Wolff) and 1859 (Darwin) that development evolved from a conception of transformation that moves toward the *appropriate* form of being to a conception of transformation that moves towards an *ever more perfect* form..." (Sachs 2005, p.8). "Development became the central category of Marx's work: revealed as a historical process that unfolds with the same necessary character of natural laws.....It converted history into a programme......The industrial mode of production, which was no more than one, among many, forms of social life, became the definition of the terminal stage of a uni-linear way of social evolution...Thus history was reformulated in Western terms." (Sachs 2005, p.9).

This made the global process of economic and social changes a duplication of the industrialized countries and became official terms after World War II when the end of political colonialism was replaced by new models of international development assistance.

Development and its related indicators have undergone changes since the 1960s due to better understanding of mechanisms and impacts of development assistance and due to change in global political scenarios. The fading out of the so-called "Second World" (which described countries under communistic economy) in 1990s again resulted in re-definitions and re-formulations of development goals and indicators. After experience of more than four development decades (1960-2000), it can be observed that definitions of "development" and "Third World" now are even more unspecified than in the decades before. Menzel (Menzel 1993, p.43) stated that since the 1980s, the discussion on development theories is stagnating. Theories were more and more replaced by discussions about strategies on how to reduce poverty of the masses and meet their basic need requirements.

Since the 1960s, awareness on the problems of poverty has grown. Distinction between rich and poor has been prevalent in the society since ancient times but the poverty issue has been dominating discussions since the 1960s in both international and national level and, despite the continuous efforts at both levels, the problem of poverty still remains the world's largest and most challenging issue. Global and national income disparities in the 1990s were, for example, such that globally 20% of the people living in the highest income countries accounted for 86% of private consumption expenditures while the poorest 20% accounted for only 1.3% (Picciotto 1999, p.3). In 1993, the net worth of the top 400 richest people in the developed world was equivalent to the combined GDP of India, Bangladesh, Nepal and Sri Lanka that accounted for a combined population of over a billion people (Picciotto 1999, p.3). The economic gap has not changed even after the decade from 1993 to 2002. The world's richest 1% of people receives as much income as the poorest 57%. The richest 10% of the U.S. population has an income equal to that of the poorest 43% of the world. In other words, the income of the richest 25 million Americans is equal to that of almost 2 billion people. The income of the world's richest 5% is 114 times that of the poorest 5% (UNDP 2002, p.19).

In this context, the latest Millennium Development Goals must be recognized with its highest priority in combating extreme poverty and achieving social development in health and education including elimination of gender disparities.

The goal of economic well-being as given in the development goals up to 2015 brings the problems of poverty on top of the agenda.



Global estimates at the end of the last decade of the twentieth century showed that 1.3 billion people were living below the international poverty line on less than US\$ 1 a day and another 3 billion live on less than US\$ 2 (Picciotto 1999, p.2). The backlog of unmet basic human needs is large and growing. Out of 4.4 billion people living in developing countries, almost one-third have no access to clean water, a fifth are not connected to basic sanitation, a quarter have inadequate shelter, a fifth are out of reach from modern health services while another one-fifth suffer from malnutrition. Furthermore, about 2 billion people in developing countries, particularly in rural areas, still rely on traditional fuels such as wood, charcoal and dung for cooking as well as lack basic modern energy services like electricity which, from the point of view of UNDP, also hinders people's efforts to move out of poverty and seriously constrains their ability to improve their living situations, or even to meet their subsistence needs (UNDP 2004[1], p.34).

In the same context, only slight changes have been observed in the beginning of the first decade of our millennium with 2.8 billion people out of 6 billion (almost a half) still living on less than US\$ 2 a day, and 1.2 billion (a fifth) very poor people are, even now, living with less than US\$ 1 a day with 44% of that in South Asia alone (World Bank 2000, p.3). The average proportion of people in developing countries living on less than US\$ 1 per day fell from 28 to 24 per cent over the last decade between 1987 and 1998 (World Bank 2004,

p.21). In South Asia, the number of poor people rose from 474 million to 522 million (World Bank 2000, p.22).

Still more than a billion people worldwide have no access to an improved source of water and 2.5 billion do not have access to improved sanitation. Only 30% of the rural population in Asia have access to improved sanitation (World Bank 2004, p.21). Cutting global income poverty by half between 1990 and 2015 would require a compound rate of decline at 2.7% per year over those 25 years (World Bank 2000, p.6).

The general understanding of poverty is that the poor live under a certain national/international level of income, and also suffer from food shortage, starvation and unhealthy living conditions. Therefore, being poor in majority of the societies would mean being deprived from power, wealth and opportunities within the society.

This leads to following remarks.

Remark 1:

Various national and international organizations as well as individual experts, scientists, and researchers have given their own interpretation of poverty. The literal meaning of poverty, in a dictionary or an encyclopaedia, is related to monetary value in terms of income to satisfy the basic needs or to support accepted living standards. In line with this, the classical definition of poverty, according to the World Bank, is "the inability to attain a minimal standard of living measured in terms of basic consumption needs or the income required" (UNDP 2000, p.25). Poverty is thus characterized by the failure of individuals, households or communities to command sufficient resources to satisfy their basic needs.

But the World Bank definition does not respond to queries on how basic needs are defined and by whom; what is the accepted minimum standard of living and who determines what is acceptable (UNDP 2001, p.25). Acceptable standard of living may vary greatly according to place and time – in an industrialized society, for example, you would consider yourselves "poor" if you cannot afford a car, television, and/or refrigerator. However, in developing countries, the situation is completely different as these items are considered only as luxuries.

Remark 2:

The international benchmark of US\$ 1 per day per person for gauging the extent of poverty is also questionable in the case of developing countries. A universal standard must be based on a common global basket of basic goods and services to be consistent

for all. However, it is worth noting that the international poverty line is formulated based on the average or median of 8-10 national poverty lines, each derived from different such baskets, converted into the same numerator using the Purchasing Power Parity (PPP) values (Vandemoortele 2002, p.5).

Remark 3:

The nature of poverty differs vastly in developed and developing countries. Every country, community, society has its own definition, concept and logic of poverty. Establishing a norm for standardizing a benchmark is one aspect but more importantly, knowing the perception of the people regarding poverty is another that requires recognition while discussing poverty. How do people perceive, feel or define poverty? Do they consider themselves to be poor or conversely, is it just a tag imposed by outsiders? What does poverty really mean for the people? These aspects warrant clear analysis to understand the dynamics of poverty (Guru-Gharana 1996, p.35).

Remark 4:

In order to understand the dynamics of poverty, it is worthwhile to recall the notions of 'capabilities' and 'entitlements', which have received a good deal of attention ever since it was introduced by Amartya Sen. He contradicts the idea that income deficits are the main attributes of poverty (UNDP 2000, p. 29). He stresses on two critical aspects for analysing poverty and vulnerability: firstly, the bundle of assets or endowments held by the poor and secondly, the nature of the claims attached to them. The vulnerability of individuals may increase with unemployment, missing markets production and price shocks depending on their asset bundle and their capacity to mobilize the resources at their disposal to endure crises and shocks. Failure of a livelihood system to provide access to an adequate bundle of commodities creates what Sen called 'entitlement failure' (UNDP 2000, p.29).

Remark 5:

UNDP, meanwhile, have attempted to go beyond the conceptualization of World Bank definition. Adding a 'human dimension' to this World Bank poverty concept, UNDP defines poverty as a state in which "opportunities and choices most basic to human development are denied – to lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity, self-respect, and respect for others" (UNDP 1997[1], p.15). This view meaningfully implies that poverty does not restrict itself to just low income, which indicates that considering only economic indicator is incomplete to define poverty. Therefore, the definition of poverty should incorporate the use of indicators of other concepts such as "basic needs", "capability" and "social exclusion".

The concept of 'social exclusion' builds on the relational philosophy of poverty. Following Bhalla and Lapeyre 'exclusion' is referred to the lack of social ties with the family, community and more generally, with the society to which an individual belongs (UNDP 2000, p.28). This concept comprises of both economic and social dimensions. Being excluded implies having no opportunities for earning income, participating in labour market and also not having access to assets. Furthermore Barry defines that people are barred from public service, community and family support and also taking part in decision making process that affect their own lives. It also excludes them from the most basic rights of a citizen (UNDP 2000, p.28).

Remark 6:

Besides the more economic perspectives, sociologists have also taken a broader multidimensional view of poverty and emphasize on social structures. Poor people are also powerless and "their marginalization extends through social exclusionary process that prevent or limit their access to assets, basic services, benefits, and rights or requirements". This is distinguished as absolute and relative poverty. 'Absolute' refers to subsistence below a minimum level of living standards while 'relative' implies a "comparison between people at the bottom of income-deprivation and those at the top, and may generate among the poorest a felt sense of relative deprivation......Women, in particular, have been the subject of sociological examination as trends point to the increasing feminization of poverty" (Ortigas 2000, p.25-26)

In the context of relative poverty, Ortigas sets the limits to Paulo Freire's 'Pedagogy of the Oppressed' and the phase of 'conscientization' to make the poor aware of and provide assistance to recognize their civil rights. She also emphasizes that a revolution is neither achieved by verbalism nor by activism but rather by putting it into practice and also underlines that the oppressed must liberate themselves (Ortigas 2000, p.28).

Summing up, the understanding of poverty in a more multi-faceted perspective means:

Development is related to poverty as a multidimensional phenomenon: not only focusing on monetary and basic needs, but also on capability and social exclusion while giving equal importance to cultural norms and gender relations.

1.3 Development in Nepal

1.3.1 Nepal's Efforts

Nepal is unique among the countries of the region in the sense that it has never been colonized and has had a relatively cohesive national identity since the late 1700s. For over a century, from 1846 till 1950, the country was isolated from the rest of the world, and power was centralized in the office of the *Rana* Prime Minister and the *Rana* family (*refer to glossary*). In 1950, the late King Tribhuvan led a popular revolt, which brought down the *Rana* regime.

Following the formation of the first elected government in 1958, the late King Mahendra dissolved the parliamentary government in 1960, banned political parties and introduced the partyless *Panchayat* system in the country instead. This *Panchayat* system, as substitute for the prohibited political parties, provided alternate channels for the articulation of group or class (but not national) interests.

The *Panchayat* system remained in the country for three decades from 1960 to 1990. After a powerful uprising from various segments of the populace, the multiparty democratic system was revived in 1990 with the promulgation of the democratic constitution of the Kingdom of Nepal (Federal Research Division 2006, printed from internet on 09.03.2006)

Nepal started its development planning only from the year 1956. When the country emerged from the century-long self-imposed isolation, there were hardly any means of transportation and communication. Education was unavailable to the vast majority of the people. The country, thus, had to start its economic and social development very late and almost from the scratch without any modern institutions and infrastructures (Shrestha 1990, p.4). On the other hand, Nepal had a unique chance in the sense that external impacts on culture, economy, political power, etc. had not been experienced over centuries and, thus, development could take off as a heritage of cultural and social values of the country.

This was the time of upcoming international discussion on development during the "First Decade of Development" in the 1960s. Related to this discussion, the situation and the development plans of Nepal can be reflected by two main development theories based on endogenous or exogenous factors (Menzel 1992, p.15 ff).

The 'Dependency Theory' is based on the influence of exogenous factors taking underdevelopment as a result of international division of labour with its main inconvenience for countries exporting primary goods and resulting in unbalanced exchange conditions in the international market. The dependency theories are directly or indirectly influenced by the critical thinking of Karl Marx and economists like John A. Hobson (Bongartz/Dahal 1996, p.9) who believe that imperialism would not benefit the nation due to the fact that it is based on savings of the rich at the expense of the poor.

Marx defines three development phases (Menzel 2000, p.8-11) which shall finally overcome this injustice:

1. The beginning of a development process (here taken as "industrialization") comes through accumulation after the end of feudalism and socio-economic separation of capitalists (capital owner) and workers in a society. To compete in the market, the capitalist has to increase the productivity which can be achieved by mechanization and use of technology.

2. The next phase is based on Marx's theory of surplus value: the value of a good is the sum of used material, resources and cost of labour. The value of the good is higher than the original cost thus giving surplus value in the form of profit.

3. Marx's criticism focuses on the surplus value of a good at its distribution, which is based on exploitation of labour by capitalists. So overcoming capitalism for fair distribution of surplus value should finally result. But before reaching this final phase, capitalism has to go through a significant mission - all productive forces and potentials must be on its maximum and globalized with prospering societies. Only then can the final phase as a kind of idealistic socialism be achieved.

Taking this understanding of development, there cannot be any similarity of interest among the rich and the poor nations, and also among the capitalists and workers within the nations because imperialism benefits only a few individuals and industrialists by exploiting a large majority of the population.

Similar view is also shared by Johan Galtung, who argues that the privileged in the developed nation would cooperate with the elite in the dependent nation to dominate and control the majority of the population. He moreover professes that self-reliance is the only solution for development (Bongartz/Dahal 1996, p.9).

Amin put forward stricter approaches like de-linking or revolution since he did not see any possibilities for developing countries under the global capitalistic system. Advocating urgent need for de-linking, Amin argues "development of the countries on the periphery of the world capitalist system must therefore come through as essential rupture with that system, a 'de-linking' or refusal to subject national development strategy to the imperatives of worldwide expansion" (Amin 1990, p.62).

The whole theory on economic development does not include any discussion on limited resources: "for this mighty and violent transformation of society and nature, an energy source had to be exploited.....Currently, there is as much fossil fuel burnt every year as has been stored up in a period of nearly a million years. The lion's share, approximately 80 per cent, is used in the industrial countries....The allegedly highly productive industrial system is, in reality, a parasite on earth, the likes of which have never before been seen in the history of humanity" (Ullrich 2005, p.279-280)

Where is Nepal in this international context?

Reviewing the situation of Nepal during the first international decade of development in the 1960s, it must be stated that the reasons for underdevelopment cannot be linked to the Dependency Theory as the problems were home made.

"And above all, while the outside world had undergone the kaleidoscope of changes, Nepal was relegated to a position of isolation and stagnation well over a century under the autocratic Rana regime...... The concept of welfare and development was, then, not only alien but totally anachronistic" (Shrestha 1990, p.2).

In the 1950s, Nepal achieved internal freedom from the autocratic regime while the neighbouring nations received their freedom and independence after centuries-long colonization. Breaking the isolation of Nepal from the external world after one century must be seen as the first step towards modernization, which also means acceptance that endogenous factors were the main obstacles for development.

Economical, social, political and mental modernization are considered as basic requirements to overcome the situation by "Modernization Theory", but the countries were facing different major economic indicators, showing Nepal lagging far behind:

| Indicators | Myan mar | Sri Lanka | India | South Korea | Philip- pines | Pakis- tan | Thai- land | Nepal |
|---------------------|-------------|--------------|-------|----------------|------------------|---------------|---------------|-------|
| Origin of GDP (%): | | | | | | | | |
| -Agriculture Sector | 43 | 53.6 | 50.6 | 42.8 | 42.8 | 59.2 | 46.5 | 65.2 |
| -Non-Agric. Sect. | 57 | 46.4 | 49.4 | 57.2 | 57.2 | 40.8 | 53.5 | 34.8 |
| Distribution of | | | | | | | | |
| Labour Force (%): | | | | | | | | |
| - Agriculture | - | 59.2 | 73.9 | - | 71.8 | 79.5 | 85.8 | 93.4 |
| - Industry | - | 11.6 | 9.9 | - | 8.9 | 7.6 | 2.4 | 2.2 |
| - Services | - | 29.2 | 16.2 | - | 19.3 | 12.9 | 11.8 | 4.4 |
| Transport | | | | | | | | |
| Infrastructure per | | | | | | | | |
| 1000 Population: | | | | | | | | |
| - Km of Highway | 8 | 25 | 11 | 13 | 14 | 12 | 4 | 0.6 |
| - Km of Railway | 0.056 | 0.162 | 0.13 | 0.133 | 0.043 | 0.136 | 0.168 | 0.015 |

 Table 1.1: Transnational Comparison of Selected Economic Indicators in 1950s

 (Shrestha 1990, p.4, edited by author)

The Modernization Theory considers the traditional structures of a society with despotism, bureaucracy, feudalism, corruption, tribalism, ethnocentrism and religious phlegm as the main obstacles for development progress and so external assistance should initiate the reforms expecting to result in economic changes that would then go hand in hand with social and political changes.

Development in Nepal in the 1960s through modernization would follow theorists like Rostow through various stages (University of Bristol 2005, printed from internet on 16.11.2005):

Stage 1: Traditional Society

This signifies a society in which the economy is based on subsistence labour-intensive activity, mainly in agriculture, with output that is consumed rather than traded. Trade is carried out by barter to exchange goods directly for other goods.

Stage 2: Transitional Stage (preconditions for take off)

This stage accounts for more trade through increasing specialization that generates surpluses besides own consumption. Improved transport infrastructure supports trade and consequently incomes, savings and investment grow causing entrepreneurs' emergence.

Stage 3: Take Off

More workers shift from agriculture to manufacturing as industrialization increases. "Growth is concentrated in few regions of a country and in one or two manufacturing industries. The level of investment reaches over 10% of GNP. The economic transitions are accompanied by the evolution of new political and social institutions that support the industrialization. The growth is self-sustaining as investment leads to increasing incomes that in turn generates more savings to finance further investment."

Stage 4: Drive to Maturity

This stage involves diversifying of economy, thus producing new type of goods and services. Likewise, technology and innovation provides investment opportunities.

Stage 5: High Mass Consumption

Economy reaches mass consumption and production stage, and the service sector becomes increasingly dominant.

This kind of big push has not come for Nepal. "In terms of Rostow's stages of economic growth, Nepal in the early 1950s bore all essential attributes of a traditional society preceded by a stage of transition when the necessary pre-conditions for economic take-off were developed" (Shrestha 1990, p.3).

The government of Nepal instituted a series of development plans to articulate the rationale, objective and means of development to be achieved during specific time periods.

The First Plan (1956/57-1960/61) was essentially a preliminary attempt to give some direction to the development process. It had a goal "to raise production, employment, standards of living and general well-being throughout the country, this opening out to the people's opportunities for a richer and a more satisfying life" (Guru-Gharana 1996, p.13). However, it was not more than "merely a collection of isolated projects having, therefore, no functional relationship... industrialization was conceived more as a matter of running a few factories than as a process of economic development...." (Shrestha 1990, p.74)

Similarly, the Second Plan (1962-65) had the objectives of improvement in standards of living of the people, increase in production and employment opportunities, provision of social services, justice in income distribution and gradual reduction of social and economic inequalities (Poudyal 1983, p.7).

Up to the Fourth Plan, the efforts toward modernization took the form of building up physical infrastructure, particularly transportation and communications (Poudyal 1983, p.9).

Regarding the phases of modernization, it must be stated that after the "Traditional Society" stage, an attempt on "Transitional Stage" as preconditions for take-off with emergence of transport infrastructure to support trade did not really succeed for the country as a whole. And it was also not followed by the third stage of "Take Off" with workers switching from the agricultural sector to the manufacturing sector although the fifth Plan, launched in 1975, gave way to 'people-oriented production and maximum utilization of manpower' and emphasized on labour intensive projects (Poudyal 1983, p.80-83).

By the times the sixth and seventh plans were formulated (1980-85 and 1985-1990), the poverty alleviation and human development objectives had almost fully taken shape under the framework of the 'basic needs' approach with emphasis on programmes that generated employment, mobilized people's participation in local development and encouraged private sector participation. The enthusiastic follower concept at that period was United Marxist-Leninist (UML) government's 'Build Our Village Ourselves' programme which did not get translated into action (Guru-Gharana 1996, p.14).

The Eighth Plan, which was launched for 1992-97, after an interim year of multi-party government, had the broad objectives of sustainable economic growth, alleviation of poverty, and reduction of regional imbalances. During this period, there was a major shift of policy recommendations of the major donors (in particular the World Bank and UNDP) from structural adjustment, and growth towards poverty alleviation and human development at the international level. This fact was substantiated by major reports in 1990, UNDP's Human Development Report and World Bank's World Development Report, which explicitly focussed on poverty (Guru-Gharana 1996, p.14).

The Ninth Plan (1997-2002) also encompassed the same broad objectives as the Eighth Plan (NPC 1998, p.597-598) giving greater emphasis to poverty alleviation and employment generation and also recognized the importance of renewable energy technologies (RET) in the overall context of national development, especially to fulfil energy requirements of rural areas and to protect the environment.

The government has come up with several strategies and programmes for the development of rural sectors:

• The fundamental goal of developing rural energy systems is to boost employment opportunity, which develops a sound economic foundation and enhances living
standards of rural people. Environmental sustainability is to be also maintained in the local area.

- Traditional sources of energy are to be gradually replaced by indigenous sustainable alternative sources. Far remote areas that are not connected to the national grid and have depleted biomass are to get priority for development and promotion of alternative energy technologies.
- Necessary arrangement is to be made to provide for research, information flow, training and financial services in a way that makes market economy and people's active participation meaningful for rural energy development.
- The commercialization and expansion of rural energy technology is to be carried out in a planned way; thus reducing external dependency for energy (NPC 1998, p.597-598).

Looking back at the periodic development plans, the changing emphasis in planning indicates that planners are not quite sure regarding the choice of relevant strategy for overcoming the problem of under-development and poverty of the people. In each case, the emphasis seems to be have been influenced by changes in other parts of the globe as well as the interest of foreign aid donors.

Analysts like Pye studied the relationship of modernization and structural differentiation and already stressed in 1965 (Pye 1965, p.2-23) that "development involves structural differentiation, equality of citizens and capacity of political system". Similarly, on the same note, Huntington remarks that modernization is a "many-sided process involving changes in all aspects of human thoughts and activity...at the psychological level, modernisation involves a basic shift in values, attitudes, and expectations.... Socially, modernisation tends to supplement basic groups whose roles are vaguely defined, such as the family, with deliberately organized groupings in which role functions are much more definite..... Economically, there is a differentiation of activity, as few simple occupations are replaced by complex ones; the level of occupational skill rises significantly; the ratio of capital to labour increases; agriculture merely to feed the farm family is replaced by agriculture designed for a market; and agriculture itself declines in importance compared with commercial, industrial, and other non-agricultural activities." (Huntington 1968 in Bongartz/Dahal 1996, p.5-6)

Considering those targets and looking at the results of economic growth and structural transformation in Nepal over the five decades, it must be regarded as a story of failed development. The indicator of Real GDP Growth Rates remained extremely low

throughout the last decades with 3.4% for a 25-year period from the mid 1960s to the beginning of 1990s (Panday 2000, p.48).

| Periods | Total % | Agriculture % | Non- Agriculture % | |
|-----------------|---------|---------------|-----------------------|--|
| 1975/76-1979/80 | 2.37 | -1.05 | 8.13 | |
| 1981/82-1984/85 | 4.71 | 5.84 | 3.04 | |
| 1985/86-1989/90 | 4.80 | 4.10 | 5.54 | |
| 1990/91-1994/95 | 5.02 | 1.55 | 8.06 | |
| 1995/96-1997/98 | 3.98 | 3.22 | 4.52 | |

Table 1.2: Real GDP Growth Rates (Panday 2000, p.48)

The Gross Domestic Product by sectors of origin also clearly shows the slow structural changes:

| Periods | Agriculture % | Industry % | Services % |
|-----------------|---------------|------------|------------|
| 1985/86-1989/90 | 49 | 16 | 35 |
| 1990/91-1994/95 | 44 | 19 | 37 |
| 1995/96-1997/98 | 41 | 20 | 39 |

 Table 1.3: GDP by Sector of Origin

(Panday 2000, p.51, edited by author)

Panday characterizes the situation of the manufacturing sector as the weakest because its share in GDP could not cross the 10% mark within more than 30 years from 1965 to the end of the 1990ies (Panday 2000, p.51). Main reasons were the highly protective regulations for national products (mainly against goods from India) which resulted in a structure that was diverted into unproductive activities. Likewise, even the positive impression of more than one-third of the GDP coming from the service sector has to be re-questioned because it is mainly related to development assistance financed by foreign donors and, therefore, is not a sustainable base for progress.

At the same time, due to existing backwardness of the rural areas, development theories justified the 'trickle-down-effect' expecting that investment in a few key areas would cause a wide-spreading economic development. Bongartz/Dahal cite John K. Galbraith who totally disagreed with this idea as, "....feeding more oats to the horse in the hope that a few more grains will be left for those who pick scraps from the manure" (Bongartz/Dahal

1996, p.7). Panday doubts that "the currently popular economic wisdom that economic growth will automatically ... facilitate poverty alleviation is predicated on such possibility" and for the situation of Nepal "...whether a rate of 5% growth in the aggregate is sufficient to trigger the trickle-down mechanism." (Panday 2000, p.52).

Economic growth experiences in developing nations indicate that "economic growth policies have led to a dual economy, which provides considerable benefits for a sizable part of the population – civil servants, favoured farmers, and industrial workers – but allows the underprivileged majority to share very little (if at all) in the new prosperity" (Grant 1973, p.43).

Similarly, experiences proved that instead of equal development within a society or country, only dualism of development was achieved with increasing disparities in the society. Expectations that benefits of modernization and increase in productivity would 'trickle down' to the indirectly involved parts of the population, including rural people, remained unfulfilled. It also ignored the potential of development of the entire rural community. Therefore, another area of concern regarding modernization was that the focus given to industrialization was only in the urban areas. Not surprisingly, during the 1970s, modernization concepts did not find much success in developing the Third World countries.



Uncertainties also remain for a country, like Nepal at that time, that income disparity between the rural and urban areas lead to urban migration that could balance the economy of scarcity, lead to more labour in urban areas and better income/employment in rural areas and finally leading the economy to development path (Bongartz/Dahal 1996, p.7-8).

1.3.2 Where is Nepal now?

The result after 40 to 50 years of development planning in Nepal is disappointing or even disastrous and it must be accepted that the attempt at economical, social, political and mental modernization of the society has failed thus far, as the following examples illustrate:

A.) The economic data of the country indicate that in 2004, the Gross National Income (GNI) is US\$ 6.5 billion, and estimated per capita is at about US\$ 260 (World Bank, 2006, p.293). Life expectancy at birth is 60 years (both male and female); and adult literacy (% ages 15 and older) is 49% (World Bank 2006, p.293). The economy grew at five per cent a year between 1990 and 1997. Agriculture is the mainstay of the economy that contributes about 40% of GDP, and is the primary source of employment (World Bank 2006, p.297). The transnational comparison between Nepal and other Asian countries shows that, even after 50 years, Nepal is lagging far behind under socio-economic aspects.

| Indicators | Myan- mar | Sri Lanka | India | South Korea | Philip- pines | Pakis- tan | Thai- Iand | Nepal |
|-----------------------------|--------------|--------------|-------|----------------|------------------|---------------|---------------|-------|
| GNI per Capita in US\$ | - | 850 | 470 | 9930 | 1030 | 420 | 2000 | 230 |
| PPP \$ | - | 3510 | 2650 | 16960 | 4450 | 1960 | 6890 | 1370 |
| Life Expectancy at birth | 57 | 74 | 63 | 74 | 70 | 64 | 69 | 60 |
| Female % of labour force | 43.4 | 36.9 | 32.5 | 41.8 | 38 | 29.5 | 46.2 | 40.5 |

Table 1.4: Transnational Comparison of Selected Indicators (2002)(CBS 2005, p.457-459, edited by author)

Meanwhile, Nepal's economy is dominated by India through an open border system with customs-free import of Indian goods including free labour permits and repressive transit regulations for export/import of goods for/from Nepal to/from Indian seaports. The country imports almost twice as much as it exports (FNCCI 2003, p.185). The main imports are gold, petroleum products, transport equipment, machineries and fertilizers. Major import

partners are India, China, Singapore, Indonesia and Saudi Arabia and major export countries are India, USA, Germany and U.K. (Trade Promotion Centre [TPC] 2006, printed from internet on 08.05.2006).





Another unique example is a dam construction, which was built by the Indian Government on Nepali land bringing water for irrigation from Nepal to India while farmland in Nepal is left without water.

Nepal still receives significant bi-lateral and multilateral development assistance accounting to almost 9% of its GDP but, it does not (as already discussed) contribute towards sustainability of the service sector.

B.) Education: One of the national goals of education is to "develop, preserve, and extend such learning and science, technology and skill development, which are necessary for the development of the country and for producing a cadre of skilful workers and technicians to shoulder responsibilities in every area of national development." The document clearly sets forth a thrust for science and technology and skill development in Nepal's education system.

In pursuance of the committed policy of the Government in making primary education accessible to all children of age 6-10 by the year 2000, the enrolment ratio for primary, secondary and tertiary education in 2001/2002 was 55% female and 67% male (UNDP 2004[2], p.219).



However, comparing Nepal's literacy rate with other Asian countries, it still not only has the lowest ratio but also has the highest inequality in education between female and male (26% female and 62% male). The inequality in education between female and male is not significant in countries like Myanmar, Sri Lanka, South Korea, Philippines and Thailand although the gap is quite significant in case of Pakistan and India from the above illustration.

The under-representation of women in the political and decision-making positions in government and administration is quite evident in Nepal. The political parties have only conceded to "at least 5%" women candidates for the parliamentary elections, thus leaving the women behind without big opportunities (just as in other spheres like income, employment opportunities outside the household sector, etc.) (Pandey 2000, p.84-85).

C.) Cultural values and social conditions are other obstacles. Reviewing the historical past of Nepal, it was noted that although King Jayasthiti Malla (Malla Dynasty before the present Shah King Dynasty) was considered a reformist, he had done great damage to the society by enforcing the caste laws and even forbidding the adaptation of any other profession other than the profession allocated by one's caste (Ranjitkar 1996, p.141). Although the importance of values and attitudes for socio-economic changes was justified by modernization theorists, it is also deceptive to believe that development cannot be achieved with traditional values (Bongartz/Dahal 1996, p.12). The gender bias against women is a well-known historical and social legacy of our society (Pandey 2000, p.84). Social life and cultural values, especially for women, have not changed and are still consistent with the prevailing religious beliefs and local traditions. The status and role of women in Hinduism and Buddhism, the main religions of Nepal, is in many ways respectful. Hindus even deify and worship the Female Principle Shakti (power) but, on the other hand, despise the "real flesh and blood woman" (Brydon/Chant 1989, p.39). There is a Nepali saying "let it be later, but let it be a son" (Shrestha 1994, p.8), which clearly indicates the preference for male child in the society that is as strong as ever (Pandey 2000, p.84). "The Hindu religion dictates that women should never be allowed to have independent lives and always to come under the jurisdiction of a man. Women are supposed to be so devoted to their husbands that...... sati, a custom whereby widows were required to throw themselves upon their husband's funeral pyre was widely practised....Although sati has virtually died out, once widowed, a woman's life is still severely restricted......" (Brydon/Chant 1989, p.40).

However, "in Buddhism, there is no caste structure. Buddhists believe in respect for all living things and the religion is ostensibly far more egalitarian than either Hinduism or Islam, in both social and sexual terms..... However, feminity is seen to act as a hindrance to women's attainment of nirvana (blessedness or enlightenment) and the *Bhikunni* (nun) is accorded lower status than her male counterpart, the *Bhiku* (monk)..." (Brydon/Chant 1989, p.41).

The fact is that "at all levels of poverty, a girl child works harder than a boy child" and girls above the age of 10 in poor rural households are engaged almost full time for domestic labour in agricultural farm and within the household helping their mothers (Pandey 2000, p.84).

The question remains: why did development fail in Nepal?

<u>Firstly</u>, it can be agreed with Menzel (Menzel 1992, p.43-44) that whatever development definition or strategy was taken, the results after four decades of international development assistance are disappointing or even disastrous – not only for Nepal.

Likewise, what Streeten stated is still valid: that development does not mean industrialization alone but it is at least a very essential aspect of development and "to rise above poverty, industrialization is necessary; for industrialization means the application of power to production and transport. Output and consumption per head can rise towards levels only with the help of mechanical aids. In this sense, development, including rural development, is industrialisation....It must, of course, be growth that benefits the right groups" (Streeten 1981, p.193-194).

<u>Secondly</u>, many doubted in the capacity of developing countries for a steady selfsustained growth because of the soft policies of the states. The importance of strong policies was already highlighted when Myrdal remarked that power base must be modified and efficient legislation enforced through structural reforms in developing countries (Myrdal 1970, p.211-251). In Nepal unfortunately, neither a rigid autocratic policy under the Rana regime nor the elected national government could succeed. The main reason is that either political power was misused in a way not serving the nation (like Rana regime) or political power was too weak, incapable and corrupted and again not serving the society. Efforts have been made by the government and other sectors to fight against the main problem of poverty with the support of various multilateral and bi-lateral donors but it has done very little in percolating benefits to the poor whose numbers are constantly on the rise. Guru-Gharana (Guru-Gharana 1996, p.15) has already mentioned earlier the two fundamental reasons behind the lack of success of past development efforts as:

- lack of political commitment of the government reflecting mainly on its weak implementation of designed policies and programmes and,
- lack of proper understanding by donors about the "dynamics of poverty" in Nepal which is not simply the poverty of aggregate resources or lack of capital or poor infrastructure or even lack of technical expertise, which can easily be removed by capital and technical assistance.

<u>Thirdly</u>, the causes are deep-rooted in the very socio-economic, cultural and political structure of the country. Additionally and unfortunately, the behaviour and attitudes of the people in political power are characterized by greed, corruption, inefficiency, mismanagement of resources while the poor have virtually no participation in the process of governance.

Not only for Nepal but for other states also, it has to be accepted that reducing the problems is not possible through growth and expansion of economy alone (Bongartz/Dahal 1996, p.11). It also needs actions to reduce the extreme dependency through self-sustaining mechanisms. Nevertheless, difficulty persists as indicated by Ashoff when he states "...the concept of development based on the theory of growth, to which both the strategy of capital-intensive forward integration and the concepts of balanced and unbalanced growth, and even import-substitution to some extent, are committed, has proved increasingly inappropriate in past development decades because of the initial economic and social conditions and problems in most developing countries and, on the other hand, the social and political preconditions for auto-centric development are satisfied hardly anywhere in the world" (Ashoff 1988, p.39).

1.4 Development for Nepal: a Vision

Nobody can expect another theory anymore on how to bring development to a situation like that in Nepal. The failure of development in the country fuelled the birth of the violent "People's Movement" by the Communist Party of Nepal (Maoist) in 1996. Meanwhile, this armed rebellion has resulted in a kind of civil war against the political system.

The "People's Movement" has its own vision of development for Nepal by linking its programmes to basic political elements of Marx and Lenin (Communist Party of Nepal (Maoist) 2006, printed from internet 14.01.2006). "The rebels, who draw their inspiration from Peru's Shining Path movement, want to drive out the monarchy" (Rao 2005, printed from internet on 22.04.2006).

And a new constituency discussed during these days now makes the government as "Government of Nepal" and no longer "His Majesty's Government" – this might bring the final end for the last "Hindu Kingdom" in this world.

Demands (selected) of Communist Party of Nepal (Maoist):

(Communist Party of Nepal (Maoist) 2006, printed from internet 14.01.2006)

- "The domination of foreign capital in the sector of Nepalese industries, business and finance should be stopped.
- The invasion of imperialist and colonial culture should be banned. Vulgar Hindi movies, videos and magazines should be immediately outlawed.
- The invasion of colonial and imperial elements in the name of NGOs and INGOs in the country should be stopped.
- The property of brokers and comprador capitalists should be confiscated and nationalised. The capital hanging unproductively should be invested for industrialisation."

These demands are again following the idea of Dependency Theory with 'de-linking' or refusal to subject national development strategy to the imperatives of worldwide expansion. It especially aims against the dominance of India as economic and political imperialistic superpower.

In addition, the Maoist programme also shows a number of demands which had been neglected by former political forces like:

- "Patriarchal exploitation and discrimination against women should be stopped. The daughters should be allowed their access to paternal property.
- The right to expression and freedom of press and publication should be guaranteed. The government mass media should be made completely autonomous.

- Regional autonomy should be given to backward areas. There should be a balance between rural and urban areas.
- Local bodies should be empowered and equipped necessarily.
- Minimum wages for the workers in industries, agriculture and so on should be fixed and strictly implemented.
- Drinking water, road and electricity facilities should be provided to all villages.
- Domestic and cottage industries should be protected and promoted.
- Corruption, smuggling, black-marketing, bribery, commission and so on should be eliminated."

In order to obtain an answer for another vision of development for Nepal, a re-definition of typical country specific problems is required which (in the author's view) are mainly related to the rural society which still represents nearly 80% of the population with its characteristic subsistence economy, poverty and social stratification.

Scales and indicators are used by outsiders to identify development problems. But beyond this, it is worth to understand that people themselves might be unable to or, at least, do not reflect their own development situation.

Traditional values and beliefs pre-dominate the societies of the rural people. Combining this fact with a view on the country's limited natural resources except water resources from the Himalayas for production of energy from hydro power, the landlocked geographic situation between the two giants of China and India, and its scattered population in remote areas, there is no expectation of any big-push industrialization in the country, which had not even been able to exploit its own assets like the vast potential of energy in the form of hydro power that, at least, could be sold to the energy hungry neighbouring countries. Although Nepal has the potential of generating 43.000 MW hydropower, only 327 MW have been developed so far. Nepal's electricity consumption is amongst the lowest in the world at 42 kWh per capita per year and only 3% of the very poor have access to electricity (World Bank 1999, p.3) as compared to a recent survey showing that about 39% of the total household have access to electricity (Awareness Development Centre 2003, p.37).

Industrialized countries had their economic "take-off" more than two centuries back, only after energy technology was available in the form of water mills and later as steam engines for mechanization and industrialization. It is worth noting that the precondition for an industrial revolution, which started in Europe, was very different: mechanization and industrialization in conjunction with energy technology was the result of an endogenous centuries-long process of social, cultural, political, and economical development in Europe

and not the external entry point trying to 'seed' development. For rural people, it ended in leaving subsistence farming and migrating to cities, loss of rural home and cottage industries, and centralization of production sectors in urban areas (Bohnsack 1981, p.237-240).

In Nepal, the predominance of the rural sector is still unbroken, and characterized by its subsistence economy and low economic growth that largely explains the low level of energy consumption and the lack of productive sector of the country. This can be easily identified on the energy front as 90% of energy in Nepal is used for domestic purposes (with women as the primary managers of this energy) and about 91% of the total energy consumption is met by traditional forms of energy such as firewood (81%), agricultural residues (4%) and animal waste (6%) (Rijal 1999, p.107).

Therefore, to formulate a vision for development in Nepal in the midst of this situation, the following facts must be accepted:

- the world is moving towards more globalization and the era of countries and societies staying untouched by external impacts is ending,
- development goals and definitions have been "standardized" based on general indicators for all countries despite vast differences in culture, tradition, social systems and how people earn their living,
- even if there is no exclusive uninfluenced way of development for Nepal and although new development theories have not been developed over the last decades, there are a number of development goals which can be taken in consensus for the situation like Nohlen and Nuscheler (Nohlen/Nuscheler 1993, p.66) proposed in a "Magical Pentagon" with elements like



Illustration 1.8: Magical Pentagon (Nohlen/Nuscheler 1993, p.66, edited by author)

The interpretation of this Pentagon in the context of Nepal should mean:

<u>Development</u>, in the smallest common sense at least, means "changes" which should strive towards "betterment".

<u>Growth</u> should not be a simple quantitative economic growth of goods and services but must have qualitative standards like

- reduction of poverty
- preservation of the natural environment.

Even "sustainable growth" is not a guarantee for success as long as the causes for the problems of poverty are not eradicated. However, it can be pointed out that economic growth is a precondition for development with the main issue being who really takes benefit out of it.

<u>Labour</u> is a second main element of development and should be seen as a prerequisite to overcome poverty or at least to meet survival needs by individual efforts. This could mean "development by labour" instead of "labour through development" which was already initiated as a slogan by the International Labour Organization (ILO) in the 1960s.

Equality and Justice is necessary to prevent economic growth without social development. Development requires more than equality in distribution of surplus income in the society and equal access to resources that includes access to (public) resources like education, health, social safety, political participation as well as land and income. In traditional societies like that of Nepal, it also requires the abolition of gender discrimination, which presently keeps one half of the population (the women) "speechless" in this process and ultimately hinders development. Therefore, one important social goal must be abolishing inequality through gender discrimination, which is more related to tradition and lack of political willpower and less to economic forces.

<u>Participation</u>, as political element of development, demands for individual responsibility in decision taking as bottom-up strategy versus bureaucratic top down decision and interdiction where the target groups are taken as "objects" by autocratic-bureaucratic regimes. This requires a certain understanding of civil sense and social responsibilities that goes beyond the limitations of personal and individual interests.

Although these general goals of development can be easily agreed upon, people themselves might be unable to or do not reflect their own development situation in comparison to the outside world and therefore, not knowing whether, what or how to change the situation. This includes reflection on the social values of the system or the role of women in public life and also their voice in economically and politically men-dominated community affairs.

A vision for development in Nepal therefore must cover:

- awareness creation,
- change of attitudes,
- change of situation by its people with self-motivation and self-initiation,
- lead to fulfilling basic needs with income above poverty line, food, water, shelter,
- better access to health and education, social justice and equality.

So the more outstanding matter is to find suitable ways applicable in the Nepalese context to overcome deficits in creating awareness, in strengthening human capabilities and capacities, in decision-making and in reflecting social structures and traditional gender roles.

Highflying economical goals are no longer to be expected in the coming decades and so the emphasis is not primarily related to national economy and industrialization. The above-discussed vision also illustrates that it is better to start with the people itself, not predominantly with technology or infrastructure.

In contrast to the prevailing practices in development projects, the priorities therefore should be to put the people first and use related technology just as a tool, but not take technology itself as development.

Energy, in this context, seems to be no exemption, neither in academic theory nor in project practice: looking into the international papers and contributions to the World Congress On Renewable Energy 2002 (World Renewable Energy Congress VII 2002), only 31 out of the 994 papers were related to non-technical aspects like socio-economic impacts or human capacity building, a mere 3%.

The question of "modern" energy (electricity) plays an important role – in many countries, early evaluation in the 1980s of rural electrification projects via national grid extension revealed that such technical projects mostly failed although they were launched with high expectations. The main reasons attributed for such failures were:

- high investment cost of EUR 600,- per consumer (household) contributing to the national debts of developing countries,

- lowest energy consumption rates (<1 kWh/d per household and smallest load factors <0,2),

- high technical and non-technical losses (15 to 50 %),

- monthly tariffs not covering the running cost for operating and maintaining the grids,

- resulting capital shortage causing expensive load sharing with reduced production in the industrialized sector (cost about 1,- EUR/kWh),

- rural electrification not improving the rural economic situation

(GTZ 1992, p.3 and Rehling/Pradhan 2003, p.323).

On the other hand, it must be understood that rural life, with its traditional ways of energy supply, does not

- allow any comfort in daily life nor improved productivity,

- reduce physical work load,

- break the centuries-long way of living in the dark at night,

- provide access to information, media or technical communication.

In most of the villages in rural areas, the young generation migrates to urban centres in search of employment and "modern life". This results in only women, children and old people being left in the villages.

The relation between energy and development is also mentioned by international donors as, "more than half the world's population lives in rural areas, nearly 90% of them – some 2.8 billion – in the developing countries. The vast majority of these people are dependent on the traditional fuels of wood, dung and crop residue, often using primitive and inefficient technologies. For many, this combination barely allows fulfilment of the basic human needs of nutrition, warmth and light, let alone the possibility of harnessing energy for productive uses which might begin to permit escape from the cycle of poverty" (World Energy Council 1999, p.7).

Although energy is still not considered as a basic human need, it is a prerequisite for meeting all the basic needs such as food and health, and in the same context also agriculture, education, information, and other infrastructure services. It also shows clear correlation with the Human Development Index (HDI) (Rehling/Karcher/Pradhan 2004, p.1).



Based on this interdependency, it can be concluded that due to lack of energy, opportunities are hindered in rural areas for employment generation e.g. creating enterprises based on energy use - "among the key lessons learned in the provision of modern energy services in the developing world (particularly in rural areas) is that the services must give rise to greater productivity if they are to be sustainable. The facilitation of new productive activities is what creates sustainable livelihoods for poor people and makes the energy projects financially viable. Productive services include a wide range of activities such as agro-processing, transport provision, battery charging, and small-scale manufacturing. Very often, particularly in dry areas, power is needed for water pumping to support agriculture. Various options, ranging from manual and animal power to photovoltaics or wind pumps should be considered against the dual criteria of sustainability and affordability" (Khennas 2002, p.10).

Indeed, it is already accepted that energy and development are closely related and energy was a prerequisite for the breakthrough in industrialization, economy and productivity in the present industrialized countries. This interrelation of energy and development might have been the foundation for the view that "energy has many links with sustainable development, notably through productivity, income growth, environment, health,

education, gender issues, macroeconomic stability, and governance" (Morales/Johnson 2002, p.3).

In addition, there are always expectations related to income generating activities -"renewable energy technologies for decentralized electricity generation are commercially available and are successfully being applied in many developing countries. The choice of technology must be based on the needs and priorities of the local population. Supply systems should be designed to facilitate income-generating activities...... Subsidies to electricity consumers in rural areas are justified for equity reasons and should be independent of the supply technology. Additional subsidies for renewable energy can be justified for introductory periods." (Kjellström 2005, p.3).

Moreover, it is worth to recall that it is not working on its own as experience from various countries like Egypt, Ghana and Zimbabwe have already shown. "In general, economic and information / awareness barriers were the most important barriers across the countries and RETs (Renewable Energy Technologies)." (Painuly/Fenhann 2002, p.37).

Besides information and awareness, other major obstacles are found in economic potentials like small size of market, unfavourable policies, and subsidy to competing conventional fuels.

Furthermore, the World Energy Council highlights, "a further factor that constrains the effectiveness of decentralised planning is the lack of sufficiently skilled people to carry it out. Local agencies need to be provided with adequate human resources and skills to develop and implement decentralised rural energy plans and programmes." Important in this context is to produce national rural energy master plans and to move away from having foreign experts (World Energy Council 1999, p.101)

This finally leads to a vision of development for Nepal:

The vision of development for Nepal is

changing people's attitudes and awareness primarily in the rural areas to be motivated and capable to improve their own situation as a precondition to fulfil basic needs and to initiate economic growth using energy as a tool.

1.5 Hypothesis and Significance of the Study

Based on this vision of development, the challenge for Nepal is:

- How to motivate the people?
- How to initiate the process of development?
- How to bring positive changes to the majority of the people living in rural societies?
- Which strategies are to be taken to ensure that stakeholders are benefited from the development process?

For overcoming this, appropriate ways to mobilize the community, to improve the life situation, to combat poverty and social injustice including gender inequality ought to be explored.

Motivation is possible if results of development efforts are visible within a short period, not having to wait for generations. Therefore, motivation must be directly related to betterment of daily life, which is mainly dominated by working for food, energy and surplus income in a subsistence life.

As already discussed above, energy projects in rural areas seemed to be a failure because it was mostly not sustainable and also did not bring changes to the people.

Despite this experience, the option for energy is still assumed as an entry point for development with the difference that

- energy is not the development as such but is taken just as a tool,
- providing energy is not the end of development but conversely, just the entry point,
- energy is not seen as a technical project but a motivation for changing people's attitude and awareness, hence, energy ought to be combined with community mobilization,
- energy is not a totally technology orientated project but follows the target of "putting people first".

Based on these assumptions, the hypothesis of the research is defined as

Hypothesis:

For development of rural Nepal, "energy" is a tool for motivation and in combination with community mobilization, it is a strategy for sustainable development. Although studies have been carried out previously, a concrete analysis based on facts and researches on utilizing energy as a tool to initiate a sustainable way of development with emphasis on community mobilization has still not been done. This endeavour should contribute to the energy and rural development sector in the country.

The significance of this study is that it uses pre-project data: In many research programmes, one of the major problems confronting researchers is having no such reliable pre-project information. Due to this constraint, the analysis is normally based on assumptions, which do not present the real scenario of the project. On the contrary, this research benchmarks the situation before and after the intervention to help in giving a realistic picture for analysing the situation.

In that sense, the study will contribute significantly in the following context:

- Local/Community Context: It can contribute to identify the strengths and weaknesses of community initiatives, which helps the community to analyse their own situation (past and present). Based on this analysis, communities can plan their future actions to establish self-reliant and self-organized village based participation at grass-root level.
- 2. Regional Context: It can contribute to clear strategy and policy guidelines for development at the regional level. The study results will provide possibility for replicating the intervention i.e. at the district level.
- 3. National Context: It can contribute to policy guidelines based on practical experience and learning for sectoral development (i.e. energy, rural development) with suitable people's participation.
- 4. International Context: The research activity can contribute to formulate bilateral projects between national governments and international donors to more realistic and holistic aspects of technology-orientated programmes.

As a scientific research, it is an open-end result: the given hypothesis can be proved or disproved – nonetheless, lessons could be taken from the findings.

Chapter 2 Research Structure

2.1 Basic Information of the Project

A solid database is required with reliable data of a development process in one or more rural communities to prove or disprove a given hypothesis. As this kind of process is undergoing for mid and long term, it is recommended to identify pre-project baseline data of the project areas that can be compared with project related data showing the impacts after some years of implementation.

The main problem in this kind of research is that pre-project baseline data are hardly taken by project donors, programme planners or development workers. Especially for this study, it was a kind of unique chance that baseline data could be taken by the project and the author followed by a continuous process of data collection during and after programme implementation. The project started in 1996 as part of United Nations Development Programme (UNDP), financed and implemented together with the Government of Nepal under the programme name "Rural Energy Development Programme (REDP)", which was later co-financed by World Bank also. The pre-project baseline data was taken in 1997/98 with the intention of following up with the collection of post-intervention data at about two years' intervals. As a result, the second round data was taken in 2002 and 2003 and the third data collection was carried out in 2004. The information contained in the first two rounds should allow for an assessment of initial impacts while the final third round survey after five years should not only give a picture of change but also provide first hints on the sustainability of the programme.

The project was launched in 25 districts of Nepal in village communities (known as Village Development Committee [VDC] in Nepal). Details of the project are provided in Chapter 3. Out of these 25 districts, a representative sample of six VDCs with 30 to 100 households each in four different districts were selected with the potential of sufficient and reliable data.

2.2 From Hypothesis to Research Design

2.2.1 Antithesis through Comparative Studies

Based on the formulated hypothesis, the main objective of the research is to find out the impact of community mobilization with motivation through energy in the rural community for sustainable development.

In order to justify the definition of the hypothesis in the first step, an "antithesis" is formulated to prove that *comparable projects with rural energy and technological focus without considering community participation/mobilization can easily fail.*

In this discussion, a number of latest field research studies from various countries with focus on rural energy are taken into consideration to prove the antithesis.

I.) Singh (Singh 2000) compared the situation in three villages of Nepal where same types of energy related project (hydropower) had been implemented. The main difference between them being the way the community was involved in decision-making and participation in the technical project.

a.) In the 1st village (Bhorletar), it was initiated from outside the village by "top-down" method. The result observed was "the author went to Bhorletar expecting the plant to be running since he was unaware that it was dysfunctional......In an interview with Mr..... who was a consultant on this project, he said that there was no commitment shown by the members of the village and hence when technical problems arose, no one showed any initiative(Singh 2000, p.91).

b.) In the 2nd village (Palpa), it was initiated by private entrepreneurship: "...the people were very closed and were not usually too willing to disclose information.....All of those surveyed, apart from one mill owner, indicated that they have not realised any extra profits since they started receiving electricity. This is very difficult to believe.....'With the lights, I can keep my shop open for an extra 1 to 2 hours per day'. Another was quoted as saying: 'this started as a little tea shop and has now grown into a restaurant'." (Singh 2000, p.91).The technology was not taken as an opportunity to develop the community. The project only served a minority of the villagers while the majority did not feel related to the project as such because it belonged to a private entrepreneur.

c.) In a 3rd village (Piughar), it was commenced with community mobilization. It was possible to investigate the impact under different aspects like agricultural output and work load of women (Singh 2000, p.64-67).



The agricultural production was increased by 50% with improved farming methods and irrigation facilities while the workload of the women was reduced.



Although the number of activities had increased, the total number of working hours had decreased by 17%. Major time saving was observed in "household cleaning" by 20% because it was made easier by lighting and also by the 'general cleanliness' approach adopted by the village.



Singh has concluded that the holistic approach of community mobilization promotes 'thinking' in the society. The community "is given the tools and the 'know-how', and a sense of belonging to the system such that they know what is demanded of them in order for their lives to continue to improve.....It is impossible to say that the system...is without problems....but what the author noticed ...was that the villagers were always willing to try and try again." (Singh 2000, p.92).

The findings of the project are comparable with similar studies carried out in Indonesia, Philippines and Vietnam.

II.) Notosudjono (Notosudjono 2000) conducted a study for the Ministry of Research and Technology (BPPT) in Indonesia. The experience with rural development projects showed typical problems related to acceptance and participation:

 energy related projects for rural areas were technology-based and not related to integrated rural development initiatives,

- the monopoly of the government-owned energy company was economically inefficient and bureaucratic,
- the projects were 'top-down' organized by centralized governmental structures without participation of the rural communities.

By tradition in islands like Bali and East Timor, the rural communities have their own traditional social system to take community based decisions and working together. Projects implemented by external organizations are not accepted as part of the village community and so the responsibility for operation, cost, etc. is not felt to be with the villagers. Based on this negative experience, new ways of community mobilization, organization in the villages and responsibility of villagers were required to overcome the failure of projects.

III.) Similar results were found by Garcia (Garcia 2002) in the Philippines. The project, financed by foreign donors in 1989, was a solar energy system for electricity by decentralized mini-grid system in the village.

It was shut down in 1994 because of:

- high cost of operation and maintenance,
- no allocation of funds for operation,
- non-reliability of the technical system,
- insufficient revenue generated by the power plant for maintenance.

In a second attempt, the project was implemented by Goal Oriented Planning Workshop (GOPP) to find out the felt needs of the people. Besides various other activities like improved pathway to the village, small Solar Home Systems (SHS) were installed to provide low-power electricity from solar modules for small electric devices (light, radio, TV, fan). The resulting changes in the village after 7 to 8 years were quite considerable:

Social impacts:

- Modernization of household facilities as transport of material was possible because of better pathways,

- efficient lighting at night as well as communication by radio and TV bridging the gap between city and rural life,

- enhancement of social activities in the village with entertainment, village meetings, etc.,

- establishment of Solar Owners Association paved the way for people's organizational maturity.

Economic impacts:

- Extended time for economic activities like mat weaving, livestock raising, etc.
- monetary savings for kerosene because SHS is cheaper
- savings for dry cells which were used for radios and now replaced by SHS

- establishment of Consumers & Credit Cooperative for aiding the users in case of financial problems.

IV.) Pradhanang (Pradhanang 2002) carried out a research in Vietnam. The Ministry of Agriculture and Rural Development installed a village based energy project to provide electrical power to four villages via a low voltage grid in 1991. After installation, the project was handed over to the Communal Agriculture Collective for the management and operation.

The Collective operated the unit for only around 15% of the time between 6 pm and 10 pm every day. After six years, the project was closed down because:

- technical operators were insufficiently prepared due to lack of effective maintenance training, tools, spare parts or follow-up support,
- the management contributed to the failure. Revenues from power sale were banked in a communal account, which was managed by the Agriculture Collective. The funds were used to pay for projects unrelated to the system and money was not available when maintenance or repairs were required,
- quality of power supply was low so the system lost paying customers and income revenue,
- effective external support for technical, managerial or financial issues were not available for the project (Pradhanang 2002, p.33).

Again in 1999, financial funds were provided by external donors to refurbish the technology for the project, which was then revived in 2000.

Nevertheless, the success of the project was not visible because of the following selected findings (Pradhanang 2002, p.86):

Social Issues:

- No participation of households in decision-making process,
- most of the households spent < 1% of their income for electricity,
- most of the households consumed <15 kWh electricity per month,
- women were not involved in the scheme,
- lack of know-how or skills.



Institutional Issues:

- The concept of managing the plant under industry cooperative framework was not applied yet,
- there were no follow up and support for the community after project establishment.

Technical Issues:

- Operators were not able to maintain the logbook,
- protective measures in household wiring were not found (i.e. no fuses),
- operators had to go to the centre for repair works in workshop,
- no monthly maintenance inspection records,
- beneficiaries were not satisfied with the supply of electricity and wanted 24-hour electricity.

Financial Issues:

- The tariff rate was 700 VND/kWh but many households were paying 800 VND/kWh,
- most households were paying tariff on meter basis but some houses were still paying flat rate,
- there was no penalty for those households who did not pay since 2 months,
- there was no bank account for the revenues.

"Na Bo refurbishment project looks like a technical demonstration programme. There was no support for the community after the project establishment. Participation, empowerment, transparency and accountability, which are the preconditions for sustainability of a plant, was almost non-existent in Na Bo." (Pradhanang 2002, p.89).

V.) A comparable project based on private entrepreneurship was carried out in Laos. "Over the past five years, a team of Lao experts has been training small companies to become village energy service specialist to work in areas not due for electricity grid connection. The companies offer a choice of electricity supply technology, so that there is a solution for each village. Most villages have chosen solar home systems (SHS), but as the companies begin to work in the remoter cloudy and hilly areas, more villagers are choosing village scale hydro systems..... If repayment performance is good, reliability is good. The prescribed delivery system has a repayment performance from consumers of over 95%, the shortfall being acceptable late payments rather than defaults. 3,000 villagers are receiving "every night, light" some already for four years." (Harvey 2004, p.1).



This project was described as a success story. In one village, for example, using Solar Home Systems the people brought the weaving looms upstairs so that they could work at night to gain extra income, which paid back the cost of the solar technology and weaving materials even saving additional money for the family. In another village with hydro power supply, families produced baskets at night time to pay the monthly hydro tariff and to have surplus income.

The proof of long-run economic sustainability was not answered. But at least, technical responsibility was clearly managed. Aspects of a further going holistic developments are not provided.

VI.) Sherchan (Sherchan 2002) compared two project sites in Nepal where technology was implemented: firstly, by Community Mobilization (village of Nayagaun) and secondly, by private entrepreneurship (village of Sarada Batase).

The following graphs (Sherchan 2002, p.46-61) showed main remarkable differences related to project implementation strategies.











Comments of the villagers in these two places showed totally different understanding of their own role related to development, their own initiatives and responsibilities and therefore, it is a typical example to stress out the

- interdependence of technology and society,
- role of community mobilization for development,
- importance of community mobilization for sustainability of development projects.

At the same time, all examples give an idea of useful strategies and indicators for sustainability of projects at the local level.

VII.) This following investigation was carried out in a village named Yingui (Amanwi 2005), with some 500 households, in the Nkam Division of the Littoral Province of Cameroon in the year 2004. Primitive non-mechanized subsistence farming is the main source of livelihood in the village similar to that in other developing countries including Nepal. The Yingui village was without electricity for the past decades with major sources of energy for lighting being kerosene, fuel wood, batteries and dry cell. In 2001 and 2002, two diesel generators were installed for supplying electricity to only 7% of the households in the village. The whole project was done for political reasons to fulfil the promise of rural electrification. Only limited household could afford to have access to electricity. After project implementation, the major problems faced were:

- lack of finance for running the affairs linked to the management of the generators,
- lack of technicians who could intervene in the operation of the generators,
- poverty on the side of the inhabitants made it difficult to be connected to electricity and pay the monthly tariff.

The research was mainly focused on the impact of rural electrification on social life especially on communication, education and health. Those villagers who could use electricity seemed to have good access to radio and TV for communication. Further improvements in education had mixed reaction as the children spent more time for entertainment rather than for studies (Amanwi 2005, p.48).

The final interpretation of the "antithesis" of evaluated projects is that energy related projects WITHOUT community mobilization do not provide a base for sustainability.

It is also significant that additional perspectives of development as such are not part of those programmes: energy related projects are typically related to "technology transfer" and not to a holistic outlook of development.

2.2.2 Study Objectives and Research Design

To prove or disprove the hypothesis, a broader aspect - related to the already figured out problems of Nepal - of quantifiable impact on people's awareness and community based initiatives had to be analysed.

This required an in-depth study in several appropriate project sites, where energy projects with community mobilization were implemented, to fulfil the following **Objectives**:

- 1. Identification of currently existing problems especially related to economical, environmental and social issues in selected places of rural Nepal.
- 2. Analysis of the impact of energy through community mobilization on the rural society.
- Formulation of a rural development paradigm with special focus on energy, mobilization of human and local resources as well as development of social capital.

In accordance with the study objectives, the **Research Questions** are devised as:

- 1. Is energy a suitable tool for community mobilization in a rural society?
- 2. Can community mobilization initiate and support sustainable development options?
- 3. How do different interest groups perceive development interventions?
- 4. Which groups in the community are being included or excluded from development benefits?

Research Design

There are different ways to design a research. Knowledge claim by Creswell purports that researchers start a project with certain assumptions on how and what they will learn during their inquiry, and thereby discussed four schools of thought (Creswell 2000, p.6):

- post-positivism (determination, reductionism, empirical observation and measurement, theory verification),
- constructivism (understanding, multiple participant meanings, social and historical construction, theory generation),
- advocacy/participatory (political, empowerment issue-oriented, collaborative and change-oriented),
- pragmatism (consequences of actions, problem-centred, pluralistic and real-world practice oriented).

The research conducted for our purpose falls under pragmatic knowledge claims as it (pragmatism) arises out of practice oriented actions, situations and consequences rather than antecedent conditions (as in post-positivism) (Creswell 2000, p.11).



This study is not committed to any one system of philosophy or reality as the world is not an absolute unity. Both qualitative and quantitative data have been used because they provide the best understanding to a problem, looking at "what" and "how" to research, in accordance with its intended outcomes, following Cherryholmes in Creswell: "Pragmatists believe that we need to stop asking questions about reality and laws of nature" (Creswell, 2000, p.12).

"Research in pragmatic tradition, however, seeks to clarify meanings and looks to consequences..... Values, aesthetics, politics, and social and normative preferences are integral to pragmatic research, its interpretation and utilization." (Cherryholmes 1992, p.13).

2.3 Research Method: Mixed Methods Approach

The spiritual and religious heritage of Nepal gives the background for the selected research methodology - Nepal is a religious country with an overwhelming majority (about 86% of population) of Hindus while the second largest religious group, about 8%, are Buddhists (CBS 2000, p.6). Hindus and Buddhists use the "Mandala" as a symbol of universe.



The Mandala was compared by Creswell (Creswell 2000, p.xix) to the creation of a research design because both creations require looking at the whole picture concentrating on every minute detail. A Mandala made of sand can take days to create because of the precise positioning of the pieces, which sometimes are individual grains of sand. The interrelatedness of all parts of a whole, as shown in the Mandala, gives a complete outline and illustration of the total. Reflecting it to the research design, each element shapes a complete study.

Creswell conceptualized Crotty's model (1998) to address three questions to design a research:

- knowledge claims,
- strategies of inquiry,
- methods of data collection and analysis.

Considering this, a mixed method approach was seen as a suitable methodology for this research. The methodology includes predetermined and emerging methods as well. Both open-ended and close-ended questions are formulated to obtain multiple forms of data drawing on all possibilities. Finally, statistical as well as text analysis is carried out.

Mixed method approach in a single study is relatively new compared to the traditional quantitative or qualitative approach. According to Creswell, the concept of mixing different methods originated in 1959, when Campbell and Fiske used multiple methods to study validity of psychological traits (Creswell 2000, p.15). Their multi-method matrix were later encouraged to be employed to examine multiple approaches to data collection in a study (Creswell 2000, p.15).

As a result, approaches related to both qualitative data collection and quantitative data collection were combined. It is a known fact that every method has its own biases. Using a single method does not usually explain the overall picture. The combinations are also taken as an instrument to neutralize the limitations of one method by the others. Triangulating data sources was initiated as a means of linking both qualitative and quantitative methods (Creswell 2000, p.15).

Triangulation forms the basis for additional reasons for mixing different types of data. Greene, Caracelli and Graham argue that for instance the findings from one method can aid to develop and inform the other methods (Creswell 2000, p.16). Also, one method can be incorporated into another method to shed light on different levels or units of analysis. Similarly, the methods can also serve a transformative purpose to change and advocate for marginalized groups such as women, ethnic/radical minorities, poor, etc. is found by Tashakkori, Teddlie or Mertens 2003 (Creswell 2000, p.16).

As discussed by Miller and Salkind, the design for this research is mainly focused on four areas:

- research element,
- type of research setting,
- central characteristics and
- prospective outcomes.

The following figure (adopted in part from Miller and Salkind 2002, p.19-21) presents the overview of the research design in this context.



Illustration 2.13: Research Design (adopted in part from Miller and Salkind 2002, p.19-21)
2.4 Methodological Structure of the Research

The methodological structure of this research has been divided into five phases. The first phase, called conceptual development, includes literature revision (books, articles, issue papers, journals, magazines and internet publications) of information regarding various researches, studies and projects conducted in the field of rural energy development. The collected information was very useful to identify the core problem, formulate hypothesis, research questions and define the objectives of the study.

Subsequently, the second phase was focused on research design. In order to compare the impacts of energy through community mobilization on rural society before and after the intervention of energy projects, a pre-project baseline data is required. The pre-project baseline data, collected in 1997/98, was available for the selected research areas from the project. The questionnaire is mainly focused on quantitative data (see annex 1). The same questionnaire was used for post-project intervention data in order to compare the situation for this research purpose. In order to verify the quantitative data, a separate questionnaire was prepared based on qualitative data. The two, quantitative and qualitative, questionnaires give the whole scenario for impact analysis. Besides finalizing the questionnaires, contact and permission with concerned organizations, village development committees and district offices for conducting the field research was accomplished.

The third stage was focused on field research. The field research was completed at different periods of time. The second phase data collection in the selected village development committees was accomplished in 2002/2003 while the third phase data collection was carried out in 2004. During the field research, the related organizations, government offices and departments were visited and the latest secondary data and information were collected for the research purpose. Field trips were done in the selected Village Development Committees. The individual household survey was conducted with pre-structured questionnaires and interviews. Direct observation was also made especially on uses and functions of technologies, village environment, income-generating activities, community organization meetings, household environment, etc. Various focus group discussions on special topics were also conducted with women's and men's group separately as well as mixed group.

The fourth segment mainly comprises of data tabulation. All the information related to technical, economic, social and environmental variables were transferred in tabular format.

59

Finally, the fifth phase, called research synthesis, combines the information and results obtained in the previous four parts, verifying hypothesis, establishing conclusions and proposing recommendations for the further research projects related to the field study if required.

| 1st Phase | 2nd Phase | 3rd Phase | 4th Phase | 5th Phase |
|--|--|---|--|---|
| Conceptual Development • Literature Review • Problem identification • Hypothesis formulation • Research Questions formulation • Research Objective formulation | Research Design Questionaire Preparation Sample size Data source Data collection method Access to organizations and respondents Duration of study Temporal dimension Degree control over social system being studied | Field Research Secondary data and information collection Visit to research sites for survey Interviews Direct observation Questionnaire Focus group discussion with women Focus group discussion with men Focus group discussion with men | Data Analysis Data tabulation Quantitative data analysis, interrelation of the technical, economic, social and environmental variables Qualitative data analysis (descriptive method) | Research Synthesis Verifying hypothesis Thesis writing Formulation of Conslusions Recommendation |

Illustration 2.14: Methodological Structure of the Research (by author)

2.5 External Limitations of the Research

Locations:

Nepal has a very difficult geographical and topographical situation. The infrastructure, especially the roads for accessing the remote villages, is not developed. It takes minimum 5-6 hours of car drive and additional walking upto 3-4 days to reach remote villages. The village settlements were observed to be very much scattered. In most cases, almost a day's walk was necessary to cover the households of one settlement. Although the rural energy programme was implemented in 25 remote districts, due to difficult geographical situation it was not possible to travel to all 25 districts for the purpose of this research. Therefore, five villages in five districts were considered for this investigation purpose.

Political Instability:

As already described, the country was and is still facing political turmoil affecting everyday life of Nepalese citizens. The so called nationwide closure "Bandh", "Chakka Jam" in which no vehicles are allowed to ply on the roads, demonstrations, etc., was a daily happening in Kathmandu, Nepal. This kind of situation has disrupted all spheres of normal life and, needless to state, the research activities were also hampered due to forced restricted mobility of the author.

Effect of Insurgency in Remote Areas:

The Maoists were especially active in rural areas, creating terror and threat for people in all parts of Nepal. Abductions, kidnappings and forced recruitments in the Maoists' army were terrorizing the local life especially in remote rural areas.

"The Maoists are already running parallel administrations and re-education camps in about 40 of the country's districts, drawing a portion of their funding from blackmailing activities and forcibly recruiting young fighters in the name of their "people's struggle". One indication of just how pervasive the Maoists have become is this: when farmers see a shoe tied to the branch of a tree in front of their hut in the morning, they know that it means the Maoists have decided to recruit one of the men in their family for their cause." (Rao 2005, printed from internet on 22.04.2006).

In such conditions, taking data, conducting group meetings and participation of all groups was difficult. Even the safety of the researcher's life was threatened and the local people were having difficulties in protecting the outsiders. Therefore, several intended consecutive surveys at 2 years' interval were not possible in all places.

Sensitive Data:

Although several good baseline data were established before the energy project was implemented, the most sensitive data related to income were not possible to collect. People were very reluctant to discuss about their income. One of the main reasons was that the Maoists group was extorting money forcefully from the poor local villagers in the name of "donation to their activities". It was not appropriate in that situation to dig more into the financial condition of the household as the whole topic was too sensitive and perceived as a threat for the villagers. Therefore, indirect methods through observation of household conditions were employed to obtain the picture of economic situation.

Time Frame:

The last survey was planned for 2004 in all research villages but due to worsening political and security situation outside the capital, the intended survey could not be done in full extent. The author had taken risks by going to nearby villages to get the final observation and feedback from the village people. The research schedule had to be shifted several times due to uncertainty in the country.

However, besides having a lot of external difficulties and uncertainties as mentioned above, the author was able to collect empirical information as much as possible from all sources - direct, indirect and secondary - for completing the prolonged research activities.

Chapter 3 The Country and the Project

3.1 Country Data at a Glance

A summary of statistical data of the country is attached in the annex. However, for authentication of the research, special attention is given to the rural aspects.

Physical Setting

Nepal stretches 885 km in length (East to West) while it has a non-uniform width with the mean being 193 km from North to South. Within this less span of country's width, elevations range from 90 m to 8848 m. The subtropical "Terai" in the South up to 600 meters above sea level has 23 % of the country's total land area, supporting 49% of the total population; the "Hills", with a temperate climate and elevation up to 4870 meters represent 42% of the land area and 44% of the population; and the Mountains with 35% of the country's area, ranging from 4870 m to 8848 m elevation, are characterized by a dry, arid, alpine climate where 7% of the total population live (CBS 2005, p.I-III). Eight of the world's ten highest peaks, including the world's peak point Mt. Everest, are located in Nepal. The capital city of Kathmandu comprises of around 20% of the country's urban population and is home to more than 700,000 inhabitants while other towns are more district centres.



Administrative Division and Political Situation

Nepal is administratively divided into five development regions, 14 zones and 75 districts.



Within the districts, the administrative unit is further divided into Village Development Committees (VDCs) and municipalities. Each VDC consists of 9 wards (or settlements) while 10-35 wards constitute a municipality. At present, there are 3,913 VDCs and 58 municipalities across the country. Although the Village Development Committee Act of 1991 visualizes VDC overseeing and being responsible for managing village-level services, in reality, this is yet to materialize.

The promulgation of the new constitution in November 1990, after the popular movement, ended three decades of partyless *Panchayat system* of governance under the direct rule of the King. Since then, Nepal has adopted constitutional monarchy and multiparty democracy. The country is divided into 205 electoral constituencies, the representatives of which form the lower house of parliament, the *Pratinidhi Sabha*, for a term of five years. The members of the lower house of parliament are elected through popular election. The upper house of parliament, the *Rajya Sabha*, is a 60-member assembly elected on the basis of Electoral College of which, 10 members are nominated by the King.

Economy

Nepal has been identified as a least developed country in the world. Economic activity is largely for subsistence for majority of the people. Output is mainly for self-consumption without much marketable surplus. Exchange is therefore limited and money is mostly irrelevant. The economic data of the country indicate that in 2004/05, the Gross Domestic Product (GDP) was US\$ 6.8 billion¹ while the per capita GDP was estimated at about US\$ 294 (CBS 2005, p.403).

The economy still depends heavily on agricultural activities on farms providing employment to over 65% of the economically active population in 2001 compared to over 91% in 1981 (CBS 2004[3], p.32-36) and the industrial sector increasing its contribution to GDP from 5% to 23% (CBS 2004[3], p.264). Over the last decade, the real term growth for the non-agricultural sector has been 4% per annum while the growth for the agricultural sector was only averaging 3.4% per annum (CBS 2005, p.409).

The non-agricultural sector is mainly concentrated in the urban areas leading to disparity in rural-urban poverty and comparatively low poverty level in Kathmandu Valley. The agricultural sector is further hampered by the uneconomical land size, lack of year round irrigation, lack of modern inputs like fertilizers and better seeds, and lack of access to transportation and road infrastructure.

| | Total | | | Male | | | Female | | |
|----------------------------|-------|------|------|------|------|------|--------|------|------|
| | 1981 | 1991 | 2001 | 1981 | 1991 | 2001 | 1981 | 1991 | 2001 |
| 1.) Agriculture, Forest | 91.1 | 81.2 | 65.8 | 88.7 | 74.9 | 60.3 | 95.8 | 90.5 | 72.8 |
| 2.) Non-agriculture | 7.0 | 17.8 | 34.0 | 9.2 | 23.8 | 39.5 | 2.8 | 8.9 | 27.0 |
| Manufacturing | 0.5 | 2.0 | 9.0 | 0.6 | 2.6 | 8.3 | 0.2 | 1.2 | 9.8 |
| Electricity, Gas & Water | 0.0 | 0.2 | 1.5 | 0.1 | 0.3 | 0.6 | 0.0 | 1.2 | 2.7 |
| Construction | 0.0 | 0.5 | 2.9 | 0.0 | 0.7 | 4.2 | 0.0 | 0.1 | 1.2 |
| Commerce | 1.6 | 3.5 | 10.0 | 2.1 | 4.5 | 10.7 | 0.7 | 2.0 | 8.9 |
| Transportation | 0.1 | 0.7 | 1.6 | 0.2 | 1.1 | 2.8 | 0.0 | 0.1 | 0.1 |
| Finance & Business | 0.1 | 0.3 | 0.8 | 0.2 | 0.4 | 1.2 | 0.0 | 0.1 | 0.3 |
| Personal & Community | 4.6 | 10.3 | 6.7 | 6.0 | 13.6 | 9.6 | 1.9 | 5.3 | 2.9 |
| Others | | 0.4 | 1.7 | | 0.6 | 2.1 | | 0.1 | 1.1 |
| 3.) Activity not described | 1.9 | 1.0 | 0.2 | 2.1 | 1.2 | 0.2 | 1.4 | 0.6 | 0.2 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Table 3.1: Economically Active Population (in percentage of total population)(CBS 1981, 1991 and 2001, edited by author)

¹The unit of currency in Nepal is Nepalese Rupees (NRs). The average exchange rate of US\$ in NRs in 2005 is taken for this figure i.e. 1 US\$ = NRs 77.83

The dependence on agriculture for employment is slowly declining with a correlative increase of employment in other sectors. The economically active population of 10 years and above has risen from 4.85 million in 1971 to 10.64 million in 2001 (CBS 2005, p.42). From 1971 to 2001, the labour force thus increased a higher percent than the population growth rate.

Demography

According to the latest population census which was conducted in 2001, the population of Nepal was 23.2 million with male to female ratio of 0.997 (CBS 2002, p.I). In contrast, according to the Nepal Living Standards Survey (NLSS) conducted in 2003/04, the male to female ratio was observed to be 0.923 (CBS 2004[1], p.22).



The population has nearly tripled in the last half century from 8.5 million in 1952/54 to 24 million in 2005 with projection to reach 35 million in 2025 which would mean another 50% growth in two decades.



Ethnic Groups, Castes and Religions

Nepal has an inhomogeneous society. Statistics count 103 different ethnic groups and castes (CBS 2005, p.30-34) as result of a historical process over centuries.

The original diversity of Nepal's society is related to ethnic groups, who lived in different parts of the Himalayan region in ancient times. "Usually, ethnic groups are characterized by residing in a restricted or fixed territory. Many of the ethnic groups of Nepal are characterized by geographical and topographical locations. For example, Sherpas of Nepal are believed to be living in the higher mountainous belts, where as Santhals & Tharus are characterized by the Plains of Terai.....Every ethnic group used to have a mother tongue." (Upadhyay 1999, p.126-127).

The social structure of the ethnic groups in Nepal shows a relative equality, not having strict stratification and many are having matriarchal style of society. Women of ethnic groups "are already enjoying a lot of rights which have been denied to the women of broader Aryan Society of Nepal." (Upadhyay 1999, p.127-128).

During the invasion of Muslim from the North in 14th century to India and Nepal the Hindus from Indian subcontinent infiltrated the hills of Nepal to protect their caste and religion. It was already described that under the Malla Dynasty the caste principles and rules were enforced. Individuals are born in the caste system of the Hindus with its strict hierarchical

structure, its separation of the society into groups on different levels of a social ladder, and its division by labour, purity and impurity, separation of marriage and social contacts.

In Nepal the caste system is described by three or four groups with

- Tagadhari or "twice born" castes with Brahmin on the top, second is Chhetri
- Matawali are in third position
- Untouchables are found in lowest position, divided again in those from whom water can't be accepted but whose touch does and does not require sprinkling the water.

(Upadhyay 1999, p.118 ff.).

Later in 19th century under the first Rana Minister of Nepal the first Legal Code was compiled classifying all ethnic groups and castes of the society into vertical categories with

- Brahmin on first position
- Chhetris on second position
- Ethnic groups under third position
- Untouchables at the bottom.

(Chhetri/Gurung 1999, p.58 ff.).

Although by Legal Code of 1963 all Nepali were declared as equal before the law strong traditions in rural areas still result in social barriers, i.e. not allowing inter-caste marriage, not using the same water wells, living in different parts of the village etc.

Besides belonging to an ethnic group or caste also religion plays an important role in culture, tradition and spiritual life. In the Himalayan region "The majority of the people belongs to Buddhist theology....They are mainly influenced by Tibetan cultural tradition." In the mountain region "an admixture of both Hindus and Buddhists" are found while in the Terai "The majority of people are Hindu" (Rakesh 2003, p. 5).

Numerically about 85% of the population are Hindus while Buddhists constitute around 8% of the population and the remaining part follows other religions like Islam, Christianity, *Kirat*, Jainism, etc. (CBS 2005, p.20). The different religious groups are living in harmony and respecting each other's beliefs.

These various influences finally resulted in the official version of a "mixed" classification of the society, naming ethnic groups, castes and religions like

- Sherpa (ethnic group of mountainous region)
- Chhetri (caste)

- Brahmin/Terai (caste of flatland region)
- Brahmin/Hill (caste of hills region)
- Newar (ethnic group of Kathmandu Valley as third class caste)
- Punjab/Sikh (religion, ethnic group)
- etc.

all under the same topic of "Nepal's Ethnic/Caste System" in statistics, reports or national laws.

To know about this diversity of the society can help to understand why and how a group or caste is more or less able, willing or open for changes.

Poverty

Nepal is caught up in a vicious cycle of economic stagnation, poverty and political violence. These, in turn, have been one of the breeding grounds for the increased ongoing disorder in the country. Poverty is very prevalent in Nepal with 38% of the population living below the poverty line (NPC 2003, p.23). A large section of the poor are extreme poor surviving on fragile and susceptible ecosystem lacking even the basic level of human needs. Also, it is observed that there is wide variation in the poverty levels based on the location (rural-urban), geography, gender, caste and ethnicity. Although definitive conclusions related to poverty situation in Nepal are hard to estimate due to lack of comparable survey data over time, some national trends could be seen from nationwide surveys since 1976. The poverty rate in Nepal was estimated to be 33% of the total population after the first national household survey in 1976/77 which increased to 42% in 1984/85 (NPC 2003, p.24). Similarly, the Eight Plan put the figure at 49% while the National Living Standard Survey NLSS I in 1995/96 showed poverty incidence at 42% of the population. However, one notable aspect to bear in mind is that this figure from NLSS 1995/96 does not provide any evidences on the improvement of poverty situation in Nepal in the last decade as the data collection methodologies used were different and thus, cannot be directly compared with each other. Nevertheless, regardless of the methodology used, estimates of the poverty incidences are generally hovering around the 50% mark.

The following graph of Human Poverty Index (HPI) (HPI: probability at birth of not surviving to age 40 / adult literacy rate / deprivation in economic provisioning i.e. percentage of people without sustainable access to an improved water source and percentage of children under five and underweight for age), based on latest data from 2004, show the unchanged situation in the country with lowest economic development under international standards.



Similarly, while considering in terms of purchasing power parity (PPP), the population living below one dollar per day is 53% or 76% living below 1.5 dollars a day (Prennushi 1999, p.2). However, according to an estimate of FNCCI, the percentage of population living on less than \$1 a day in 2001 had decreased to 37.7% (FNCCI 2003, p.185).

Poverty is mostly a rural phenomenon. Not surprisingly, the incidence of poverty in Kathmandu Valley is only 4% while it is 34% in other urban areas excluding Kathmandu Valley (WB 1999 in NPC 2003, p.25). An overwhelming majority of more than 90% of the poor live in rural regions.

From NLSS I, it was also observed that poverty is more severe in female-headed households than the male-headed ones. Almost one in seven households in Nepal is headed by women. This figure goes up to 20% in mountain and remote areas due to high migration rates of the male population to the urban areas. This factor has also aided in the high poverty incidence in the mountainous regions. Women's employment in Nepal is very restricted. Women constitute only about a third of the paid labour market. On top of that, women generally earn as much as 20% less than their male counterparts for the same type of work (NPC 2003, p.27).

Education

When looking at the educational status of Nepal, it is observed that although significant progresses have been made over the last four decades, the indicators of educational achievement are still very low as compared to the international standards. The gender gap in the educational sector is also quite significant.

From the following table, it is observed that a little more than half the population aged 6 years and older is literate in Nepal. This shows an improvement of 12.8% as reported in NLSS 1995/96 (CBS 1996[1], p.57). Not surprisingly, urban areas have significantly higher literacy rates as compared to rural areas. According to NLSS II, the most striking aspect seen is the relationship between literacy rate and per capita household consumption. Three out of four people in the richest quintile are literate while only 25% is literate in the poorest quintile (CBS 2004[1], p.61). This is also another indication of the role of education in the development and prosperity of the nation as a whole.

| Age | Urban | | | Rural | | | Nepal | | |
|------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|
| Group (years) | Male | Female | Total | Male | Female | Total | Male | Female | Total |
| 6-9 | 69.3 | 62.2 | 65.8 | 37.1 | 33.6 | 35.4 | 40.8 | 36.7 | 38.8 |
| 10-14 | 93.6 | 86.1 | 90.0 | 75.1 | 65.0 | 70.3 | 77.5 | 67.7 | 72.8 |
| 15-19 | 93.1 | 89.5 | 91.4 | 85.8 | 64.0 | 74.4 | 87.0 | 67.8 | 77.1 |
| 20-24 | 94.9 | 83.1 | 88.8 | 80.1 | 50.8 | 62.4 | 83.4 | 56.3 | 67.5 |
| 25-29 | 93.4 | 79.9 | 86.0 | 70.7 | 33.3 | 48.2 | 75.3 | 41.1 | 55.1 |
| 30-34 | 90.0 | 69.3 | 79.3 | 63.9 | 25.0 | 42.0 | 69.0 | 32.4 | 48.7 |
| 35-39 | 87.5 | 55.2 | 70.7 | 62.5 | 16.4 | 36.6 | 67.9 | 23.7 | 43.4 |
| 40-44 | 82.6 | 53.0 | 68.0 | 49.0 | 11.0 | 28.1 | 56.1 | 18.3 | 35.7 |
| 45-49 | 83.7 | 45.1 | 63.3 | 48.5 | 10.4 | 28.2 | 54.3 | 16.0 | 33.8 |
| 50-54 | 77.6 | 37.9 | 59.9 | 39.0 | 3.8 | 19.3 | 45.4 | 7.5 | 24.7 |
| 55-59 | 66.0 | 19.1 | 41.6 | 37.7 | 2.6 | 21.6 | 41.7 | 5.5 | 24.7 |
| 60 + | 60.2 | 16.6 | 38.6 | 29.3 | 1.7 | 16.0 | 34.4 | 4.3 | 19.8 |
| Total | 84.5 | 64.2 | 74.4 | 59.3 | 34.3 | 46.1 | 63.5 | 38.9 | 50.6 |

Table 3.2: Literacy Rates² 2003-2004 (in %) (CBS 2004[1], p.66)

Again the disadvantage of illiteracy is particularly in the rural areas. Due to their inability to read and write, there have been numerous cases where the rural population have been

² NLSS defines a literate person as one who can read and write basic Nepali or local language.

This definition is also used for the purpose of this thesis.

taken undue advantage of or have been over-exploited by other people. Uneducated people especially in the villages are easy preys for village money lenders, traders and contractors. The money lenders charge exorbitant rates on their loans from the rural poor, even often leading to loss of their property. Some traders exploit these poor people by paying very low prices for their products, sometimes even less than their production cost. Instances where contractors pay uneducated people less than what they ought to be paid are not isolated cases.

The prevailing gender gap in literacy rates is also evident as the female literacy rates are considerably lower than the male ones in all areas. The gap is more extensive in Mid Western and Far Western Regions, and also in rural areas. The gender disparity for women in the yesteryears is evident by the literacy rates for older females especially in the rural areas. Similarly, adult literacy rate i.e. literacy for the population aged 15 years and more in Nepal is put at 48% (CBS, 2004[1], p.65). The trend and pattern of gender gap and regional differences are pretty much similar to the literacy rates for 6 year olds and more.

Predictably, literacy rates among the elder members of the society are less. A positive aspect of the observed statistics of the country is that literacy rates among the younger generations are higher which indicates some progress being made in recent years. Also, the gender gap is much smaller among the younger population, both in the rural as well as in the urban areas.

Aspects worth taking note of are the reasons for not attending schools. According to NLSS 2003/04, it was revealed that among the youth from the age of 6-24 years which consists of 21% of never attended school population, the main reason for not attending school was because their parents did not want them to (33%). Similarly, other reasons cited were 'had work at home' (20%), 'too expensive' (19%), 'not willing to attend' (13%) and 'school far away' (3%). Among the sex groups, majority of the male considered cost as the main barrier for attending school while parents were the main reason for majority of females. Surprisingly, location and distance to the school was the factor for only 4% of the people (CBS 2004[1], p.62).

Human Development Index (HDI)

The HDI as integrating Index of the above discussed indicators (HDI: life expectancy at birth/adult literacy rate and combined gross enrolment ratio for primary, secondary and tertiary schools/GDP per capita) again makes clear that the problem of development lies in rural areas: except in Kathmandu Valley and in tourism spots like Pokhara in the district of Kaski, the Human Development Index in general is <0.5.

As the HDI is based on the already illustrated indicators it is evident that the combination of those indicators will prove the negative picture because in all above mentioned cases the rural areas are behind the urban situation.



Energy Consumption

Energy problems in Nepal are barely different than in other developing countries. Nepal's energy consumption is one of the lowest in the world with 8.5 million tons of oil equivalent (toe³) (CBS 2004[3], p.115). In addition, the per capita energy consumption of Nepal in 2001 was found to be 0.34 toe i.e. 15.93 GJ, which is one of the lowest of modern world as compared to 1.67 toe of a world's average (UNDP 2004[1], p.28). Similarly, the per

³ One metric ton of oil equivalent (toe) is defined as the energy contained in one metric ton of crude oil. One toe is taken as 46.87 GJ for the purpose of this report.

capita commercial energy consumption of almost 44 kg of oil equivalent is also one of the lowest in the region. The lack of productive sector in the country is clearly visible with only 1% of energy consumption for industrial purpose and the type of energy used with the biggest share for fuel wood as a "non-productive" energy compared to i.e. electricity. The growth rate in the commercial energy consumption has been high at around 4% per annum on a low level itself (CBS 2004[3], p.118) which is mainly due to increased urbanization and ever increasing number of vehicles while most of rural areas still have not been introduced to modern forms of energy like electricity.



Nepal's energy mix can be broadly divided into traditional and commercial energy sources. An overwhelming majority of rural people are using traditional sources like firewood, agricultural residue and animal wastes to cater their energy needs.

Main purpose of energy is fulfilling lighting and cooking needs at home with around 95% of the energy consumption through traditional sources and firewood covering 85% of the total residential sector.



Firewood is mostly collected from public, community, private forests and private land. Due to the excessive use and overexploitation, Nepal is faced with grave problems of deforestation, natural resource depletion and other environmental implications.



Nepal has no proven reserves of oil or gas and only very negligible reserves of coal but a huge potential of hydropower of the magnitude of 83,000 MW of which about a quarter is considered to be technically feasible (CRT 2005, p.4). Unfortunately, installed capacity reached only 400 MW at the end of year 2002 of which more than 80% is hydroelectric.

According to NLSS 2003/04, the percentage of population having access to electricity has increased from 14% in 1995/96 to 38% in 2003/04 mainly in the urban areas. The transmission losses in 2002/03 were of the magnitude of 910,481 MWh equivalent to 35% of the total electricity supply due to transmission losses and power theft which is exceeding the supply to ever increasing power demand in the country (CBS 2005, p.365).



The following table shows the energy consumption forecast based on the year 1994/95 up to year 2014/15. It is expected that the annual growth rate of energy consumption will be 4.2% which results in consumption of more than double within two decades.

| Energy Sources | 1994-1995 | 2004-2005 | 2014-2015 | Growth Rate (1994/95-2014/15) |
|----------------|-----------|-----------|-----------|----------------------------------|
| Biomass | 262.3 | 302.5 | 369.5 | 1.7 |
| Commercial | 23.1 | 58.3 | 149.3 | 9.8 |
| Coal | 2.8 | 4.2 | 7.6 | 5.1 |
| POL products | 17.5 | 54.7 | 164.4 | 11.9 |
| Electricity | 2.8 | 6.6 | 16.3 | 9.1 |
| Total | 308.5 | 426.3 | 707.1 | 4.2 |

Table 3.3: Estimated Energy Consumption⁴ of Nepal (Mio GJ)
(Dhungana 2003, p.8)

Looking ahead towards rural energy systems, different renewable energy schemes were introduced like biogas schemes, solar schemes and micro hydropower schemes. According to Biogas Support Programme (BSP), the total potential of biogas in Nepal is estimated to be 4,356,000 cubic meter of gas. This is an enormous potential compared to what is being exploited presently i.e. around 120,000 family sized biogas plants in the country. A BSP study estimates that installing 1,000,000 biogas plants could save up to 170,000 metric tons of fuel wood, 72,000 tons of agricultural residues, 40,000 tons of animal wastes and 4.5 million litres of petroleum product mainly for cooking purposes (BSP 2004, p.7-8).

Similar is the case with Solar Home Systems (SHS). Based on experience of the Alternative Energy Promotion Centre (AEPC) it was found that with subsidy being provided many households were able to install this technology with an estimated 22,000 SHS in the rural as well as in the urban areas (MOPE 2003, p.34).

⁴ For the purpose of this estimation, Dhungana (2002) has assumed that annual population growth rate will remain constant at 2.24 per year and the real GDP growth rate will be around 4 % per annum.

3.2 The Programme

3.2.1 Rural Energy Development Programme (REDP)

3.2.1.1 Background

In the mid 80s, it was recognized that the expected results of "Integrated Rural Development Programmes (IRDPs)" in Nepal were not achieved. The IRDPs were blamed for not being focused while lacking proper coordination and participation at the grass-root level due to its top-down approach. An alternative to IRDPs was seen in community participatory planning process as "it could take advantage of the government-supported pluralism in the existing market place" (Gurung 2004, p.58). It was expected that participation of the vast majority of the rural poor people in the development process could be instrumental for the transformation of agriculture from "subsidence trap" to commercially viable options. Modernization of their subsidence agriculture in conjunction with promotion of small and cottage industries could go a long way in transforming economy towards a sustainable state.

The participation of non-governmental organizations (NGOs) to provide services to local people was initiated by the government from the Eighth Five Year Plan (1992-1997). In addition, the de-licensing of hydropower plants up to 1,000 kW by the Electricity Act of 1992 (Article 3), along with tax exemption for 15 years, was to create an encouraging environment for private and community participation in the development and promotion of hydropower resources in Nepal. This acknowledged the fact that the government's planned energy funding from donors and other sources, which predicted a 10% growth in energy demand, could not meet the actual growth in demand of 14.7% (NPC 1998, p.48)

So an alternative energy plan was looked for to be linked with rural development: the Rural Energy Development Programme (REDP).

3.2.1.2 Why choosing REDP? Paradigms and Objectives

With reference to Chapter 1, the author's "vision of development for Nepal is primarily related to rural areas by changing people's attitudes and awareness to be motivated and capable to improve their own situation as a precondition to fulfil basic needs and initiate economic growth by using energy as a tool."

The author's vision was related to following objectives:

- awareness creation,
- change of attitudes,

- change of the situation by its people with self-motivation and self-initiation,
- leading to fulfilling basic needs with income above poverty line, food, water, shelter,
- better access to health and education, social justice and equality,

Based on this vision the hypothesis was formulated as:

"For development in rural Nepal, 'energy' is a tool for motivation and combined with community mobilization, it is a strategy for sustainable development".

So the question rises to which extent can the "Rural Energy Development Programme (REDP)" fulfil the author's vision and test the hypothesis:

- firstly, the vision of development for Nepal will be reflected with the paradigms and objectives of the programme
- secondly, the hypothesis will be analysed on the basis of field research findings in the following chapters.

Without discussing the different meanings of "paradigm" itself, the interpretation here follows probably the most common use of the word *paradigm* in the sense of "Weltanschauung" which was taken from German philosophy. The word *paradigm* is also "a typical example or pattern of something" (Oxford 2001, p.918) while in the German language, *Paradigma* is mainly taken as "example, sample" (Brockhaus 2006, translated by author and printed from internet 26.02.2006).

In this context, the REDP formulated "paradigms" are interpreted as examples or models of a for-betterment-changed situation or (if it is more related to "Weltanschauung") it could also be taken as a vision of a better society.

REDP has formulated four paradigms for its programme (UNDP/REDP 1997[1], p.50):

Paradigms of REDP

- **i. Productivity:** Productivity in the rural communities is increased through participation of rural dwellers in various employment oriented income generating activities carried out in the community. Power (electricity) generated by rural energy system is taken as stimulant.
- **ii. Equity:** Both male and female are equally involved in various economical and social activities.

- **iii. Empowerment:** Development is brought about by the people for the people. Community members fully participate through the community organizations to take decisions and implement appropriate activities based on the community's demand.
- **iv. Sustainability:** Development is sustained not only for the present generation but for future generations as well.

These paradigms of REDP are in line with the above mentioned objectives of the author with regards to awareness creation / change of attitudes / change of the situation by its people with self-motivation and self-initiation / leading to fulfilling basic needs with income above poverty line, food, water, shelter / better access to health and education, social justice and equality.

The activities and target of REDP are visualized in an "Energy Wheel" (see following illustration). The centre shows 'Rural Energy Systems (RES)' as a focal point with a surrounding first circle illustrating the directly influenced sectors (i.e. household, agro production, agro processing, transport and enterprises) while the second circle gives examples of related technical items (i.e. huller, grinder, oil expeller) to be used in the various sectors. The use of those technical items finally leads to the outer circle showing expected improvements in daily life like drudgery reduction, labour saving, income generation, employment, etc. which, in total, is then summed up as "Enhanced Livelihood". In this outer circle with technical items like huller, grinder, oil expeller, etc., the perspectives are technology related which are expected to lead to enhanced livelihood.

The total interpretation of the "Energy Wheel" is therefore that introduction and implementation of energy related technologies are finally the objectives of the programme or at least the decisive prerequisites to reach an enhanced technology-based livelihood:

Overall objective of REDP:

Implementation of Renewable Energy Sources (RES) to enhance rural livelihood and sustainable development.



At this phase of the dissertation, the question remains open whether Rural Energy Systems (RES) at the centre of the Energy Wheel point out an interpretation that it is a technology centred programme. But answering this question (considering all potentials with also risks of failure which had been already discussed earlier with other technology related projects) remains open until the findings of the field research have been analysed.

At least from REDP's own paradigms, finally one paradigm, the paradigm of **Productivity**, can be directly related to the Energy Wheel.

In relation to the author's vision of development for Nepal, REDP's Energy Wheel does not yet cover non-technical objectives like

- awareness creation,
- change of attitudes,
- change of the situation by its people with self-motivation and self-initiation.

3.2.1.3 Promotion Strategy

The following illustration shows the strategy of promoting "Sustainable Rural Energy Development" which emphasizes on six technical and non-technical activities and subactivities:

- i. Institutional Development
- ii. Demonstration Scheme Implementation
- iii. Human Resource Development (HRD)
- iv. Community Mobilization
- v. Natural Resources Management
- vi. Research & Development (R&D)
- i. Institutional Development: The objective is to institutionalize a rural energy development agency which would be the leading agency for this sector in Nepal. Interpretation of this statement is that, from REDP's point of view, the lack of comprehensive institutional arrangement from the centre down to the grass-root level is one of the main reasons for the slow progress of rural energy in Nepal.
- ii. Human Resource Development: As the programme activities are on various levels (central, district and grass-root), REDP sees capability of human resources as a prerequisite for sustainability together with lack of able manpower as one of the major impediments for rural energy development. Human resource development activities of REDP can be generally classified into following categories: (1) orientation, (2) observation study tours, (3) workshops and seminars, and (4) trainings, especially for building up the capabilities of the community to plan, implement, operate and manage small hydropower systems.
- **iii.** Natural Resource Management: Almost all rural communities in Nepal overly depend on firewood for fulfilling their energy needs leading to deforestation over the past few decades and resulting in serious environmental problems. This component of holistic approach, through sustainable use of firewood and other natural resources, is putting its

effort to improve the environmental situation by more efficient use of resources like promotion of improved cook stoves (ICS) or community forests.



- iv. Research and Development: Research and development of suitable technologies for production and use of rural energy systems is taken as important and so the programme is supporting the development and testing of prototypes of appropriate technologies of rural energy systems especially Micro Hydro Systems (MHS). The main focus is on building local capacity, cutting cost, improving quality, replacing firewood and promoting end uses.
- v. Demonstration Scheme Implementation: This activity can be interpreted as a marketing tool through the philosophy of "seeing is believing". Through financial and

technical support, the installation and operation of electrical energy from small village based systems driven by water power for a "Micro Hydro Demonstration Schemes (MHDS)" is promoted. The idea in the background is showing functioning examples and indirectly creating awareness and information also. A precondition for implementing such schemes is a demand driven basis. The commitment of the communities to contribute their share towards the schemes financially and otherwise, apart from the technical feasibility, is an essential criterion for implementing a demonstration scheme.

vi. Community Mobilization: REDP looks at community mobilization as a significant condition for the programme progress with emphasis on changing the "top-down" process into a bottom-up approach considering that the community itself should be involved in all phases of decision making, planning, designing, implementation and benefit sharing. "A properly designed and implemented community mobilization process leads community members, both male and female, to the emergence of self-governing institutions, which act as sustainable organizations for empowerment. They not only help people enhance their receiving and utilizing capacity but also provide the mechanism to work together for households and community initiatives" (UNDP/REDP 1998[1], p.9). The programme maintains "community mobilization as an effective vehicle for self-governance to ensure active participation of local people to manage and operate rural energy system and other community development efforts in a sustainable manner" (UNDP/REDP 1998[2], p.4).

The community mobilization process itself follows six basic principles, popularly known as "Mul Mantras" (UNDP/REDP 2002[2], p.1) of:

- 1. Organization development,
- 2. Skill enhancement,
- 3. Capital formation,
- 4. Technology promotion,
- 5. Environmental management,
- 6. Women's empowerment.

The practical process of community mobilization is discussed in detail in the following sections of this chapter. The following illustration of a Micro Hydro Demonstration Schemes (MHDS) shows connected activities.



Illustration 3.13: Micro Hydro Demonstration Scheme (MHDS) (edited by author)

3.3 Community Participation and Mobilization

3.3.1 Interpretations

Community mobilization is not only the decisive part of the hypothesis but also part of the **promotion system** of rural energy systems of REDP.

To understand the role of community mobilization for the hypothesis on one side and for REDP on the other side, a more detailed interpretation is required.

United Nations Research Institute for Social Development (UNRISD) defines participation as "the organized efforts to increase control over resources and movements those hitherto excluded from such control" (Rahnema 2005, p.120). Generally spoken, mobilization is a precondition for participation. Given the shortcomings of top-down development approach, people's participation in rural development has come to be recognized as an absolute imperative for development not only within the alternative tradition, but also in many mainstream strategies (Brohman 1996, p.250).

Participation should cover four different functions (Rahnema 2005, p.121-122):

- in cognitive terms, aiming at replacing the western-ethnocentric-industrialized perception of reality by a different system which represents people's own cultural heritage,
- in political terms, assigning to empower powerless which also represent the target groups of development,
- in instrumental function, to provide the actors of development with new answers to the failures of projects and programmes under conventional strategies.

However, the understanding and interpretation of participation and the method to achieve it is different for different groups/institutions and their interests, and it has been connected to multiple methods of implementation. As Brohman discussed, the results from evaluations of participation have often been disappointing as unanswered questions remain on:

- who participates (e.g., just an elite group or a broader range of people),
- what they participate in (e.g., more limited or broader range of decision-making),
- how they participate (e.g., as benefit recipients or as project designers),
- and, what reasons they participate for (e.g., as a mean toward other objectives or as an end in itself).

Ultimately, participation has become a complex issue because it is a multi-dimensional concept. Furthermore, as it is an inherently political act, it can never be completely neutral.

For analysts like Fleming, participation emphasized the decision-making and role of the community and Cornia found that such participation helps to improve policy formulation so that it corresponds to the needs and conditions of the people to whom they are directed to. And Fenster differentiates that while development economists defined community participation as equitable sharing of benefits of projects, social planners tend to define it as the community's contribution to decision-making (Brohman 1996, p. 251-252).

For others like Oakley and Marsden the more common interpretations of community participation may be represented as a continuum (Brohman 1996, p.252). At the end, participation may merely mean voluntary contributions to projects without any local influence over their shape. On the other hand, participation may also be seen as an active process to increase local or community control. Most of the development projects understand real participation as participation in information collection, planning, implementation, decision making, benefit sharing, monitoring, evaluation and taking overall responsibility in running the programme smoothly even after external support phases out. Citing Paul in Brohmann (Brohman 1996, p.252) community participation is "an active process by which beneficiaries influence the direction of a development project with a view to enhancing their well-being in terms of income, personal growth, self-reliance or other values they cherish."

The need and desirability of people's participation in development activities have also been felt and solicited for a long time in Nepal by those who are concerned with the development of rural areas. However, the experiences show that the meaning of the words "people's participation" tend to vary in its concept and application. Among rural projects, the term people's participation has been used synonymously with "voluntary" labour which is also obtained through considerable pressure. Furthermore, any programme involving voluntary labour only is declared as having been completed through people's participation. Similarly, the collection of funds while implementing activities that have already been planned by the organization is also considered as participation. In such programmes, there is no people's involvement as target group. Of course, cash or kinds of labour contributions are some significant indicators of people's participation. Apart from this, while accepting the need and desirability for such participation in theory, there has also been reluctance on the part of the local level leaders, planners and the so-called local elites to permit actual people's participation. Such a state of affairs has come into existence because there seems to be some difficulty in explaining, convincing and motivating the rural people. Two possible reasons for such a situation are either due to a lack of technique to encourage participation or due to superiority of the vested interest in rural areas.

A strange phenomenon in relation to public participation in rural areas has been experienced in Nepal. Though there exists diversity of conditions and perceptions in the rural societies, somehow oddly enough, their "felt needs" always (ironically) happen to be the same (roads, schools, dispensaries, drinking water, electricity) and almost always with similar order of priorities. It is surprising to see how people in diverse conditions tend to make similar decisions. What's more, given that most of the rural people are so poor, one wonders why they have not identified their "felt needs" to be those activities which would provide immediate relief from hunger and poverty. Therefore, it seems that a process by which the local people are made to decide or ask for things desired either by the so-called rural leaders, elites or the upper rural classes is also termed as people's participation.

Achieving full and effective community participation in development activities is a difficult task which depends much on how the community members are approached by so-called development projects. Projects have failed because the intended beneficiaries failed to change their behaviours or attitudes that were critical to the projects' success.

In any sector where the focus is on achieving large scale physical targets within a set time frame, there may be a tendency to treat attitudinal constraints lightly. Project personnel could be well aware of possible community resistance and behaviours which could run counter to the project objectives, but may tend to believe that these attitudes and behaviours will readily change once the installation or services are in place. They may even try several short-cuts to induce behavioural change: pressure from prestigious leaders, pep talks to motivate the community, large community meetings to explain roles and obligations, and setting up local committees to enforce those obligations. Often these methods do not work. Women especially may be reluctant to take part or to speak up at large meetings even though they may be the ones who will be expected to carry out most of the relevant tasks.

In those cases, participation should not be defined as "real" participation but only be taken as "pseudo" participation:

i. Participation Concept: Cheap Labour

In other projects, the community is considered to have participated when it provides free, unskilled labour for construction and donates raw materials in the spirit of self help. The role assigned to villagers is to carry pipes, dig trenches and perform other unskilled construction tasks. The judgment part (surveying, planning, designing, etc.) is done entirely by engineers and other technically trained personnel. One benefit obtained from this arrangement is obviously the lowering of cost. There are some who believe that labour contributions increase people's identification with the system being built. The assumption is that if they have built a system with their own unpaid labour, they will take pride in it and want to maintain it properly. Others contest this assumption saying that pride of ownership depends also on what the people's other priorities are. If the constructed project is not a priority for the average community member, labour may be contributed under compulsion rather than voluntarily. If so, then the interest in using and sustaining the facility may perish after a while.

ii. Participation Concept: Cost Sharing

In the eyes of many project managers, the key issue here is not just cost reduction but cost recovery. They advocate at least token contributions by community members in cash or in kind towards maintenance. People's willingness to invest a part of their meagre resources in maintaining the system (e.g. to pay the local mechanic) is taken as an indication that they value the service and are therefore committed to keeping it in good condition. In the meantime, some others also believe that agreements to maintain a system may not in themselves be a reliable indicator of local commitment. For example, if average community members and, in particular, women have not been involved in decisions concerning the system, they may revert to their old water sources when the pump breaks down rather than contribute towards the cost of repair.

iii. Participation Concept: Contractual Obligation

From another viewpoint, neither of the above concepts of community participation is considered adequate to prevent large-scale project neglect, misuse or abuse. Instead of focusing primarily on the cost factor, attempts are also made to establish at least a minimal local infrastructure to manage and maintain the system locally. Three aspects are basically focused like (1) local leadership, (2) local committee and (3) locally recruited maintenance volunteers on the assumption that the infrastructure could be sustained with local support. A contract is often drawn up to make it more formal and binding between

the government and the community. The contract specifies clearly what roles and responsibilities apply to both the partners. The question, however, lies on whether this kind of approach could involve the entire village. If not, this could very well create misunderstanding and mistrust resulting in loss of interest of the community in participation.

iv. Participation Concept: Community Decision-making

A different approach is needed to create a strong sense of local responsibility. The approach should neither minimize the importance of cost-cutting and cost recovery measures nor dispute the need for local institutional mechanisms. However, they argue that genuine commitment and widespread support of the community as a whole will only come about if these other measures have been preceded by a process of participatory community education and by involving a broad base of the community in decision-making right from the onset. Thus the decision-making requirements apply not only to the male leadership but particularly to village women also. Women's lack of schooling and literary skills should not be a constraint for making valuable contributions to the community's decision-making. But, there is always a doubt whether such an approach can be applied on a larger scale as it is time consuming, too difficult and too costly also.

v. Participation Concept: Community Mobilization

"Real" participatory development concept warrants people's active involvement in every stage of development for their own well-being and upliftment of their current situation right from the beginning of decision-making up to benefiting of the programme.

So a more holistic definition of participation must answer the following questions:

- 1. Which approach will assure voluntary inputs from the community with regards to ideas and solutions?
- 2. If women and other disadvantaged groups do not actively participate in community level discussions, what can or should be done about it and by whom?
- 3. How can technical (hardware) and social (software) inputs best be co-ordinated and integrated so as to encourage and permit full and effective involvement of the people?
- 4. What are some reliable indicators to show the effectiveness of community participation?
- 5. What awareness and educational process should accompany this effort?
- 6. Which local attitudes, beliefs, or behaviours stand in the way of full community collaboration in the project?

(Srinivasan 1990, p.16-18)

3.3.2 Community Mobilization of REDP

3.3.2.1 Six Principles

Based on those interpretations, the question is what type of participation is used by REDP that is organized as a multi-dimensional package based on six main principles:



i. Organization Development

People living in close proximity generally share common interests. The programme is emphasizing the need to work collectively to achieve common goals which are not possible individually. Hence, the people are encouraged to organize themselves in community organizations (CO) to perform a number of social activities. These community organizations are holding weekly meetings, discussing and taking decisions based on transparency and consensus through their own concerns, vision and commitments. These grass-root organizations, consequently, should help the people to organize themselves and mobilize local resources for productive uses.

ii. Skill Enhancement

Skills are necessary to perform tasks more efficiently. Various need-based skills passed on to community members should increase their capacities to use and get most out of their participation and available scarce resources. The skills being imparted to the community members by the programme are clustered into the following broad categories:

- management skill to administrate smoothly grass-root organizations like community organizations and functional groups (organization development, management, book-keeping, saving and credit operation, etc...),
- skill to implement, operate and manage various rural energy systems especially micro hydro schemes,
- entrepreneurial skill to carry out various income generating activities based on the use of energy (agriculture, livestock, forestry, off-farm activities, marketing, etc.), and
- skill to initiate various social activities in the community.

iii. Capital Formation

One of the pre-requisites of any development work is capital. The rural livelihood cannot get over subsidence trap without capital investment. Capital for development has to be mobilized from external and internal resources including a saving and credit scheme among the community members to mobilize the local capital for productive use. Regular weekly savings of a small amount in individual terms shall sum up to a substantial amount in the community organizations (COs). These generated funds are being utilized by the CO members as credit to start income-generating micro-enterprises at the household and the community level. In addition to the credit and saving scheme, the revenue from the different activities like micro hydro power system is collected as community energy funds which are being used for sustainability of the scheme as well as funding for undertaking various developmental works in the community on their own.

iv. Technology Promotion

As already discussed earlier, the objectives of the programme are to implement Rural Energy Systems (RES). Emphasis is given to technologies that are considered decisive for increasing productivity, reducing drudgery of women and helping to conserve the natural environment in the rural areas. Apart from the installation of micro hydro schemes, the programme is also promoting other rural energy technologies such as solar photovoltaic, biogas and improved cook stoves to compliment and/or supplement each other. Based on the feasibility and demand, REDP is encouraging the local people to adopt one or more rural energy technologies to totally fulfil their energy needs.

In similar manner, the programme has given special emphasis for the promotion of small scale agro-based and off-farm enterprises based on the installed technologies to

supplement the income level of the rural population. Major enterprises can include agro processing mill, rice huller, cereal grinder, oil expeller, battery charging station, poultry farming, water pumping, saw mill, furniture making, paper making, milk chilling, etc.

v. Environment Management

Environmental preservation is an important criterion for sustainable development and in the same line, watershed condition and management of natural resources are key parameters for sustainable operation and management of a micro hydro plant.

In general, initiatives taken under environmental management range from commercial community forestry to watershed management and from environmental education to health and sanitation (like renovation of drinking water schemes or construction of garbage pits and toilets).

vi. Women's Empowerment

The triple role of women in family economy has been widely recognized in recent years. The traditional single reproductive role of women in the society has now been transformed into three important roles i.e. productive, reproductive and managing work. In view of the key involvement of women in the well being of a household, the programme is also focusing on the empowerment of women as one of its priorities. Involvement of women in economic activities would lead to greater security and welfare of the family while increasing their control on resources. Thus, the programme is concentrating on activities and strategies to build the self confidence of women and their capacity for self-governing actions, incorporating them into the decision making process and bringing them in the mainstream of the development process.

3.3.2.2 Process of REDP Community Mobilization

A Community Organization (CO) is the basic element of community mobilization. This CO is considered as the fundamental for any sustainable organization formation at the grass-root level. These organizations embark on various socio-economic activities in their respective communities in line with REDP's six basic principles of community mobilization. Subgroups under the CO, so-called Functional Groups (FG), for various specific development initiatives such as energy, forestry, plantation, etc. are formed under the CO after the CO has gained a certain level of "maturity". Maturity of COs is attained if the members of the organization hold regular meetings, have regularly savings, take consensus decisions and properly carry out the responsibilities of CO office management.

The complete mobilization process is as follows:
Stage I: Formation of Community Organizations (CO)

Process of Sensitization

Considering the view that community mobilization will not succeed unless the villagers and their representatives are made aware of various issues relevant in the area, mass sensitization is conducted for both the villagers and the local government officials. It is carried out in each programme settlement. Participation of one male and one female from each household are made compulsory for the mass sensitization programmes. The various issues focused upon during the sensitization process include issues regarding energy and environment, community development and the need for community organization and social capital for poverty reduction. The sensitization process looks to fulfil the following purposes:

- making people aware on the need and importance of energy for household and community development,
- motivating people to come together and form COs for socio-economic development,
- encouraging the formation of different functional groups to promote various social and economic functions.

Various tools and techniques that are useful and appropriate for the community level sensitization such as resource maps, drawings and cartoons and audio visual shows are used for better communication.

Preparatory Phase of Community Mobilization

The preparatory phase of community mobilization involves Village Development Committees (VDCs) and informal dialogue with the villagers for the formation of community organizations.

A. Enter the selected VDC

This is a general adaptation phase where mainly introduction and familiarization takes place after entry into the selected VDC. Following the general introduction with the VDC officials, familiarization about objectives and activities of the REDP as well as clarification of the role of the VDC and its responsibilities is done for smooth and cordial future mutual cooperation. Similarly, the local representatives and officials are briefed about a household baseline survey, informal dialogues and community mobilization process. Likewise, efforts to prepare a VDC profile are initiated with the collection of relevant information from the VDC.

B. Mobilize villagers, both men and women, to form COs

- Basis of CO formation:

Each CO in the villages are formed on the basis of any factor that ensures a "natural" and sustainable organization formation such as location, ethnic group or caste, economic situation, interest group, etc. The most common practice is the formation of COs based on locality of residence i.e. a number of COs are formed in each ward (ward is a settlement of households depending upon the size and accessibility).

- Informal Dialogue:

Informal dialogue is basically an informal introduction stage with the community members. A Community Mobilizer (CM) visits individual households to introduce himself/herself and in turn, gets to know the household members. During this informal dialogue, the community members are encouraged and motivated to attend the first dialogue at a later date. Generally, the CM does not discuss about REDP or its activities and leaves it for the first dialogue.

Mobilization Phase of Community Mobilization

The mobilization phase is initiated with mass meetings and holding community discussions on the proposed plans and programmes (called first and second dialogues). A mandatory requirement for participation is that 99% households are included in the dialogue with both male and female members of each household.

A. First Dialogue

The first dialogue provides the attending community members with first hand information about energy, environment and the programme activities by the programme personnel. In addition, other purposes of the dialogue are as follows:

- Establishing common understanding of the Terms of Partnership (TOP),
- Information about the household baseline survey, and
- Identification of potential persons for the posts of Chairman and Manager for each CO to be formed.

An important aspect to be noted is that the programme personnel and the CM just act as observers and do not take part in the discussion to avoid influencing the community members. They take note if there has been a consensus decision of the community. If agreeable to all, the details of the next dialogue are also fixed. If not, the villagers are asked to discuss further and set a date on mutual consensus.

B. Second Dialogue

As in the first dialogue, it is again mandatory to have participation of male and female member of 99% households in the second dialogue. Major activities performed in this mass meeting are:

- Formation of CO by signing the TOP,
- Selection of CO chairmen and managers,
- Knowledge and information on meeting organization and management,
- Fixation of a date for the manager's training

The following principles are adopted for mobilization process:

- 1. Each settlement must have at least two COs, one male CO and one female CO.
- 2. A CO must not have less than ten members. Normally, 20 to 30 members are considered ideal.
- 3. There must be weekly meeting for saving and credit scheme within the CO. The amount of weekly saving should be decided by the CO members themselves and should be equal for all members. Also, all decisions and developmental activities should be recorded in a minute register.
- 4. There ought to be consensus among all CO members for all CO decisions.
- 5. There can be a number of COs in a settlement if there is large number of households.
- 6. Each CO should start an adult literacy programme to make the members able to read and write. It is especially mandatory for the female COs.
- 7. CM will collect household information through questionnaire for the energy baseline survey.
- 8. The COs are eligible to start rural energy schemes once they are matured. The CO are considered matured if they demonstrate their ability in holding weekly meetings regularly, identifying and initiating different socio-economic activities, undertaking regular savings and credit and conducting functional literacy classes for the illiterate members. In general, the three key indicators of CO maturity are conducting weekly meeting, regular saving by members, and making decisions by consensus and recording them in the minute book.

Stage II: Formation of Functional Group (FG)

For implementing any rural energy activities, formation of a community functional group (FG) to manage and operate such a scheme is necessitated. The matured and willing COs are encouraged to organize themselves into energy functional groups (EFG). The FG

has compulsory representation from all concerned COs, both male and female. The representatives are chosen from each CO on a consensual basis.

Within the FGs, an executive committee is formed from all the representatives of the participating COs. The executive committee will select one chairman and one secretary. The responsibilities of the executive committee are as follows:

- organize meetings regularly to plan and discuss activities for the future regarding the scheme,
- undertake all works related to the construction, operation, maintenance and management of the implemented energy system,
- manage and coordinate community's efforts for effective and timely implementation of the energy and other initiatives,
- review and evaluate the progress,
- maintain close liaison with village and district level organizations and agencies like the Support Organization (SO), DDC:REDS and VDC, and
- create assets in the form of community energy fund (CEF) for successful operation, maintenance and sustainability of the implemented energy systems.

Stage III: Community Based Project

Community based projects (i.e. Micro Hydro) are decided and implemented through COs and FGs of the village itself. All activities are based on transparency and consensus. Required skills are being enhanced in both technical and managerial aspects. In addition, required technology is introduced and disseminated, i.e. for rural energy systems. Women are considered as equal partners in all activities.

Financial resources have to be mobilized at all levels by:

- Community contributions: the most common forms of contribution are voluntary unskilled labour and local materials. However, cash contribution is also possible and also necessary,
- Local government (District Development Committee DDC and Village Development Committee VDC) can provide 10 to 20% of the cost of small-scale energy schemes on the understanding that the community will pay back dividends,
- Government resources in the form of subsidies for different technologies,
- Bank loans, and
- Donor agencies.

3.3.2.3 Real Participation by Community Mobilization

Based on the former open question of 'what type of participation is used by REDP programme' and the details of the six principles of REDP's community mobilization, a first impression can be expressed.

To answer the question, the former given holistic view of participation had the following six points that can now be tried to combine with the six principles of REDP's mobilization:

1.) <u>Question: Which approach will assure voluntary inputs of the community with</u> regards to ideas and solutions?

The project is based on the community's priorities and decision, represented by a CO or a FG, which includes the decision of the financial or labour contribution of the community.

- 2.) Question: If women and other disadvantaged groups do not actively participate in community level discussions, what can or should be done about it and by whom? Participation of women is a prerequisite of forming COs and FGs – so the question is no longer relevant.
- 3.) <u>Question: How can technical (hardware) and social (software) inputs best be co-</u> ordinated and integrated so as to encourage and permit full and effective involvement of the people?

Technology (hardware) is entering the project side only after decision of the community which again is part of the CO – so the social input (software) by forming a CO is already a pre-condition to decide about technology. Also, the technology related training and capacity building to further manage the project after implementation can be seen as effective involvement of the people.

4.) <u>Question: What are some reliable indicators to show the effectiveness of</u> <u>community participation?</u>

The main indicator is that a project is not offered from outside but has been requested by the village community to REDP. In addition, another indicator is that all decisions and initiatives are with community itself.

5.) Question: What awareness and educational process should accompany this effort?

Awareness is mainly orientated to overcome traditional behaviours regarding the role of gender which is a main obstacle for development as such while educational process is more orientated to capacity building of CO members to plan and manage the project.

6.) <u>Question: Which local attitudes, beliefs, or behaviours stand in the way of full</u> <u>community collaboration in the project?</u>

If attitudes and all are obstacles in the project, the newly formed COs have not yet reached the stage of 'maturity'. In that case, the assistance of REDP is not provided as the project must be demand driven from the villagers' side.

In a first reflection the concept of REDP's Community Mobilization is described as "real" participation of the community.

Chapter 4 Research Area and Research Questions

4.1 Inception

"The Rural Energy Development Programme (REDP) was initiated in 1996, as a joint Programme of His Majesty's Government of Nepal (HMGN) and the United Nations Development Programme (UNDP) to respond directly to expand rural energy access by communities, strengthen institutional capacity, and put in place appropriate rural energy policy framework. The successful demonstrations and piloting of the Programme has, since 2003, resulted in the World Bank coming on board as a Programme partner to expand the model from the first phase 15 districts to an additional 10 districts." (UNDP/REDP 2006[1], printed from internet 23.04.2006)



| Far Western | Mid Western | Western | Central | Eastern |
|-------------|-------------|---------|-----------------|---------------|
| Achham | Dailekh | Baglung | Dolakha | Okhaldhunga |
| Baitadi | Humla | Myagdi | Dhading | Panchthar |
| Bajhang | Mugu | Parbat | Kavrepalanchowk | Sankhuwasabha |
| Bajura | Pyuthan | Tanahun | Sindhupalchowk | Solukhumbu |
| Darchula | | | | Taplejung |
| Dadeldhura | | | | Terhathum |
| Doti | | | | |



The Programme has been the recipient of a number of prestigious international awards and recognitions:

- Featured Expo 2000, Germany
- Best Practice Programme (no details available)
- Best Institutional Model (no details available)
- Energy Globe Award 2000, Austria
- Pearl of Knowledge Award 2005, Bangkok, Thailand
- Global 100 Eco Tech Award, Nagoya, Japan
- Exhibited in World Exposition 2005, Aichi, Japan

(UNDP/REDP 2006[1], printed from internet 23.04.2006)

Till the end of 2004, about 150 Micro Hydro Demonstration Schemes were installed with a total electrical capacity of 1,850 kW serving more than 17,500 households. Additionally, more than 1,700 Solar Home Systems were installed benefiting 1,724 rural households (UNDP/REDP 2006[1], printed from internet 23.04.2006)

4.2 Sample Size and Survey Design

In order to test the hypothesis, an in-depth research at appropriate project sites with community mobilization and energy projects was required. Out of the 25 REDP programme districts in Nepal, a sample of 6 Village Development Committees (VDCs) in four different districts was chosen.



The chosen locations needed to provide relevant information to prove or reject the hypothesis of this research. Relying on this vital criterion, the following norms for selection were set:

- Availability of empirical data of household baseline survey before project intervention,
- Collection of minimum of three survey data within 4-6 years,
- Duration of project above 5 years,
- Easy accessibility for the survey team,
- Good representation of social composition or ethnic groups.

The sample size of 4 districts with a total of 6 Village Development Committees (VDCs) is considered statistically adequate in the set of the 10 districts under consideration.

A minimum of three surveys within 4 - 6 years were carried out at the household level. In each sampled settlement, a household questionnaire (see annex) was administered for at least 30% of sampled households.

To meet the concern that the samples may not be representative of the main socioeconomic groups in the community, welfare ranking was conducted by the communities themselves using participatory approach. This basis was able to assure that the samples taken were reasonably representative of the main socio-economic groups in the community.

The data are either supporting or not supporting the hypothesis. As already discussed in chapter 2, this required an in-depth research on the following **Study Objectives**:

- Identification of currently existing problems especially related to economical, environmental and social issues in selected places of rural Nepal,
- Analysis of the impact of energy through community mobilization on the rural society,
- Formulation of a paradigm with special focus on energy, local and human resources mobilization and social capital development.

Similarly, linked with the **Study Objectives**, the overall **Research Questions** were identified as:

- Is energy a suitable tool for community mobilization in a rural society?
- Can community mobilization initiate and support sustainable development options?
- How do different interest groups perceive development interventions?
- Which groups in the community are being included or excluded from development benefits?



Overview of key structure and contents of the household and community questionnaires are described in the following illustrations (adopted and modified from NLSS 1998, p.4).

HOUSEHOLD QUESTIONNAIRE

Section 1. HOUSEHOLD INFORMATION

This section served two main purposes: 1) identify each member of the household, and 2) provide overview of basic demographic data such as age and sex of everyone presently living in the household. Information on parents of household members was collected to examine inter-generational dynamics.

Once all members of the household were identified, it is easy to identify labour force participation rates, under-employment and un-employment rates.

Section 2. HOUSING

This section collected information on the type and size of the house occupied by the household, housing expenses, access to utilities and amenities (water, electricity, cooking facilities), use of and time taken to fetch water and wood.

Section 3. EDUCATION

This section collected data on literacy for all household members as well as the level of formal and informal education.

Section 4. INCOME

This section gathered information on various sources of income of the household members.

Section 5. REMITTANCES AND TRANSFERS

This section accumulated facts on remittances sent by household members to others and transfers received by household members – source, amount and occupation.

Section 6. HOME PRODUCTION AND FOOD EXPENSES

This section included food expenditures, consumption of home-produced food and any food items received as compensation for service or as a gift.

Section 7. HEALTH AND SANITATION

This section collected information on past and present episodes of illness and chronic ailments, use of medical facilities, expenditure on health care, children's immunization, incidences of diarrhoea, and access to sanitation facilities like toilets, safe drinking water

Section 8. FARMING AND LIVESTOCK

This section gathered data on all agricultural activities – land owned or operated, crops grown, use of crops, income from sale of crops and number of livestock.

Section 9. NON-FARM ENTERPRISES/ACTIVITIES

This section clubbed together details on all non-agricultural enterprises and selfemployment activities – type of activity, revenue earned, expenditures, etc.

Section 10. SAVING AND CREDIT

This section dealt with loans given to others by the household or loans taken from others – source of loan, purpose, amount, cost and collateral.

Section 11. GENDER DIVISION OF LABOUR

This section gathered relevant information on gender division of labour – who does what at the household level (cooking, cleaning, firewood and fodder collection, taking care of children, grinding, water fetching, farming, animal grazing, etc.).

Section 12. ENERGY USE PATTERN

This section encompassed the type of energy used (firewood, agricultural residues, animal dung, kerosene, electricity or LPG) for cooking and heating purposes in the household.

Section 13. ENERGY TECHNOLOGIES

This section revealed the type of energy technologies (micro-hydro, solar home systems, improved cooking stoves, biogas, etc.) available in the household and the community.

Table 4.2: Household Questionnaire(adopted and modified by author from NLSS 1998, p.4)

RURAL COMMUNITY QUESTIONNAIRE

Section 1. POVERTY SITUATION

- 1.1 Health
- 1.2 Shelter
- 1.3 Education
- 1.4 Security

This section collected information on poverty situation regarding health facilities, housing, access to education facilities and the village security systems.

Section 2. GENDER DISPARITIES

- 2.1 Socio-political profile of women's position
- 2.2 Access and control over resources

This section covered facts on how men and women in the community feel regarding women's position in addition to access and control to all community and personnel amenities.

Section 3. ORGANIZATIONAL CAPACITY AND EMPOWERMENT OF MOBILIZED COMMUNITY

- 3.1 Level of Participation
- 3.2 Grass-root Organization
- 3.3 Functional Organization
- 3.4 Accountability
- 3.5 Transparency
- 3.6 Consensus Decision Making
- 3.7 Leadership
- 3.8 Mutual Trust
- 3.9 Conflict Management Capability
- 3.10 Partnership

This section dealt with organizational capacity and empowerment of mobilized community with the above-mentioned indicators.

Table 4.3: Rural Community Questionnaire
(by author)

Practicing the Research on Local Level: During the research, the author took assistance from qualified local helpers who were familiar with the locality, culture, tradition and the socio-economic structures of the villages.

• Sample Distribution

The distribution of the sample took account of the following parameters:

- Community having energy (electricity) with the support from REDP, DDC and VDC,
- 2. Mid hills to remote and mountainous gradient,
- 3. Diverse ethnic or caste (Gurung, Brahmin, Chhetri, Magar, Newar, Kami) representation,
- 4. Equal representation of both genders,
- 5. Economic status of the community mixed from poor to rich (e.g. 6 VDCs),
- 6. Education level illiterate, literate and educated groups,
- Communities with energy supply from biogas or Improved Cooking Stoves (ICS) in addition to electricity,
- 8. Settlements in an hour to two days' walking distance from the district headquarters.

Table 4.4: Sample Distribution Parameters(by author)

Selection proceeded after consideration of the characteristics of the total sample of Village Development Committees to ensure that the sites chosen were representative.

• Survey Team

Besides the author, six community mobilizers, who had worked in the same Village Development Committees for 2-4 years and with previous survey experience, assisted in conducting the surveys. Special consideration was given to have gender-balanced teams for the surveys.

• Informants

Each survey commenced with a baseline survey seeking basic statistical data while also posing qualitative questions. The survey forms were designed to collect information about demographic, economic and welfare indicators. Information about other development drivers was indicated to allow testing for other variables that could influence social or economic development. The interviews sought both quantitative and qualitative data about delivery, use and impacts of health and education services over time, productivity, expenditure and prices, changes in time and energy use plus allocation of labour, culture and leisure.

A survey form is attached in the annex. The form had been used for the baseline survey by REDP in 1997 in Nepali language. The survey form was later translated in English language, which was adopted for this study purpose. Besides the baseline survey form, a second questionnaire was developed to obtain quantitative data for the research purpose (see annexes).

• Survey Procedure

REDP was requested to facilitate the access to the selected sites well in advance to ensure that communities and VDC officials were briefed beforehand. The six surveyors in four districts were oriented on the questionnaires with discussion on how to obtain information at the household and community level. The foremost advantage for the research was that the surveyors were all community mobilizers working in the same VDCs for the past 2-4 years, so they knew every household closely. The reliability and validity of the data source were very accurate in the sense that the surveyors were well acquainted with the local situation. The researcher visited all the research sites twice and in some cases, even more. Household information was gathered through selected household interviews while the community questionnaires were mainly discussed in groups through participatory approach. The survey procedure was performed for three surveys in 4-6 or 5-7 years' project implementation phase exclusively for this study purpose.

Household Samples

A dropout rate must be anticipated in a survey of five years' duration. A sample of 10% of households, usually around 30 households in this case, would be desirable to ensure that the sample at the end of the survey period is still statistically robust. The aim was to survey the same households at approximately 2-year intervals. To be on the safer side, a minimum of 30 % of the household of the total settlement in each VDC was considered during the research. The initial selection of households was not entirely random but based on socio-economic ranking (income, cast) to cover low, middle and higher classes of the society.

| District | VDCs | Sample (No. of Households) | Economic Group | Ethnic Group or Caste | |
|----------|----------|-------------------------------|-------------------|-----------------------------|--|
| Baglung | Taman | 1997: 220 (= 100%) | Mixed | Magar | |
| | | 2002/03: 65 | Group | Magai | |
| | Sharkuwa | 1997: 67 (= 100%) | Mixed | Brahmin, | |
| | | 2002/03: 66 | Group | Chhetri | |
| Tanahun | Piughar | 1997: 40 (= 100%) | Mixed | Gurung | |
| | | 2000/01: 42 | Croup | | |
| | | 2002/03: 30 | Group | | |
| | | 1998: 40 (= 100%) | Mixed | Thakuri | |
| | Ghumlekh | 2000/01: 40 | | | |
| | | 2002/03: 35 | Group | | |
| Myagdi | Arman | 1998: 283 (= 100%) | Mixed | Gurung | |
| | | 2002/03: 36 | Group | | |
| Kavre | Pinthali | 1997: 108 (= 100%) | Mixed | Tamang | |
| | | 2002/03: 40 | Croup | | |
| | | 2004: 40 | Group | | |

Table 4.5: Distribution of Sample Size
(by author)

• Data Processing

The main objective of the household survey was to gain primary information at the household level regarding access to various facilities and services, and also data on how this alters with time. An attempt was made to evaluate a household level indicator of welfare such as income or consumption expenditures. Therefore, households were asked about general characteristics, employment, assets and amenities, production and employment activities along with participation in and access to education, health, markets, credit, community activities. The questionnaire was primarily quantitative although it also included some qualitative questions.

Secondary data on district and village level were collected to bring the acquired data in context. This included information on population, land use, economy, infrastructure, social indicators and prices. The baseline data were computerized to compare the situation of the community before and after inception of energy initiatives focusing on the underlying economic, social and political processes. Later rounds of surveys were then used to understand gains measurable at the community level to provide an unbiased estimate of project impacts in the presence of unobserved time invariant factors influencing both the selection of project areas and the outcomes. The data sets are mandatory to result in

outcome indicators and explanatory variables. The outcome indicators examined included community level agricultural production yields, income source diversification, employment opportunities, land use and distribution, availability of goods, services and facilities, asset wealth and distribution as well as gender related work and time load.

Pre-project baseline data of the research villages from 1997/98 were collected from the REDP Project Office in Kathmandu. Not all data were previously tabulated in the computer; therefore, the whole questionnaire was tabulated in EXCEL table for every Village Development Committee. In total, more than 150,000 data had to be tabulated as the survey was conducted three times over the years.

4.3 Key Indicators

Resulting from the data collected, a number of indicators were defined, mostly in line with the key indicators used to calculate the Human Development Index (HDI), with special importance on analysis:

- Health

The status of health is described and assessed in relation to life expectancy, infant, child and maternal mortality, morbidity and disability (NHDR 1998, p.56). Additionally, nutritional status is also considered for health status in national as well as for UNDP human development context.

For the research purpose, health status was evaluated on the basis of access to medical facilities in the village, change in awareness and health education, change in sanitary conditions, safe drinking water facilities, health and environment education and food sufficiency in the rural areas of Nepal.

- Education

"....Societies develop multiple structures and agencies for generation, validation and transmission, including inter-generational transmission of knowledge-systems, knowledge, attitudes and skills." (NHDR 1998, p.75). And even Schumacher - who was the first to propagate medium technologies and 'Small is Beautiful' - gives priority to "Development does not start with goods; it starts with people and their education, organization and discipline" (NHDR 1998, p.75).

For discussion purpose during the research, access to education is categorized into formal and informal education. Formal education consists of primary, secondary and higher secondary school level, college and university degrees whereas informal education consists of adult literacy, self-learning to read or write, etc.

- Income

The problem of poverty has already been discussed in detail earlier. Poverty severely limits household capability to meet even the basic human needs such as food, shelter, clothing, primary education, basic health facilities and safe drinking water (NHDR 1998, p.114).

Income is a very sensitive issue and, to get the accurate income status of a family is a challenging task for any surveyor. During this investigation, therefore, indirect questions

were formulated to obtain the real picture of income, as people are reluctant to give direct answers on how much a family earns for living.

- Energy Consumption

It is already reflected that energy consumption was never defined as a basic need. However, histories of the industrialized countries have shown that productivity is not possible without mechanical or other forms of technical energy. Additionally, it has also shown that there is a relation between HDI and energy consumption. Based on this fact, "energy" was also taken as a key indicator to correlate it with other (key) indicators.

4.4 Research Areas

In the following subchapters, the six selected research areas are described to give a picture about the location, infrastructure and living conditions of the rural people.

Out of these six research places, the village of Pinthali is taken as representative of a typical rural settlement of Nepal as well as of Rural Energy Development Programme (REDP) programme areas. Therefore, the situation in Pinthali over a number of years is described in more detail to understand the frame conditions, motivation, activities, phases of programme implementation and outcomes. The other five research areas are described in general basic facts and figures.

Pinthali, Mangaltar VDC, District Nepal Legend IO5 Micro Hydro Pinthali, Mangaltar VDC under author's research Other REDP programme VDCs Illustration 4.4: Map of Pinthali (UNDP/REDP 2006[2], printed from internet on 06.04.2006, edited by author)

4.4.1 Description of Research Village 1: Pinthali (Kavre)

The Pinthali Village lies in Mangaltar VDC, 27 km from the town of Dhulikhel, the headquarters of Kavrepalanchowk District.

The district is divided into 87 Village Development Committees (VDCs) and three municipalities namely Banepa, Dhulikhel and Panauti. Since the year 2000, the transportation to Pinthali has become easier due to the construction of the Banepa-Sindhuli Highway. These days, one can reach Pinthali with about two hours' drive from Kathmandu in addition to half an hour of steep walk uphill to the village. Previously, people had to walk on a very narrow footpath along the Rosi River for five hours from Dappcha to reach the village. During the monsoon season, it took almost 12 hours of walk to reach the place.



(REDP unpublished)

Pre-1996: Village Situation before Implementation of Energy Project

The small village consists of 107 households with a total population of 709 consisting of a homogenous Tamang community of Buddhist religion.

Agriculture – basically garlic farming – was the main source of income and occupation. Besides this, very good craftsmen of "Thanka Painting" and "Lamapat", both traditional Buddhist paintings, were found in the village. There was only one secondary school in the village. The literacy rate was very low at less than 30%. Alarmingly, more than 95% of the women above 30 years were illiterate and never came out in the public or community affairs. The village had no good drinking water facilities and thus, this lack of safe water supply caused waterborne diseases, which killed one to two people annually. Hepatitis, cholera and diarrhoea were the diseases mostly troubling the villagers. There was no health post in the village and people had to walk for about 3 km to access the nearest health post. According to local women, cases like death of pregnant woman due to lack of timely medical care were witnessed in the village from time to time.

Fuel wood and agricultural residues were the main source of fuel supply for cooking. The women had to walk for about 5-6 hours for collecting their fuel and fodder supplies due to less forest cover, landslides and under-utilization of available natural resources.

In Pinthali, a traditional village fund, named as 'Eighteen Fund' in local terms, existed in the village with all villagers being members of this fund. The fund was managed by an 11 member executive committee out of which only three were women. Women were given the seats just as symbols.

1997: Initiation of Rural Energy Development Programme

Based on people's enthusiasm, effort and willingness as well as technical feasibility of the area, REDP was implemented in the village since mid 1997. With the vision of holistic development, the community mobilization process with its six basic principles of organization development, capital formation, skill enhancement, environment management, technology promotion and women empowerment was initiated in the village. The first step of the project was to sensitize and make people aware with the help of a community mobilizer, who stayed in the village together with the local people.



Illustration 4.6: Women Community Organization (UNDP/REDP 1997[2], p.4)

After a period of two months, eleven community organizations were formed out of which five were female with 107 female members. Selection of the chairperson and manager in each community organization was conducted by the group themselves whereas the training for chairpersons and managers were given by the energy project in the village itself.

Knowledge on leadership, book-keeping, conflict management, meeting conduction, minute writing, and agenda setting was imparted on them step by step. Both women's and men's community organizations were holding weekly meetings, carrying out their weekly savings along with taking decisions on various development activities.

Adult literacy class was also started on request from the women CO members because there were very few women who could read and write. They were, thus, encouraged to read and write regardless of their age group.



The enthusiasm of the people in participating for their development activities was very high. Previously, the village did not have a single well-maintained trail. However, through the joint efforts of both the male and female Community Organizations, six trails of about 9 km length linking different parts of the village were constructed. "Competition" on weekly cleaning of their localities, maintaining drinking water facilities, sending their children to

school and constructing of toilets were the motivational changes during the initial phase of community mobilization.

The health and sanitation conditions were significantly improved in the village through construction of toilets, health education and weekly cleaning of the village by the women group.

Once the COs were regular in weekly meetings taking decisions and conducting the saving and credit programme through supervision of community mobilizers, the village formed two Functional Groups after about six months from the initiation of the project.

- 1.) Micro Hydro Functional Group formed with membership of all villagers. The main purpose was to implement a 12 kW micro hydro power project.
- 2.) Forestry Functional Group, with the same structure as the Micro Hydro Functional Group, to protect, to preserve, and to effectively utilize the forest resources.

1998: Survey, Cost Estimation, Resource Mobilization of the Scheme

The enthusiasm of the community was increased as well as their long-standing dream of village electrification seemed to materialize when REDP conducted a feasibility study and detailed survey for Micro Hydro Demonstration Scheme. The scheme of the "Daune Khola Plant" was designed to generate 12 kW of electricity with intended flow of 60 lps, using 33 metres of head. The length of the power canal was 1,900 m and the scheme targeted to benefit 107 households.

The total cost of the scheme was NRs 1.48 million. The mobilization of necessary resources was done from various agencies; REDP, as the main stakeholder, contributed 50% of the total cost of the scheme while the District Development Committee of Kavrepalanchowk and the Village Development Committee of Mangaltar each provided NRs 100,000 as investment. Government subsidy was about NRs 200,000 and a loan of about NRs 190,000 was provided by Agricultural Development Bank (ADB/N). The community of Pinthali contributed about NRs 225,000 in cash along with voluntary participation of the community members in activities like digging of canal and transportation of electro-mechanical equipment, cement, sand, etc. The total cost per kW amounted to NRs 123,000. A special fund of NRs 200,000 was allocated by the villagers for repair and maintenance service.

1998: Implementation of the Micro Hydro Scheme

A working committee of Micro Hydro Functional Group (MHFG) comprising of 22 CO members (two from each COs) was formed to push ahead the implementation of the scheme. The construction work was initiated in the beginning of 1998.



Illustration 4.8: Pinthali MHP installation and construction (UNDP/REDP 1998[3], p.17)



Illustration 4.9: Villagers' Contribution with Transport of Building Material (UNDP/REDP 2000[1], p.18)



At the beginning, the existing earthen canal of 1.9 km was upgraded to a permanent one. For that, villagers themselves made a routine thereby requiring one person from every household to offer voluntary labour for transporting sand from the river, which was about 30 minutes down the hill. The construction of water intake, desilting basin, forebay and powerhouse was all completed on time.



Illustration 4.11: Final Construction of Water Intake for the Hydro Power (by author)

The supply of the equipment as well as the installation work was entrusted to Kathmandu Metal Industries (KMI), Kathmandu. The District Office of REDP facilitated the construction works with necessary technical inputs. The scheme was successfully commissioned at end of 1998.



Illustration 4.12: Turbine and Generator of Micro Hydro Power Plant (by author)



4.4.2 Description of Research Village 2: Piughar (Tanahun)

Piughar lies in ward number 3 of Deurali Village Development Committee (VDC) of Tanahun District. The village is accessible with one and half hours' drive along the highway and further one hour on foot along the Seti River. The village has 3 clustered settlements. The VDC headquarter is about 6 hours' walk uphill from Piughar. There is no health post in the village. People have to go to the VDC headquarter to get medical facilities, which too are very limited. The people, however, prefer to go to the city of Narayanghat, which takes one and half hours (one hour on foot and thirty minutes ride on

bus) to reach, for all types of medical treatments. Since transportation is comparatively expensive, the sick people too have to walk.

The village lies on the trekking route from Damauli to Ghumaune Ghat and also benefits from being on the white water rafting route along the Seti River from Damauli. Despite being on the trekking and white water rafting routes, the place does not lie on the resting spot and so is not directly benefiting from tourism.

The village does not have a police post, a post office or even telephone facilities. Five small shops provide basic stuff for daily requirements.

The village students benefit from a school up to grade 7. After completing secondary school, they have to go to another village, Dharampani, which is an hour's walk away, to complete grade 10.

The village does not have any productions or home industries and the villagers' income generating activity is mainly confined to farming. After completing school education, they have to work on their fields, as families cannot afford to send them to other places for higher education due to monetary constraints. This situation has resulted in many villagers migrating to foreign countries to earn a living.

The majority, almost 90%, of the village population comes from the Gurung community. The Gurung community is famous for their contribution in both homeland and foreign armies. Therefore, it is very common in the village that the male population are either exarmy men or present army men working with the army in Nepal or abroad, mainly India and Britain. Besides the Gurung community, the village is well rounded by Brahmins, Magars, Chhetris and Tamangs.

There used to be no electricity supply to the village although the national grid passes through the village itself. Nevertheless, the place is benefiting from a very old irrigation system; the benefit of this system expanded after April 1998 when the micro-hydro power plant was introduced in the village by the Project.



4.4.3 Description of Research Village 3: Ghumlekh (Tanahun)

Ghumlekh village lies in ward number 4 of Bhirkot VDC and is situated in the south of Damauli. This village is accessible only by foot. It takes about eight hours - about 6 hours of mild slope alongside Seti River and Bordi Khola plus two hours of steep slope - to reach the place on the hilltop. The VDC office is in Bhirkot, which is around 30 minutes of walking from Ghumlekh.

The village has no police post and is isolated from communication facilities. Even though there is a health post in Bhirkot run under a health worker, people can only rely on this post for minor injuries and diseases like cuts, wounds, headaches or fever.





Illustration 4.16: On the Way to Ghumlekh (by author)

There is a primary school in the village. However, with local resources, the school has managed to upgrade itself into a secondary school. After completing secondary schooling, the students have to go to Bhirkot to pursue education up to grade 10.

The villagers are farmers and keep livestock. Their daily routine is to cook, work in the fields, look after the cattle, collect fuel wood and fodder, and take animal for grazing. One traditional water mill is available in the village for processing agro-products of Ghumlekh and 4 or 5 other nearby villages.

The village does not have any other production units or cottage industries. Daily requirements are met from four small shops and one restaurant. The villagers have to walk six hours to reach Damauli to meet additional needs. A precious day is lost by the villagers in coming to the city and returning with supplies.



Illustration 4.17: Reaching at "electrified" Ghumlekh Village (by author)

Prior to REDP interventions, the village had already installed a solar photovoltaic system for lighting profiting 22 households with 7-Watt bulb each. The villagers, utilizing the developmental budget from the VDC, had managed to install two units, each of 60 Watt capacity. Unfortunately, the system was dysfunctional, not long after the installation, due to repeated technical problems with the inverter (which transforms 12 VDC from battery into 220 VAC). The repair and maintenance of such technical difficulties were

compounded as technicians would not come to the village for repairs as and when required. In view of all these previous not-so-good experiences, the village wanted to benefit from electricity generated by a micro hydro power plant. REDP initiated its activities in this village from June 1998.



4.4.4 Description of Research Village 4: Taman (Baglung)

Taman is situated in the North-western part of Baglung District, at an elevation of about 2,000 metres above sea level. The village is predominantly resided by the ethnic group of Magars, whose main occupation is agriculture and animal husbandry. It is one of the remotest villages in the district and can be reached with two days' walk from Beni Bazar, the district headquarters of neighbouring Myagdi District.

The VDC consists of mainly two settlements: one is Taman, which comprises six wards and 200 households while the other is Lamela, which has three wards consisting of 175 households.



Besides agriculture, Lokta processing for hand made paper is quite common in Taman. In addition, the villagers also have the tendency of migrating to the cities for better livelihoods and foreign countries for army jobs.

REDP activities were initiated in the VDC from August 1997 with the formation of 22 community organizations (11 female and 11 male).

A micro hydro power plant with 20 kW capacity was successfully installed and commissioned.



4.4.5 Description of Research Village 5: Sarkuwa (Baglung)

Sarkuwa is four hours' walking distance away from the nearest road head of Kushma, the district headquarters of adjoining Parbat District. The VDC has a total area of 718 ha with 210 ha of forest area and 520 ha of cultivated land, out of which only 85 ha are irrigated.

The main occupation of the village is agriculture with 95% of the population involved in it. The rest are engaged in trade/business, small industry with two mills and other miscellaneous activities.
The population of Sarkuwa VDC is 3290 with the male population being 1623 while the remaining 1667 are females. The village is dominated by Brahmin, Chhetri, Magar, Thakuri, Kami and Sarki groups.

REDP entered Sarkuwa, as one of its programme VDCs, in August 1997. Then on, a micro hydro power plant (MHP), as part of the REDP project, has been constructed and operated since 2001 in Sarkuwa village. The total installed capacity of the MHP is 24 kW with 32 m water head. Simultaneously, a mini electric grid was implemented to supply electricity to 4 out of 5 wards in Sarkuwa.

In the village, 290 households out of the total 399 households (73%) use electricity from MHP. In line with REDP rules, 50 % of the capital cost of MHP construction (excluding local labour and local construction material) was financed by REDP as grant. The remaining capital cost was contributed by DDC, VDC and the community themselves.

After the commissioning, the hydropower has been handed over to the local community with the responsibility of management, operation, repair and maintenance of the plant as well as setting the tariff and collecting the electricity bill. It has also been entrusted with the full right to use the money collected from electricity bill.

The MHP also operates two mills, a 5 kW and a 180 W, for certain times during the day. The mills are run by both electricity and diesel with diesel being the substitute when electricity is not available.



4.4.6 Description of Research Village 6: Arman (Myagdi)

Arman is situated in Myagdi District at 5 hours' walking distance from Beni, the district headquarters.

The village is predominantly populated by the ethnic Gurung community whose main occupations include agriculture, animal husbandry and foreign jobs (army, labourer).

REDP initiated its activities in 1998. Consequently, a 10 kW micro hydro power plant has been installed in the village that has benefited 70 households.

Chapter 5 Research Findings

The vision for development in Nepal was already given with development targets like

- 1. Awareness creation,
- 2. Change of attitudes,
- 3. Change of the situation by its people with self-motivation and self-initiation,
- 4. Leading to fulfilling basic needs with income above poverty line, food, water, shelter,
- 5. Better access to health and education, social justice and equality.

To test the hypothesis that community mobilization combined with the motivating "energy tool" is a prerequisite for sustainable development, the detailed **research questions** for **key areas** were already defined:

- 1. What <u>functional institutions</u> are available?
- 2. What are the technological changes in the villages?
- 3. What is the status of skilled human resources in the research areas?
- 4. What are the economic changes of the following activities?
- 5. What are the environmental benefits for the community?
- 6. What are the social transformations brought about to the rural society?

To answer the above questions, the findings are prepared and analysed as facts based on quantitative data of household surveys. Qualitative data based on interviews are additionally supplementing the findings.

It is worth mentioning here that not all of the vast number of about 150,000 survey data are displayed in totality but rather in selected scenarios, places and indicators to obtain results related to the basic questions of the research.

5.1 Functional Institutions

5.1.1 Grass-root Organizations and Leadership

Community Organizations (COs):

The idea behind "Community Organizations (CO)" was already discussed previously. It is looked upon as a basic element of and for community mobilization. Although COs have no legal status, it is important for the village that these groups are organized, motivated and qualified for taking all kinds of decisions for the development of the rural community they are living in. The individual CO has its own rules and regulations, statutes, roles and responsibilities which all members have accepted and agreed to abide by.

The function of the CO as grass-root organization is also immensely important as it binds like-minded people with common interest in a group to organize themselves and start undertaking something for socio-economic upliftment.



(by author)

These grass-root organizations, as a result of community mobilization, can be seen as a catalyst for social transformation which also stimulates the members to organize themselves, take group action by sharing their problems and seeking their own solutions, pool their own resources, obtain external help, and participate actively in the decision-making processes.

The social situation and role of gender in a traditional rural society was taken into consideration by forming separate "male" and "female" COs to prevent the situation where women are kept out from "male" meetings. Each CO has one chairperson to conduct regular weekly meetings and a manager to keep the financial records and minutes of all meetings and collective decisions.

The trend in formation of community organizations in the 25 districts where rural energy projects were implemented is shown in the following illustration. Before project implementation, there were no comparable grass-root organizations in the village except mothers' group. The main roles of such groups were collecting donations through cultural performances (performing dances and songs) in order to do some social welfare activities like building temples and performing village "pujas" (worshipping God for the betterment of the village community). The traditional mothers' groups still exist and continue its activities even now.

Not a single CO existed in the villages in the research areas in 1996. In Arman village, the formation of Community Organizations started from 1998 only during the second phase of Rural Energy Development Programme.





Over the years, the total number of COs in all the programme areas reached nearly 3000 in 2004. The ratio of male to female community organizations seems to be nearly equal in all villages.



Every household holds a membership in both the male and the female COs and each CO member deposits a fixed weekly saving amount ranging from NRs 1 to NRs 5 as decided by the members themselves in the weekly CO meetings. The whole system works in the same manner as a rural banking and saving system which is managed and controlled by its members themselves with the target of initiating economic activities on a level that is suitable to villagers' financial capacities.

The trend of the capital formation is as shown in the following illustration. During the initial phase of programme implementation in 1997, CO members had in total NRs 0.04 million whereas after 7-8 years in 2004, the total capital formation was about NRs 22 million (!) collected through weekly saving. The rural remote villages, where people do not have ready cash in hand and always have to depend on money lenders paying high interest rates, were freer from economic dependency. Every CO had enough money to give as credits to its members as per the needs.



The figure also depicts that women were still economically more dependent or weaker than their male counterparts - the total capital formation of female COs with NRs 10.3 million was lesser than NRs 11.7 million of male COs.

A general question arising from these circumstances is why there was such a tremendous increase in CO formation at the local level?

Besides the mandatory requirements of the project which takes community organizations as a prerequisite for the project, the following reasons were found:

Overall Finding (1):

Members found an economic benefit from the CO in their daily lives: the weekly meetings with money savings from the members worked like "rural banking" which was transparent in accounting, book-keeping and money lending for individual members.

The attraction was found to be even more in female groups as they could easily obtain a loan with fair conditions from the CO to undertake small income generating activities or fulfil household needs without having to sell property or give a plot of land. "Guarantee" for paying back the money to the CO is the membership of the CO itself as well as the related social pressure within the group.

The villagers do not have to depend anymore on money lenders who charge high interest rates and unfair exploiting conditions of providing loans. Not surprisingly, the money lenders in the villages tried to oppose these activities – but without success.

For female villagers, it is the first time that they are allowed to attend village meetings, express their needs and ideas among other female members, which certainly boost their status and moral.

When discussed on how the group helped the economically weak members, it was reported by the women members that they give topmost priority to such weak members to take a loan from the COs and also extend necessary help to start up a business.

Apart from these positive aspects, some major constraints were also found in the Community Organizations especially in women's COs due to the lack of qualified managers who can keep proper financial records. This situation reflects the very low literacy rate of women in the villages. Normally, the COs appointed school-going students to keep those records. Nevertheless, the problem was that once they get married and then move to other villages.

Serious concerns for the continuation of COs were observed over the years as members were not meeting regularly anymore as before. Meeting once a week in the founding stages has changed to meeting once a month. Lately, the monthly meeting was also not attended anymore by all its members; hence, the manager just collected the money for savings individually.

Although the COs still exist, the members do not meet frequently nor do they volunteer in activities of the COs aimed at improving their communities. During the initial project phase, a sense of 'competition', i.e. cleaning the locality or repairing drinking water systems etc., were very positive aspects, but over the years the cleaning mechanism has disappeared. The expression given by the villagers was that their mission was completed

on commissioning an energy project like a Micro hydro power plant and now that the village has electricity, they do not need to meet every week.

Functional Groups:

In addition to the COs, Functional Groups (FGs) were also established in the village for implementation of specific projects/activities.

The two major functional groups established in the villages were:

- Micro Hydro Functional Group, and
- Forestry Functional Group.

Unlike as in COs with separate male and female membership, the FGs were represented equally by both men and women; the equal participation of men and women in an organization can be taken as a social "revolution" in the traditional role of gender in village communities.

Similar to the problem of decreasing regular participation of members in the COs, the same trend was also found with the FGs; after the projects were accomplished, the regular meetings slowly eroded or, in some cases, the FGs dissolved completely.

This tendency of eroding active participation leads to a substantial first interpretation:

Overall Finding (2):

The determination and motivation of the members of Community Organizations (COs) and Functional Groups (FGs) decreased over the years as they accomplished their activities and energy projects in their villages. The mentality of the people was more relaxed and they felt that their mission is accomplished.

5.1.2 Organizational Capacity Building

As already described in the earlier sections, major constrains were found in the Community Organizations (especially in women's COs) which are faced with the lack of qualification. To assess the status of organizational capacity building, a method applied by 'Survey of Socially Mobilized Communities' known as SSMC (NHDR 2004, p.74) was adopted and modified according to the need of the research.

A set of qualitative indicators for eight different dimensions of institutional capacity building adopted by REDP project was considered for this study. The eight indicators were

- 1) Level of participation,
- 2) Leadership,

- 3) Consensus in decision making,
- 4) Transparency,
- 5) Accountability,
- 6) Mutual trust,
- 7) Conflict management capability,
- 8) Partnership.

All eight indicators were measured on a five point ordinal scale between very good (5 points) and worst (1 point) outcome. The overall score of each indicator was calculated by giving points to different sub-indicators that was conducted through participatory approach with women's and men's group separately:

- 1) Level of participation: Formulation of rules / community development,
- 2) Leadership: Honesty / dedication / capability,
- 3) Consensus in decision making:
 - Selection of chairman and manager,
 - Formulation of rules,
 - Programme selection,
 - Implementation,

Monitoring and evaluation,

- 4) Transparency: Decision making / saving and investment / funds,
- 5) Accountability:
 - Leadership accountability to groups,
 - Members' accountability,
 - Accountability of stakeholders,
- 6) Mutual trust: Team work / tolerance / harmony,
- 7) Conflict management capability:
 - Manage inter-group conflicts,
 - Manage intra-group conflicts,
 - Working together in harmony,
- 8) Partnership with:
 - Village Development Committee,
 - District Development Committee,
 - District line agencies,
 - Financial institutions/banks,
 - Donor organizations,
 - NGOs/INGOs.

The status of the organizational capacity building of grass-root organizations is given in the following table to show participation in COs after a period of 5 to 6 years.

| | Piug | har | Ghun | nlekh | Tan | nan | Sar | kuwa | Pint | hali |
|-----------------------------------|--------|------|--------|-------|--------|------|--------|------|--------|------|
| Qualitative indicators | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male |
| 1. Level of Participation | | | | | | | | | | |
| Formulation of rules | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 |
| Community development | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 4 | 4 |
| Sub-total (1) | 2.5 | 2.5 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 |
| 2. Leadership | | | | | | | | | | |
| Honesty | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Dedication | 3 | 4 | 3 | 4 | 2 | 4 | 2 | 2 | 2 | 3 |
| Capability | 2 | 3 | 2 | 4 | 2 | 4 | 2 | 3 | 2 | 4 |
| Sub-total (2) | 3 | 3.6 | 3 | 4 | 2.6 | 4 | 2.6 | 3 | 2.6 | 3.6 |
| 3. Consensus decision | | | | | | | | | | |
| making | | | | | | | | | | |
| Selection of chairman and manager | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Formulation of rules | 3 | 3 | 4 | 4 | 3 | 4 | 2 | 2 | 4 | 4 |
| Programme selection | 3 | 3 | 3 | 4 | 3 | 4 | 2 | 2 | 4 | 4 |
| Implementation | 3 | 3 | 3 | 4 | 3 | 4 | 2 | 2 | 4 | 4 |
| Monitoring and evaluation | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Sub-total (3) | 3.2 | 3.2 | 3.4 | 3.8 | 3.2 | 3.8 | 2.6 | 2.6 | 3.8 | 3.8 |
| 4. Transparency | | | | | | | | | | |
| All decisions | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

| Saving and investment | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Funds | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Sub-total (4) | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 5. Accountability | | | | | | | | | | |
| Leadership accountability to | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 |
| groups | 5 | 5 | 5 | 5 | 5 | 5 | 2 | 5 | 2 | 5 |
| Members' accountability | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Accountability of | 3 | 3 | 3 | 2 | 1 | 4 | 3 | 2 | 1 | 1 |
| stakeholders | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 2 | 4 | 4 |
| Sub-total (5) | 3 | 3 | 3 | 3 | 3.3 | 3.3 | 2.6 | 2.6 | 3 | 3.3 |
| 6. Mutual Trust | | | | | | | | | | |
| Team work | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 4 |
| Tolerance | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 4 |
| Harmony | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 |
| Sub-total (6) | 3.3 | 3.3 | 4 | 4 | 3.6 | 3.6 | 3.3 | 3.3 | 4.3 | 4.3 |
| 7. Conflict Management | | | | | | | | | | |
| Capability | | | | | | | | | | |
| Manage inter group conflicts | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 |
| Manage intra group conflicts | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 4 | 4 |
| Working together in | 3 | 3 | 4 | 1 | Л | 1 | 3 | 3 | 1 | 1 |
| harmony | | 5 | - | | - | | 5 | | - | - |
| Sub-total (7) | 3 | 3 | 3.3 | 3.3 | 3 | 3 | 2.6 | 2.3 | 3.6 | 3.6 |

| 8. Partnership | | | | | | | | | | |
|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Village Development | Δ | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 |
| Committees | т | - | 5 | 5 | 5 | 5 | 5 | 5 | | |
| District Development | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | Λ | Λ |
| Committees | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 |
| District line agencies | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 4 | 4 |
| Financial institution/banks | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 |
| Donor organizations | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| NGOs/INGOs | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 |
| Sub-total (8) | 3.1 | 3.1 | 3 | 3 | 3.1 | 3.1 | 2.8 | 2.8 | 3.5 | 3.5 |
| Total Average | 3.1 | 3.2 | 3.3 | 3.5 | 3.1 | 3.3 | 2.8 | 2.8 | 3.4 | 3.6 |

(Measurement of impact: 1: very bad; 2: bad; 3: satisfactory; 4: good; 5: very good)

Table 5.1: Organizational Capacity in Research Area after 5 to 6 Years of Implementation

Method adopted from (NHDR 2004 pp.182-184) and modified according to the requirement of the research by author in 2004. The compilation of the results (assessment done by villagers of research villages) was done based on participatory approach.

In comparison to the initial phases of COs, the picture has changed in some aspects:

During the onset of community mobilization process, the motivation for **participation** in the COs and FGs was high with ranking up to scale of 4 and above out of the maximum of 5 while after 4 to 6 years, the level eroded to a scale of 2 or 3. This again shows the dwindling motivation to make the process of development sustainable and rather than just working for a temporary project.

Both men's and women's group have highly rated the honesty of the **leadership** in all research villages which means that the villagers were able to choose the right leadership in their grass-root organizations by themselves, not through external appointments. The male chairpersons in all five researched villages seemed to be capable with score of 4 and 3 whereas women chairpersons still lacked behind with 2 points. The reason behind it was the level of education. Most of the female chairpersons were not formally educated, therefore, reading and writing was not possible for them. Adult literary classes helped to some extent but according to the women's group, the programme was not continuous. Dedication of the leadership was observed to be lowest with a rating of 2 in case of Sarkuwa village (both female and male) and female CO in Taman and Pinthali. The reason behind it was that the chairpersons were not giving enough time for their COs due to other obligations.

Under the heading of **consensus in decision making** process, five sub-criteria were evaluated by the community themselves. There was no second voice or conflict on selecting the CO chair-persons and managers in their respective groups which was rated with the maximum 5 points. Among other sub-criteria like formulating rules, selecting programme and implementation, both male and female CO organizations evaluated giving 3 and 4 points which mean satisfactory to good range.

The **transparency of decisions, saving and credits** seem to be guaranteed among villagers, which was also rated as 4 points. During discussion among CO members for taking any kind of decisions, consensus decision making process and transparency among all members was emphasized from the initial phases of the project. This was found to be a positive aspect as indicated by the villagers.

The **accountability of the leadership**, members as well as the stakeholders seems to be moderate around 3 points. However, in villages like Pinthali and Sarkuwa, the chairpersons and managers of various groups have left the village due to personal reasons (getting married, migrating to other places, etc.) without appointing a new

leadership. The accountability of the leadership was not fulfilled as expected by the members of these groups.

The **mutual trust** among community members and villagers for team work, tolerance and harmony seem to be good which is about 3 - 4 points.

Partnership with Village Development Committees (VDC) and District Development Committees (DDC) was found to be excellent in all research villages as it was mandatory to mobilize resources from these institutions. Of the total energy project cost, a minimum of 5% should be given by the VDC and 10% by the DDC from their development funds, which was found to be successfully carried out in all villages. But the idea of village development through cooperation and mobilizing resources from other stakeholders like district line agencies, NGOs/INGOs, etc., was not found to be effective. Financial banks like Agricultural Development Bank of Nepal were collaborating with villagers for having access to loan and subsidy programmes at all levels.

The overall index of organizational capacity building was found to be between 2.8 for female to 3.6 for male. This clearly shows that the women are still lacking behind men in rural villages.

It was already found that after 5 to 6 years of mobilization, the COs still exist but frequency of meetings or volunteering in activities for the village communities were greatly reduced or even disappeared. This leads to the interpretation that there is no concrete perspective for these community organizations and serious questions arise on the sustainability of these grass-root organizations after 10 or 15 years. With this present observed trend, it can be inferred that these informal organizations will not be sustainable but just a temporary initiative.

Overall Finding (3)

People (male and female) in the villages were able to organize themselves, taking decisions in consensus and carry out the project. The female members showed lower capability compared to their male counterparts because of lack of basic literacy skills.

The villagers seem to be united only for limited village activities. After implementation of the project, they tend to focus more towards their individual day-to-day affairs than to development of their community - thus leaving the Community Organizations behind as a temporary initiative.

5.2 Technological Changes

Knowledge about technical options is a decisive element for implementing an energy related project. Prior to the decision on which technology the villagers would like to implement (viewing technical, economical, geographical and social settings), awareness and information dissemination is required from the project side at all levels like women's adult literacy groups, village schools, both male and female COs, elected and nominated political leaders and members of Village Development Committees or District Development Committees.

The baseline survey carried out in 1996/97 in the research villages indicates that almost all of the rural people had not previously heard, seen or been aware of renewable energy technologies like biogas, solar home systems or even electricity generation using available water resources in their villages. This specific situation totally changed over the years.



Taking Pinthali village as an example, it showed that about 20% of the villagers (mostly active groups who were working as village development chairperson and members) had heard about electricity generation from micro hydro power plant before 1996. Only 5% of Pinthali people had heard about electricity generation from the sun through solar photovoltaic systems. Biogas technology was mostly unknown in all villages before 1996. Some at least, knew the name and use of this technology as "gobar gas", which means "gas from cow-dung" in local terms.

In case of energy saving 'Improved Cooking Stoves (ICS)', up to 80% of the people had already heard about those technologies in all the villages in 1996. The reason for such knowledge about the ICS technologies was due to the fact that the Department of Forestry had implemented community forestry programmes through District Forest Offices in every district of Nepal. The ICS were disseminated for conserving forest, saving firewood and improving health hazards of women in the villages. Besides being aware about this specific ICS technology, the findings clearly showed that people in rural areas are found to be isolated in terms of technological advancement and knowledge dissemination.

Regarding awareness creation and knowledge of new energy technologies, the situation had changed in 2002 when almost 100 % of the people in all villages heard about the new technological options.



The impact of the widespread information and technology dissemination in rural villages was enormous. Installation of a Micro hydro power plant in the village by the villagers themselves was a kind of technological revolution in such remote villages of Nepal boosting confidence level and motivation for using rural technologies.

The illustration above shows that the rural energy project is able to disseminate various kinds of energy technologies. Especially, the significant increase in the use of Improved

Cooking Stoves (ICS) was possible only because of this simple technology can be built with local materials on low cost.

Several questions arise on what the real **motivation** was behind the use of technologies:

- 1. Were villagers aware of the type of technologies disseminated?
- 2. Was there imposition from outside for the implementation of the project?
- 3. Were villagers tempted to take the technologies as gifts rather than their need?

After interviews with various village groups like women, school children and men, it was obvious that the villagers were aware of the advantages of new technologies. It was expressed that having **electricity in the village was the biggest motivation** for them - that means electricity was the highest attraction for the villagers and they were ready to fulfil any pre-conditions set by the project for getting electricity.

The second motivational factor was that REDP was funding 50% of the cost of non-local materials of the energy project as well as contributions of minimum 10% and 5% of total cost from District and Village Development Offices respectively. In total, around 75 to 80% of the overall project cost was granted through various financial means, which was very attractive for the villagers.

Implementing new technologies was based on those high motivations and expectations but the question still remains – can the technological changes itself be taken as sustainable?

Although a final answer might be obtained only after 15 years, it is already worth mentioning about potential risks and limitations which could be seen in the economical sustainability. Of course, there is no financial risk for the technology of an improved cook stove, but it is different for investment-based technologies like a micro hydro power plant. The risk factor lies in the investment plus running cost against the revenues coming out from the technology.

Within the investigated areas, the case of Sarkuwa village is taken as a representative example:

In 1999-2000, the electricity was serving about 330 households each paying NRs 45 per month as fixed tariff in addition to an initial investment of NRs 100. The voluntary labour of the community to implement the project is also considered as financial contribution worth nearly 20,000 days at a rate of NRs 50/day. Using electricity reduces kerosene consumption which saves another estimated NRs 1.548 million which is also taken as indirect income by saving of money. Besides the households, a rice mill also pays a

monthly tariff of NRs 6750. Under the assumption that the number of paying clients is not dwindling but at least stable, the total income of the plant within the next 20 years is calculated to be about NRs 6.22 million.

The expenses in the same period are investment for electrical, mechanical and civil works, etc. which amounts to a total of NRs 2.6 million. Similarly, the running cost for operators and maintenance is NRs 2.589 million and reduced by a bank loan (Rural Energy Development Programme 2000, p.6-4).

Under these conditions, the total cost-benefit ratio results in 6.22 / 6.02 = 1.03 showing a non-sustainable base for the economic perspective of the new technology even under the very ideal pre-condition that saved money on kerosene is available for the hydro plant. Only under the assumption that portions of the investment is coming from the donors' side, the technology might be economically sustainable.

This depicts a typical problem of rural economic power that only under donors' assistance can the new technology sustain on the long run, or under the condition that the income situation in the village is remarkably improved through the new technology and related income generating activities that people can pay higher tariffs over time.

Recommendations were already proposed from different sides, i.e. to introduce equipment which uses electricity for income generating activities like wood or agro-processing units (SESAM 2001, p.31)

Overall Finding (4):

Information dissemination on new energy technologies was possible and accepted in the initial phase as part of the project.

After implementation of the technology, there is no further information flow or access to information that the villagers might need.

The economical sustainability of investment-based technologies can hardly be achieved and depends mostly on grants and subsidies provided by donors.

5.3 Skilled Human Resources and Local Capacity Building

While discussing aspects of people's technological knowledge and awareness on technological changes, the improvement of skills is a decisive factor.

Over years of project implementation, a significant number of villagers have undergone additional training which was mainly on personal development, organizational capacity building, further income generating activities as well as technical and natural resource management as shown in the table below:

| Type of Training | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|------|------|------|------|------|------|------|------|------|
| Technical Training | 0 | 98 | 235 | 486 | 843 | 1025 | 1166 | 1481 | 1482 |
| Income Generating and Micro Enterprise | 0 | NA* | 734 | 2028 | 3424 | 4701 | 5931 | 4345 | 1917 |
| Environment and Natural Resource Management | 0 | NA | 65 | NA | 4613 | 1366 | 2219 | 1715 | NA |
| Institution Development | 0 | NA | 1591 | NA | 1363 | 4108 | 6446 | 6569 | 6722 |
| Orientation/Visit/ Tours | 0 | NA | 300 | NA | 1599 | 1485 | 2047 | 5901 | 1766 |
| Others | 0 | NA | NA | NA | 3930 | NA | 3914 | NA | 4498 |

NA* Data Not Available

Table 5.2: Measures of Capacity Building under REDP

(UNDP/REDP 1997[1], p9-12; UNDP/REDP 1998[3]; p.49, UNDP/REDP 1999, p.65-67; UNDP/REDP 2000[1], p.61; UNDP/REDP 2001[1], p.59; UNDP/REDP 2002[1] p.49; compiled by author)

The following measures for individual or organizational capacity building were provided:

Technical Operation:

Technological empowerment basically deals with technological interventions appropriate in local conditions in order to improve the existing village situation with wider range of economic opportunities. It also deals with people's knowledge, awareness, skill and capability on technology. The main issue of concern under technological aspects was whether there is enough technical manpower in the village to maintain and operate new technologies like micro hydro system, biogas, improved cooking stoves, etc. The so-called "technological security" is an important aspect after introducing a new technology in the village because failure of the project is often due to lack of capable human resources to operate and maintain the technology in the long run. Ready availability of spare parts in the village itself and easy accessibility of technical service centres (workshops) nearby is a must. The skilled technical manpower, spare parts and service centre are the basic indicators taken for this research to ensure technological security in the village.



Illustration 5.7: Village Technician (by author)

The operation of micro hydro power plants in Taman, Piughar, Ghumlekh, Sarkuwa and Pinthali is carried out by local micro hydro operators. Two operators from each village were trained by the project in basic operational skills. The Micro Hydro Functional Group then hired the operators with monthly salary ranging from NRs 1,000 to 2,500 which should encourage the local technician to stay in the village and earn a living.

The example of Pinthali shows how the community organized their technical security:

A special fund of NRs 200,000 was allocated by the villagers for repair and maintenance service showing that they are well aware of the technological security on the long run. Trained technical operator and manager are running the micro hydro technology, and these village technicians have trained other villagers to operate the micro hydro plant. Besides that, they have installed three more micro hydro power plants (peltric sets) in the neighbouring villages.

Furthermore, questions on whether the skilled people would stay in the village or go to larger cities in search of better job is still prevalent. During the research in the villages, it was found out that the trained operators were working in the four villages of Taman, Piughar, Ghumlekh and Sarkuwa. But in the case of Pinthali, the community had to hire a new person without any formal training as the trained operator left the village for a better job elsewhere.

| Place | Technology | Cost | House | End Use | Related Income |
|----------|--|-----------|--------|---|--|
| 1 1400 | reenneregy | (NRs) | -holds | (Direct) | Generating |
| Taman | Micro Hydro Power Plant (20 kW capacity) | 2.3 Mio. | 200 | Rice huller, Oil expeller, grinder | Paper making |
| | ICS | | 230 | | |
| Sarkuwa | Micro Hydro Power Plant (24 kW capacity) | 25.6 Mio. | 290 | Rice huller, Oil expeller, Grinder | Computer training centre, battery charging |
| | Biogas with toilet attached | | 26 | | |
| | Solar PV | | 19 | | |
| | ICS | | 112 | | |
| Piughar | Micro Hydro Power Plant (12 kW capacity) | 1.2 Mio. | 53 | - | Poultry, weaving |
| | Biogas with toilet attached | | 7 | | |
| | Solar PV | | 7 | | |
| | ICS | | 44 | | |
| Ghumlekh | Micro Hydro Power Plant (10 kW capacity) | 1.4 Mio. | 53 | Rice huller, Oil expeller, Grinder | Poultry, restaurant, |
| | Biogas with toilet attached | | 15 | | |
| | Solar PV | | 5 | | |
| | ICS | | 74 | | |
| Pinthali | Micro Hydro Power Plant (12 kW capacity) | 1.3 Mio. | 116 | Rice huller, Oil expeller, Grinder, | Furniture shop, tailoring, Lampat making, Thanka painting, garlic |
| | Biogas with toilet attached | | 31 | | |
| | Solar PV | | 30 | | |
| | ICS | | 75 | | |
| Arman | Micro Hydro Power Plant (10 kW capacity) | 1.47 Mio. | 70 | Rice Huller, Oil expeller, Grinder | |
| | Biogas with toilet attached | | 67 | | |
| | Solar PVI | | 138 | | |
| | ICS | | 100 | | |

In total, technical training was provided as follows in the research area:

Table 5.3: Technological Interventions in Research Area UNDP/PEDP 2001[1] p.48-53 vorification from survey by author in 200

(UNDP/REDP 2001[1], p.48-53, verification from survey by author in 2004)

Repair and Maintenance: The micro hydro operators were trained to do small repair and maintenance services in the village itself. Naturally, the operators were having limited skills but regular refreshers' training was not conducted either by the rural energy project or by any other technical institution. Due to this limited level of technical knowledge, practical experience, and lack of confidence about the technology, the operators were not able to do the repairs themselves. Whenever small repairs were required, the operators had to take the equipment to a near-by workshop or a higher qualified technical person was hired to do the repairs in the village. Both these cases meant that the village had to stay without electricity for some days.

Rural Energy Service Centre: To provide better repair and maintenance options, Rural Energy Service Centres (RESCs) based on private entrepreneurship were established by the project to provide technical services in the districts. This had led to the reduction of dependence on the central markets (Kathmandu or Butwal) for immediate repair and maintenance of the rural energy technology. It has also created an environment of competition within the sector, which has helped to reduce the cost. The technical service of the RESC is not limited only for REDP districts but is also provided to villages of adjoining districts. It can be concluded that RESC plays an important role in technology transfer on the long run.

Financial Management: It was observed that the management of micro hydro schemes in the research villages was under the responsibility of the so-called managers. These managers were also trained by the project. One of the pre-requisites for managers was that they should have minimum level of formal education up to class 8 or 10. Each community with a micro hydro project had hired trained managers whose main responsibility was to collect electricity revenue from every household and to keep the financial records transparently. Since the manager's job was not technical, rural women were also taking this opportunity in the villages. The salary of the managers varies from NRs 2,000 to 2,500 per month which was quite an attractive salary for the village level of income.

Fund generation: In every village, the community had established a fund named "Community Energy Fund". All electricity revenues, salaries for operators and managers, cost for repair and maintenance and also enterprise development loans were disbursed from this fund. Not surprising, the communities were very cautious and interested for information regarding the balance of the community energy fund. The balance sheet of the fund was also transparent for the whole community.

Following tables as examples from two selected places (Pinthali and Sarkuwa) provide a first overview on the type of training, number of beneficiaries and gender related aspects.

| | Training of Villagers in Pinthali | | | |
|------------------------------|--|------|--------|---|
| | Estimated Population: 709 | Male | Female | Total |
| Micro Enterprises | Off-season vegetable | 12 | 18 | 30 |
| Training | | 12 | 10 | |
| | development | 8 | 1 | 9 |
| | Incense stick making | 0 | 3 | 3 |
| | Poultry farming and village specialist | 4 | 0 | 4 |
| | Mushroom farming | 8 | 8 | 16 |
| | Laundry soap making | 3 | 0 | 3 |
| | Thanka painting | 22 | 8 | 30 |
| | Hand loom knitting | | 10 | 10 |
| | Lamapat wood carving | 2 | 0 | 2 |
| | | 59 | 48 | 107 |
| Energy Technology | Micro hydro operator | 2 | 0 | 2 |
| | Advance operator | 1 | 0 | 1 |
| | MH repair and maintenance | 1 | 0 | 1 |
| | MH manager | 1 | 0 | 1 |
| | Advance manager | 1 | 0 | 1 |
| | Electrical pole treatment | 2 | 0 | 2 |
| | ICS technicians | 2 | 1 | 3 |
| | House wiring | 1 | 0 | 1 |
| | | 11 | 1 | 12 |
| Institutional Development | COs operation and management | 28 | 28 | 56 |
| | CO audit | 4 | 0 | 4 |
| | Micro hydro cooperative management | 4 | 0 | 4 |
| | In-country study tour | 14 | 10 | 24 |
| | | 50 | 38 | 88 |
| Environment Management | Nursery management | 4 | 1 | 5 |
| | Community environment specialist | 0 | 1 | 1 |
| | Community forestry management | 3 | 1 | 4 |
| | Health and environment | 0 | 70 | 70 |
| | Forest utilization and management | 5 | 2 | 7 |
| | | 12 | 75 | 87 |
| | Total | 132 | 162 | 294 (about 40% of village populat.) |

 Table 5.4: Human Resource Development in Pinthali Village

(Rural Energy Development Programme 2002 [unpublished] p.3 and by author in 2004)

| | Training of Villagers in Sarkuwa | | | |
|-------------------------------|---|------|--------|-----------------------------------|
| | Estimated Population: 3290 | Male | Female | Total |
| Micro Enterprises Training | Pig rearing | 3 | | 3 |
| | Poultry farming | 10 | 18 | 28 |
| | Enterprise introductory workshop | 35 | 56 | 91 |
| | Enterprise development | 5 | | 5 |
| | Rural animal health training | 2 | | 2 |
| | Goat rearing | 15 | 13 | 28 |
| | Bee keeping | 4 | 1 | 5 |
| | Off-season vegetable farming | 60 | 55 | 155 |
| | Ginger/cardamom training | 2 | | 2 |
| | Milk processing training | 2 | | 2 |
| | | 138 | 143 | 281 |
| Energy Technology | Micro hydro operator | 2 | | 2 |
| | MH manager | 1 | | 1 |
| | ICS technicians | 2 | 4 | 6 |
| | House wiring | 1 | | 1 |
| | Solar technician training | 1 | | 1 |
| | Biogas technician training | 1 | | 1 |
| | | 8 | 4 | 12 |
| Institutional Development | COs operation and management | 26 | 34 | 60 |
| | Informal education | 1 | 8 | 9 |
| | | 27 | 42 | 69 |
| Environment Management | Forest management | | 2 | |
| | Nursery owner training | 5 | | 5 |
| | Community forest co-ordination training | 1 | 1 | 2 |
| | | 6 | 1 | 7 |
| | Total | 179 | 190 | 369 (about 11% of village popul.) |

 Table 5.5: Human Resource Development in Sarkuwa Village

(Rural Energy Development Programme 2002 [unpublished], p.5 and by author in 2004)

The main categories besides the technical training were:

- Income generating / micro enterprise,
- Institutional development,
- Natural resource and environment management.

<u>Income Generating / Micro Enterprise Training:</u> This was one of the most important aspects of the whole project to make villagers capable and to provide necessary trainings, new skills, and financial funds from COs to start additional income generating activities.

The number and distribution of gender in the training courses show some remarkable differences:

In case of <u>technical training</u> related to energy (like micro hydro operators, micro hydro managers, electrical wiring, solar and biogas technicians), the participation of women was virtually nil or very nominal.

When the question of the very less participation in technical field was put up for discussion in women's organizations, the women opined that operators' job, electrical wiring as well as repair and maintenance job are not suitable for them because the operators have to stay in the power house to monitor and run the plant. Normally, the power plants are in isolated riversides 1-2 km from the village. From the security point of view and social attitude towards them, it does not allow women to take such jobs. In addition, most of the married women are illiterate and without basic education it is difficult to build up their confidence for technical jobs.



Participation in the training under <u>institutional development</u> seemed to be almost equal for men and women in both villages. However, it was observed in Pinthali village that only male had participated in skill trainings for decision making positions (like auditing or micro hydro cooperative management). Also finances and cooperative management were found to be under male dominations.

Under <u>natural resource and environment management</u> women's participation was found to be significantly higher in health and environment sector because they were responsible for village cleaning and child caring. In contrast, nursery management, forest utilization and management, community forestry management trainings were again dominated by the males. In general, the women's role was more orientated to management and care taking while decision making training was more under male activities.

Besides the three categories of skill development as discussed above, the most important aspect of enhancing rural income was through various income generating trainings and <u>micro enterprise development</u> with equal participation of male and female members in both villages being a very positive feature.



Among various income generating trainings such as off-season vegetables or poultry farming, soap making or handloom knitting, trainings based on traditional values such as *"Thanka"* painting and *"Lamapat"* wood carving were also provided. The masters (highly skilled so-called *"Gurus"*) of these special traditional crafts wanted to transfer the skills and improve income in a commercial way in their villages.

Similarly, the income related training was conducted in Sarkuwa village with women's participation even higher than men's. But in case of enterprise development training, the participation was found to be exclusively of men.

Overall Finding (5):

Electricity for the village was the highest motivational factor for technology promotion, human resource development and project management.

Technical awareness and capacity building was related to technologies used in the project (i.e. micro hydro) but limited to basic operation that were insufficient for repair and maintenance.

Trainings were gender biased with women mainly involved in traditional roles of care-taking while men dominated in technical and decision-taking trainings.

5.4 Economic Empowerment

It is of major interest (and part of the hypothesis) to find out whether the programme had helped villagers in entrepreneurial training and capital investment to initiate further income generating activities in combination with new technology and energy.

As already discussed previously, the rural energy project had supported the villagers from the very beginning for productive end-uses/enterprises promotion with trainings as well as identification, planning, and establishment of "micro" enterprises. The project also provided end-use promotion grant to each Micro Hydro Functional Group at the rate of NRs 10,000 per kW of power output for creating a revolving fund within a Community Energy Fund (UNDP/REDP 2003, p.3). The potential entrepreneur has access for loan amounting to 50% of total investment from Community Energy Fund and bears the remaining 50% by self as his/her equity.

Capital formation was initiated through collection of mandatory weekly savings by the established COs and the success was already shown in previous subheading 5.1. So the basic pre-conditional requirements related to training, skills and capital were fulfilled.

However, the main question to ponder is whether new initiatives, new products, new rural workshops or other cottage and family based income generating activities had come up and could sustain and whether energy as an entry point helps or motivates people to initiate income generating activities.

It was found that the cumulative investment was rising with highest increase rates in the first 3-5 years. But interviews showed that most of the loans were taken for household needs, which was not the main purpose of the savings scheme. Nevertheless, at least the villagers did not have to undergo bureaucratic difficulties in banks or dependencies on village money lenders.

The findings on enterprises and income generating activities were discussed with the communities on three different situations:

- How was the income generating and enterprises situation before the project?
- What had changed in the village with intervention and support of the project?
- And what was the situation after the project activities were withdrawn?

The following research findings on enterprises and income generating activities established in the villages are selected examples from Pinthali and Sarkuwa villages, representing similar situations and findings in other research areas.

Phase A: Income Generating Activities in Pre-project Phase (before 1996)

Main traditional source of income was based on agricultural production in both villages of Pinthali and Sarkuwa. Almost all households were dependent on agriculture in both villages for their subsistence. In case of Sarkuwa, the yield of crops like paddy, corn, wheat was very low due to it being traditional. There was lack of knowledge on improved methods of farming like cash crops with good infrastructure of irrigation facilities. Therefore, the farmers did not have sufficient income from agriculture besides subsistence farming.

Generally, the geographic location of Sarkuwa village is also in difficult terrain and also lack proper road and infrastructure facilities, therefore, apart from agriculture and few animals, there were no notable income generating activities found in the village.

Pinthali village was different in some aspects although the geographic situation was similar with lack of proper road and infrastructure facilities. Majority of the households were dependent on subsistence farming but garlic production was done by a few (about 10-15) richer households which means cash and income was only with richer households. Additionally, traditional income generating activities like "*Thanka*" painting and "*Lamapat*" making was already discussed and only few households were benefiting from those skills.

Phase B: Income Generating Activities in Peak Phase (1997-2002)

A peak phase of investment and micro enterprise activities was found within the first five years of programme intervention in the communities.

In Pinthali village, around 38% of the trained people (41 out of 107 trained) were engaged in various income generating activities and enterprises like garlic farming, saw mill, poultry farming, soap making, incense stick making, Thanka painting, weaving, etc. The following illustration shows the activities during pre- and peak phase.







Illustration 5.12a: Weaving (by author)



Illustration 5.12b: Incense Stick (by author)



Illustration 5.12c: Tailoring (by author)



Illustration 5.12d: Thanka Painting (UNDP/REDP 2000[2], p.4)



Illustration 5.12e: Agro Processing Mill (by author)



Illustration 5.12f: Soap Making (by author)

Illustration 5.12: Income Generating Activities in Pinthali

The situation in Sarkuwa village was different than Pinthali. Out of 281 people who participated in various income generating and enterprise development trainings, very

nominal income generating activities were actually put into practice. The major electricity and skilled based enterprises in Sarkuwa were as follows:

| Nos. | Enterprises | Power Consumption | Cost Invested |
|------|----------------------|---------------------|---|
| 1 | Chakra Thapa Milling | 5 kW 2-3 hrs/day | NRs 50,000 (REDP loan) NRs 50,000 (local contribution) |
| 2 | Khageshower Mill | 5 kW 2-3 hrs/day | NRs 25,000 (REDP loan) NRs 65,000 (local contribution) |
| 3 | Battery Charging | 250 watt 24 hrs/day | NRs 750 (local contribution) |
| 4 | Shanti Thapa Poultry | | |
| 5 | Veterinary Service | | |

Table 5.6: Electricity Based Enterprises in Sarkuwa Village (by author)

Although a big number of people had participated in off-season vegetable and ginger/cardamom farming as cash crops, pig and goat rearing, poultry farming, etc., the village community did not take any chance for commercial agricultural farming or animal husbandry for economic benefits. The problem was remoteness, no market potential and people mainly involved in daily subsistence farming rather than going for new income generating activities. Only a small market place called Sera Bazar is available near Sarkuwa village. The enterprising people from the market area, though, have taken some benefits of electricity (example given below).

Entering the Computer Age with Micro Hydro

"The Sera Bazar of Sarkuwa VDC of Baglung district has become the first village to enter into Computer Age under REDP. A Computer Learning Centre named as the Nepal Technical Institute (NTI) was established by a local entrepreneur Mr. Bal Bahadur Thapa, who is also the instructor of the institute. The ambitious dream plan of Mr. Thapa has been possible only because of the availability of dependable electricity generated by the community managed 24 kW Theule Khola Micro Hydro Scheme installed with the technical and financial support of REDP district office......Initiated with one computer, Mr. Thapa expanded his business and now has three computers. Mr. Thapa and Theule Khola MHFG have entered into a five year contract for the supply of uninterrupted electricity to the institute. Under the contract, the NTI has paid NRs 10,000 (Rupees Ten Thousand) as the initial connection charge. Besides, it pays NRs 500 per month as electricity tariff....

The NTI only provides training to local youth interested in computer, but also access computer desktop services to local customers, computer awareness classes to students of three local schools and internet and email facilities to rural people and visitors to the village......In fact, it is a history witnessed with a great change for the betterment." (UNDP/REDP 2002[1], p.5)

Phase C: Income Generating Activities after 2002

For how long will people's aspiration and motivation remain for such activities is always a critical question. The question of sustainability arises when the programme redraws the activities after implementation phase.

Although it was already shown that not all communities were able to take benefits out of trainings on skills and capital formation, at least the "better-off" communities with new income generating initiatives should keep going on new paths of economic development. The following graph shows the example of Pinthali Village with its remaining income generating activities after terminating the project phase.



In Pinthali, out of 15 different rural based income generating and enterprise activities involving 58 households, only 5 activities remained with 97 households while, out of it, 93 (= 80% !) households were occupied with traditional garlic farming, one tailoring shop, one agro-processing mill, one *"Lamapat"* making, and one furniture workshop. The former

"Thanka" painting had shifted to a nearby market place to do business in a commercial way due to better transport and good electricity facilities.



The overall annual investment for income generating activities is drastically decreasing in all communities after the programme redrew its activities.

So, besides few traditional based enterprises, nothing was found in the village. The different reasons why the enterprises no longer existed were explained by the villagers as follows:

- the main problem was the missing market potential for the products,
- another major problem was missing availability or difficulties in transporting raw materials, like chemicals required for soap production,
- people do not want to take any risks on cash crop production but prefer to have reliable food production for domestic consumption. The nutritional level of food was found to be very poor while protein-rich food like fish, meat, and eggs were very rare. Even if it was available, it was very expensive for the rural people to afford.

So consequently, all other income generating activities were slowly disappearing due to market problem, financial loss or some other personal reasons.

It is not possible to investigate the detailed change in available income per rural household. On one hand, people do not have detailed overview over their monthly cash flow while on the other hand, the income data are too sensitive to be discussed in detail.

However, to find out the trend on how people are earning their living, direct questions were asked for the sources of income with results compiled in the illustration below.



- i. It proves the former (unexpected) findings that agriculture after project implementation plays an even major role in the source of income. The agricultural sector as a source of income has increased in all places (except Ghumlekh) with percentages going up to 55% in Taman, 85% in Aman and even 100% in Piughar. The main reasons behind the increasing role of income from agriculture are the improved facilities for irrigation system which is a by-product of the canal construction for the micro hydro power projects along with the results from the trainings for the villagers on different cash crop production.
- ii. The second highest source of income is from foreign jobs. It is important to note that in all villages about 75% to 80% of the male population from every household are serving foreign employers abroad either in armed forces for the Indian and British Army or mostly unskilled labour jobs in Singapore, Arab countries, Malaysia, South Korea, etc. . This situation has not changed before and after project implementation.
iii. The third category of income is coming from either inside village or from bigger cities where people work for various governmental and non-governmental organizations, private companies or any other kind to support their families in the village. Such employment rate is increasing up to 40% after 4 to 6 years compared to 1997 as the younger generation in the village do not go for work in the agricultural land and therefore shift from traditional professional to more "modern" jobs.

Landless families in the villages depend on seasonal or daily labour. The labour jobs with daily wages in Taman and Arman villages were decreasing over the years compared to 1997 because of the trend of going for foreign jobs was found to be quite high in these villages whereas in case of Sarkuwa, Piughar and Ghumlekh, the labour jobs had slightly increased as more local daily paid jobs were available through more small private enterprises or other activities.

iv. The fourth category is the development of enterprises:

Income from already existing traditional cottage industries was found to be still low because of no increment in market and customer potentials, for example, traditional hand-made paper which existed since decades in Taman where about 20 households were engaged in this small family business.

Income source from cottage industry was found to be nearly 30% in Taman. Ghumlekh and Piughar had started small family based enterprises after electricity was generated in the village. Therefore, it can be noted as positive indication that income source from cottage industries had increased to 20-25% in these villages.

Overall Finding (6):

Positive frame conditions for income generating activities and micro enterprises were created by the programme through training of skills, entrepreneurship and capital formation.

During a peak phase of about 2-3 years, under the guidance of the programme, new income generating activities were promoted and implemented. After the programme redraws, the new income activities decrease and finally vanish except traditional (improved) subsistence agriculture.

5.5 Environmental Benefits

5.5.1 Activities

The project had given equal emphasis on sustainability of resources and use of available natural resources at the micro level. The project encouraged the local users in the efforts of fulfilling their day to day needs of timber, fuel wood, fodder plants and other forest products. It was observed that the level of environmental awareness at the community level, village and district level was changing. No data were available from the statistics before 1997. According to Pinthali, Piughar, Ghumlekh and Taman village sources, there existed a so called "community forest" in all villages formed under District Forest Office. But proper protection and conservation of forest were not fully efficient.

In order to create awareness of their environment, various environment education activities were carried out in 2004 with more than 320 such campaigns through local schools, community organizations, functional groups, etc.

Local people were encouraged to do extensive plantation in barren lands which showed that 2.7 million saplings were planted with a survival rate of about 60%. Similarly, 183 community forests were handed over to the locals after evaluating their commitments and progress which gave very positive impressions. A minimum of one local nursery in each village was found to be established by the local residents with initial training and financial support from the project. So far, a total of 96 nurseries have been established. In case of Taman and Sarkuwa villages, the nurseries were given up due to the remoteness of the villages as well as the unfavourable climatic condition.

| Activities | 1996 1997 | 1998 1999 | | 2000 2001 | | 2002 2003 | | 2004 |
|--------------------------|--------------|-----------|---------|-----------|-----------|-----------|-----------|-----------|
| Nursery Establishm. | - | 13 | 44 | NA* | NA | NA | 96 | 96 |
| CM Forest | - | 27 | 119 | 57 | NA | NA | 181 | 183 |
| Plantation | - | 107000 | 330 071 | 1283 624 | 1 342 100 | NA | 2 702 622 | 2 714 873 |
| Environment Education | - | 28 | 130 | NA | NA | 322 | 322 | 322 |
| Toilet Construction | - | 1 397 | 4 012 | 6 914 | 1 183 | 10 295 | 10 986 | 12 111 |

*NA = Data Not Available

Table 5.7: Environmental Activities under REDP(UNDP/REDP 2000[1], p.15-16; UNDP/REDP 2001[1] p.23-24; UNDPREDP 2002[1],
p.10; UNDP/REDP 2003, p.8; UNDP/REDP 2006[6]
printed from internet 12.04.2006, compiled by author)

5.5.2 Health, Hygiene and Sanitation

Traditionally, there was no safe drinking water in a village like Pinthali. People used to drink contaminated water from the canal which caused severe water borne diseases that took two to three lives every year. There was regular water scarcity in the village and during dry drought seasons, villagers used to migrate to the river side for 5 to 6 months. There was no health post in the village. Hepatitis, cholera, and diarrhoea were the most commonly occurring diseases in the area. In 1997 before the intervention of project in research villages, almost 100% households had no toilets.

However, the situations have then changed within the few years. Changes observed in the health, hygiene and sanitation conditions seem to be significant as many respondents were found to have enhanced level of knowledge and skills. The increased level of awareness on hygiene and sanitation among people was found having been translated into practice which is indicated by the trend in the table below.



In Taman, Sarkuwa and Arman villages, the construction and use of permanent sanitary installations (toilets) were significantly higher to more than 85%. Also in Ghumlekh and Piughar villages, the use of temporary pit type installations had increased. However, the construction of permanent sanitary installations was found to be slow below 20%. The construction of permanent installations was also dependent on the use of biogas technology (through which biomass from agriculture and dung is used to produce

burnable gas for cooking and lighting) as the project encourages and gives additional subsidy for toilet attached to biogas plant. The villages like Ghumlekh and Piughar have installed nominal numbers of biogas plants.

An overview on how health and sanitation has changed in a place like Pinthali village is described as follows:

Example: Pinthali Village (2004)

After the intervention of the programme, the scenario has changed in the village and created awareness for the villagers through health and sanitation education. Installation of pipe for safe drinking water from the hill helped to reduce water diseases. 76 toilets, of which 16 are permanent, were constructed in the village.



Illustration 5.17: Safe Drinking Water in Pinthali Village (by author)

The village cleanliness was improved by the women's group which cleaned the village once a week. Apart from that, they also made a rule that if any child or adult make the trail dirty then the family has to pay a penalty.

The attitude towards household waste had also changed. In 1997, all households threw the waste just outside and people were not aware of the consequences on their health.

Better hygiene and sanitation practices had direct impacts on health condition in the village.



The overall increased awareness on health and hygiene with improved conditions of sanitation, water and waste resulted in a positive trend within 5 or 6 years showing that main diseases in Taman, Sarkuwa and Arman had changed drastically from waterborne diseases like worm, jaundice, gastric to more simple common diseases like fever, cough and diarrhoea.

The village people themselves described during interviews that due to better drinking water facilities, village cleaning and increased use of toilet in the village, less people were getting sick. The main improvement is that death from simple diseases like diarrhoea had decreased significantly.

| VDC | Year | Main Diseases | Distance to Clinic |
|---------|------|---|-------------------------------------|
| Taman | 1997 | Gastric, worm diseases, fever | Clinic in the middle of the village |
| | 2003 | Cough, fever, dysentery | Clinic in the middle of the village |
| Sarkuwa | 1997 | Typhoid, jaundice, pneumonia, diarrhoea | Shera Bazar 30 minutes-1 hours |
| | 2003 | Typhoid, diarrhoea, fever | Shera Bazar 30 minutes-1 hours |
| Arman | 1999 | Gastric, diarrhoea, typhoid | 1 hour walking |
| | 2003 | Cough, cold, fever | 1 hour walking |

| Ghumlekh | 1997 | Diarrhoea, cold, fever, headache | 3 hour walking |
|----------|------|--------------------------------------|-------------------|
| | 1999 | Diarrhoea, cold, fever, headache | 3 hour walking |
| | 2003 | Diarrhoea, cold, fever | 3 hour walking |
| Piughar | 1997 | Cold, pneumonia, fever, diarrhoea | 1.5 hours walking |
| | 1999 | Cold, pneumonia, fever, diarrhoea | 1.5 hours walking |
| | 2003 | Cold, fever, diarrhoea | 1.5 hours walking |

| Table 5.8: | Main Diseases and Distance to Clinic in Research Area |
|------------|---|
| | (by author) |

However, the main diseases had not changed in Ghumlekh and Piughar while there were not any improvements in the medical and clinical facilities in all the villages. So, villagers still had to walk 1-3 hours just to access some medical facilities.

Another consequence was the way villagers used different methods of healing technique. Using local herbs and traditional village healers were quite common but were decreasing drastically to less than 10% (local herbs) and about 30% (village healer) over time. Offering "puja" (Hindu and Buddhist way of prayers), worshipping God and Goddess, sacrificing goats, chicken or ducks depending on the type and magnitude of illness was still in practice. Villagers were found to be very religious and had strong belief in their own culture and tradition.



Other health related changes seem to have occurred among people of both sexes. For instance, considerable changes were indicated by people regarding their personal hygiene that involved taking bath, washing cloths, caring and cleaning children, etc. Health related consciousness permeated among people gradually after listening radio and viewing TV, reported the people.

It is not appropriate to comment on whether this trend is positive or negative because going for "modern" health treatment also means going long distances and also paying more for treatment and medicines.

Besides the new technical infrastructure and electrical systems, the villagers unfortunately had not taken any initiatives to improve their health system infrastructure and also no FGs for Village Hospital or Village Health Post had been founded.

Overall Finding (7): Health and sanitation conditions had improved but still the main diseases had not changed in some places. There was no improvement in the medical and clinical facilities because villagers were not aware of options and so had not applied to get better medical facilities and infrastructure.

5.5.3 Energy Consumption

Changes in energy use in all research villages after the intervention of the rural energy project was expected as one of the main targets to find out whether it brings betterment in rural livelihoods. When introducing new technologies, it is always envisaged for positive changes but it has to be found out how the technologies have direct and indirect effects on the lives of rural people before coming to positive conclusions.

The dependence of all surveyed villages on firewood is extremely high. Almost 100% household use firewood for cooking before and after the intervention of the rural energy project. "Cooking" generally refers to all kinds of cooking, i.e. cooking meal, cooking animal feed and even preparing alcohol especially in Gurung, Tamang and Magar communities. From the graph, it can be seen that the consumption of firewood had decreased in Arman and Piughar for cooking by 10 to 20%. But there was no change in percentage use of fuelwood in other remaining villages.

The use of firewood for heating purposes had changed in all villages from 100% to a minimum of 20% in Sarkuwa village. The reasons for the decrease in use of fuel wood for heating, as mentioned by the villagers during interview, were that initially when there was no electric light in the house, families stay around the stove to take the heat from fuel wood. On the other hand, once the electricity was available, people do not stay in the kitchen but instead watch TV or do some other work. The daily habits of people were slowly changing according to the locals.



The second reason mentioned was the use of improved cooking stove which does not allow heating the house because of its construction. Therefore, fuel wood used for heating had significantly changed over the years. The use of other traditional fuels such as agricultural residues and animal dung were not found in all research areas.

Overall Finding (8):

It can be concluded that villagers in all areas still use fuel wood as the main source of energy for cooking and heating purposes. There is no change in the dependence and use of firewood.

Since traditional firewood was found to be dominant in all research villages, it was obvious to analyse and find out what were the measures taken to improve the fuel wood situation in the villages. It was found that before any rural energy project intervention, traditional types of stoves (three stone open fire stoves, stoves without chimney or stoves using just iron tripods) were used by 100% of the households in 1997.

But the scenario had changed within few years - the project trained local technicians to construct improved cooking stoves and through these local trained ICS technicians, improved stoves were disseminated in the villages.



Illustration 5.21: Improved Cook Stoves (by author)

The following graph shows that within 3 to 4 years, more ICS than traditional fire places were used already in Taman (90%), Sarkuwa (50%), Arman (70%), Ghumlekh (nearly 80%) and Piughar (50%).



The increased use of ICS was a very positive trend found in the villages. This showed that people, especially women, in the rural villages were open-minded and accepted ICS. During interviews, women from all villages described the easiness and comfort in using ICS. The foremost advantage described was smokeless cooking and more cleanliness than before. Women also found that when using ICS, the pots were not very black and dirty; therefore, it took less effort to clean the utensils. The cloths were also not as dirty as before thus saving one to two soaps (saving NRs 5 to NRs 10 per month) for washing cloths which, in monetary terms, is quite a lot in rural scenario.

The firewood consumption in the three seasons of winter, summer and monsoon were surveyed before and after the energy project intervention. The trends found out in all research villages were almost similar. It clearly showed that the firewood consumption is higher in winter season as most of the household use firewood for heating purposes as well. Firewood consumption in summer and monsoon season was found to be almost comparable. Looking at the trends of consumption in 1997 and 2002, it showed quite

positive results in fuel savings like the case of winter season in Taman village (1610 Kg), Sarkuwa (420 kg), Arman (732 kg), Ghumlekh (696 kg) and Piughar (672 kg).



Likewise, the following graph shows how much these improved cooking stoves have helped to reduce people's expenditure on fuel which can be related to savings on fuel.

Converting the fuel wood savings in annual economic terms, it comes out to NRs 2,300 in Taman, NRs 750 in Sarkuwa, NRs 420 in Arman, NRs 135 in Ghumlekh, but negative NRs 240 in Piughar only. Even a saving of NRs 100 is quite a high amount in the rural context.

Overall Finding (9):

It can be concluded that the consumption of firewood was affected by the use of improved cooking stove which had positive influence in saving firewood and financial sources in the village.

Commercial Energy Consumption

The sources of commercial energy in all research areas are kerosene, liquefied petroleum gas (LPG), battery (dry cell) and electricity. The use and the impact of these commercial energies show that kerosene was significantly used 100% for lighting purposes in 1997 before the intervention of the rural energy project.



However, in 2002, the scenario had changed drastically after generation of electricity through micro hydro power in all villages. The use of kerosene for lighting was almost replaced by electricity. Still, it can be seen that about 20% use kerosene for lighting. This was generally due to the fact that kerosene was used as substitute when there was some problem in power supply. The use of kerosene for cooking was found to be very nominal (less than 10%) in Sarkuwa, Arman, Ghumlekh and Piughar. The kerosene using households reported that it was specially used for preparing tea in the morning and during the day time. Besides lighting and making tea, kerosene was more and more used for igniting fire on fuelwood in Ghumlekh and Piughar.



The total consumption of kerosene had significantly decreased in all villages. In Taman village, the yearly requirement was 40 litres in 1997, but in 2002 it had reduced to less than 10 litres which saved 30 litres equivalent to about NRs 600 per year. The trend in use of kerosene was going down in Ghumlekh from 35 litres in 1997 to 15 litres in 1999 and around 8 litres in 2002 which saved money from spending NRs 600 in 1997 to NRs 200 in 1999 to less than NRs 100 in 2002.



Since kerosene is an imported item, it may not be easily available in remote rural areas where people have to walk days to reach the district headquarters. It costs significant amount of time and money for individual villagers. And the expenses on kerosene result in drainage of money out of the villages.



Illustration 5.27: Electric Light replaces Kerosene for Cottage Industry (by author)

Dry cell batteries were found to be used in almost all research settlements. The main purpose of using dry cell batteries were for torchlight and radio. The scenario of using dry cells for lighting and radio had changed over the years. Before electricity generation in the villages, all households used dry cells for torchlight, however, this had reduced by almost half in all rural communities.

Similar condition was also witnessed for radio use. Comparing before and after project intervention, dry cells for radio had reduced to nearly 50%. The number of pairs of dry cells used in 1997 (80 pairs in Arman in 1999) had reduced to 25 pairs in 2002 which means saving in dry cells of 55 pairs equivalent to savings of NRs 1375 (per pair NRs 25) which is again a remarkable amount of money for the locals.



The trend of decreasing use of dry cells was found to be a very positive change also under environmental aspects because the discharged dry cell batteries were just thrown away in the fields or farms. Although, it is worth mentioning that the people still lack awareness and knowledge on how dry cells are harmful for environment and nature.

Overall Finding (10):

Electricity helped reducing the dependency on commercial fuel like kerosene and dry cells which was found to be positive in saving money and time in all villages.

5.6 Social Transformation

Core and prerequisite condition for sustainable development lies in the already described targets of

- awareness creation,
- change of attitudes,
- change of the situation by its people with self-motivation and self-initiation,

These objectives are orientated to social transformations in the rural society.

5.6.1 Impact on Education

For the research purposes, the education system was categorized as illiterate, literate, primary school (classes 1-4), secondary school (classes 5-7), high school (classes 8-10) and university level after school. Since the project had mandatory requirement of conducting adult literacy programmes for women in each village, education in this context means to provide basic capabilities in reading and writing to manage book-keeping of COs, FGs, savings and credit, etc. Furthermore, after being a member of a CO, the illiterate women also wished to give own personal signature in their saving passbook and meeting attendance. This was also one of the main motivations behind women to be able to read and write.

Traditionally, education for females is looked at as not so important thus resulting in higher illiteracy rates for women compared to men. So improvements especially for female were envisaged. It was found that the most progress was made at the level of primary education because villagers' educational level was "upgraded" from illiterate to primary education. This does not mean or include that all participants were able to pass all classes from 1 to 4 but rather were able to manage basic skills in reading and writing.

From the household surveys, it was found that the illiteracy of female has decreased from 76.4% to 59% in Taman, 70.9% to 57.8% in Sarkuwa, 67.3% to 46.4% in Piughar and 61% to 47.4% in Ghumlekh Village.

On top of that, more positive increases at all levels from primary, secondary, high school and university level was also observed. In primary school level, the enrolment of girls was found to be almost doubled in Taman from 15.6% to 22% and Piughar from 12.7% to 33.3% while there was slight increase from 13% to 20% and 26% to 32% also in Sarkuwa and Ghumlekh respectively.

The increment in enrolment of girls was due to the awareness created by the project. Similarly, the trend in secondary, high school and university was found to be increased by twofold in most cases. More interesting result was seen in university level. Before 1997, higher education was almost zero for girls but in 2002/03, it was observed that about 2% of the village girls were attaining university education.



In case of enrolment of boys in the village, there was no significant change in the education system. The illiteracy situation had not reduced at the same scale like for the female because the level of illiteracy was comparatively less for the male villagers. Accordingly illiteracy was reduced only by 10-15% in Sarkuwa, Taman and Piughar villages within 4 to 6 years. A significant change, however, could be observed in Ghumlekh where the illiteracy of men had reduced to about 30%. The number of students had increased in all villages by 5 to 9 % in primary school, about 4 to 10% in secondary school, 7 to 13% in high school and about 2 to 3% at the university level.

In contrast, the number of students in high school is almost the same in case of Piughar and Sarkuwa while it has slightly decreased in Piughar. The reason provided for this trend was that once the boys were 17 to 20 years old they tend to go for army services or some other activities in the near-by cities even before completing their schooling. The tendency of increasing number of students at the university level showed that people in the remote villages had recognized the importance of education and thus, parents are investing more money for their children's education.



Comparing the trend of girls' and boys' access to education, the enrolment of girls was found to be nearly doubled from the previous situation. The positive aspects showed that parents were more aware that girls should be educated equally like boys.

Finally, it is also worth pointing out that the tradition within the ethnic group or caste is very strong: In spite of many positive developments in female's education system, there was no real change in female education compared to male education in Sarkuwa village. Here the influence of the caste system is quite obvious as the area is dominated by Brahmins and Chhetris. In these castes male family members are more educated by tradition and the situation is conservative towards women as there still exists the hierarchical position of women in the house with the mother-in-laws having more freedom

than the daughter-in-laws. It is a noteworthy fact that the project could not change this situation which was more resistant to changes in its traditional structures.

Overall Finding (11):

Education in the project was understood as functional skills in reading and writing. The level of literacy especially for women was remarkably increased in most of the villages with the exemption of places with strong traditional roles of women.

5.6.2 Workload of Women

The project activities should result in betterment of daily life situations, i.e. reducing the work load, drudgery or time spent for daily routines. To understand the necessity and importance of those targets, a more detailed picture is given under perspectives of drudgery and role of gender as well as on health and sanitation.

The social life of women varies according to the prevailing religious beliefs and practices in the community, as well as on castes and sub-castes, economic condition, education, etc. Woman and man are ideally expected to form a union but, in reality, the situation in Nepal looks different in being born as boy or girl. These issues are illustrated in the following tables based on interviews in the villages. Two cases of daily routines of a girl and a boy or a man and a woman in Piughar are representative of village life.

| 05:00 - 06:00 | Waking up and cleaning house |
|---------------|--|
| 06:00 - 07:00 | Collecting Fodder and Feeding Buffaloes |
| 07:00 - 07:30 | Cooking animal feed (kudo) |
| 07:30 - 08:00 | Grinding corn or other pluses if required |
| 07:30 - 08:30 | Preparing tea and distributing to the household members |
| 08:00 - 09:30 | Preparing meal for the family |
| 09:30 - 10:30 | Feeding lunch to family members and self eating rice |
| 10:30 – 11:30 | Cleaning all utensils and also house cleaning after lunch |
| 11:30 – 13:00 | Going to nearby forest to collect fodder and firewood |
| 13:00 – 13:30 | eeding animals in the stall |
| 13:30 – 15:30 | Staying in the small family village shop |
| 15:30 – 16:30 | Preparing afternoon snacks and tea for the whole family members and eating |
| 16:30 – 18:00 | Staying in the shop |
| 17:30 – 18:30 | Preparing evening meal |
| 18:30 – 19:30 | Feeding dinner to family members and self eating rice |
| 19:30 – 20:30 | Cleaning utensils and house cleaning after dinner |
| 20:30 - 22:00 | Reading books or newspapers if available and listening to the radio |
| After 22:00 | Going to bed |
| | Table 5.9: Daily life of a Gurung Girl of Piughar Village |

(by author in 2004)

| 07:30 - 08:00 | Wake up, washing face |
|---------------|--|
| 08:00 - 08:30 | Drinking tea |
| 08:30 - 10:00 | Working in the field if required |
| 10:00 - 11:00 | Eating lunch |
| 11:00 - 12:00 | Resting |
| 12:00 - 16:00 | Going to the field for agricultural work if required |
| 16:00 - 16:30 | Eating snacks and tea |
| 16:30 – 18:30 | Meeting friends and playing volleyball or football |
| 18:30 – 19:00 | Cleaning or washing face and body |
| 19:00 - 20:00 | Taking dinner |
| 20:00 - 21:00 | Reading books or newspapers if available |
| 21:00 - 21:30 | Listening to the radio |
| After 21:30 | Going to bed |
| | Table 5.10: Daily life of a Gurung Boy of Piughar Village(by author in 2004) |

When comparing the daily lives of a girl and a boy, it clearly indicates that cooking animal feed, collecting fuel and fodder, cleaning the house, preparing meal for the family, cleaning utensils are all done by the girl whereas the boy's main responsibility is in agricultural works. Besides that, he has a lot of time for leisure or playing with friends, for reading books and listening to the radio. The work time for a girl starts from the time she wakes up at 5:00 a.m. in the morning where as boys' work from 08:30 a.m. It is evident that girls in rural areas are overburdened with chores whereas boys have more free time for other personal activities and interests.

Similarly, the comparison of daily lives of a housewife and a man was taken in Pinthali Village. The woman's daily work starts from 5:00 a.m., cleaning house, grinding grains, preparing meals, collecting fuel and fodder fetching water, etc. These are normal daily routines and besides that, the women are also members of various COs and many are also active members of Micro Hydro Functional Groups. Therefore, they have to attend CO meetings on Friday every week and FG meeting once every month.

But the daily lives of men are different as their responsibilities are mainly in agricultural fields apart from meeting and chatting with people. The persons interviewed are also members of the COs and, like women, are also active members in the Micro Hydro Functional Group.

| 05:00 - 06:00 | Waking up and cleaning house and grinding if necessary |
|---------------|---|
| 06:00 - 06:30 | Washing face, morning ritual |
| 06:30 - 07:30 | Preparing tea and eating some snacks before going for fodder collection |
| 07:30 - 09:00 | Collecting fodder |
| 09:00 - 10:00 | Preparing meal for the family |
| 10:00 - 11:00 | Feeding lunch to family members and also self eating |
| 11:00 – 12:00 | Cleaning all utensils and taking rest |
| 12:00 – 17:00 | Collecting fodder and animal grazing or going for farm working |
| 17:00 – 17:30 | Preparing snacks and eating tea and snacks |
| 17:30 – 18:00 | Collecting water |
| 18:00 – 19:30 | Preparing evening meal |
| 19:30 – 20:30 | Feeding dinner to family members and self eating |
| 20:30 - 21:00 | Cleaning utensils and cleaning house |
| 21:00 – 21:30 | Discussing with husband for tomorrow's work |
| 21:30 – 22:00 | Going to bed |
| | Table 5.11: Daily Life of a Housewife of Pinthali Village |

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(by author in 2004)

| 06:30 - 07:00 | Waking up and washing face |
|---------------|---|
| 07:00 - 07:30 | Giving food to animals (buffaloes, cows, etc.) |
| 07:30 - 08:00 | Drinking tea and snacks |
| 08:00 - 10:30 | Working in the agricultural field |
| 10:30 – 12:00 | Taking lunch and rest |
| 12:00 - 17:00 | Working in the agricultural field |
| 17:00 – 17:30 | Taking tea and snacks |
| 17:30 – 18:00 | Cleaning, washing face |
| 18:00 19:30 | Chatting with friends and relatives |
| 19:30 – 20:30 | Taking dinner |
| 20:30 - 21:30 | Listening to radio and discussing about tomorrow's work |
| 21:30 - 22:00 | Going to bed |
| | |
| | |

Table 5.12: Daily Life of a Male of Pinthali Village
(by author in 2004)

A more detailed analysis was done in order to verify more quantitatively the roles of gender in rural communities through questionnaires on division of labour and how it changed over time before (1997) and after (2002) project implementation.



The illustration shows that the time spent for cooking had reduced in all villages except Arman. But still, the participation of men in cooking meal is found to be insignificant. In Arman and Piughar villages, men's help increased from 23 hours per month in 1997 to 50 hours per month in 2002 (Arman) whereas from 0 in 1997 to 8 hours per month in Piughar for cooking or helping the female members.



Illustration 5.32: Magar Girls in Taman Village Collecting Firewood (by author)

The scenario for women members had changed positively with hours per month for cooking meal decreasing from 110 to 68 hours in Ghumlekh and from 122 to 40 hours in Piughar over the time frame of 1997 to 2002. The reason for the decrease of time spending is due to improved cooking technology with the promotion of ICS and biogas technologies in the villages. Men's participation in fuel wood collection had increased significantly. In Sarkuwa village, average time spent by men had changed from 27 hours to 45 hours per month while the trend is similar in other villages too like in Piughar from 8 to 27 hours and Arman 39 hours to 59 hours per month. This support from men has helped to reduce the drudgery of women with firewood collection time reducing from 114 hours to 39 hours per month in Ghumlekh and 45 hours to 36 hours per month in Piughar from 1997 to 2002.

The quantitative data show positive trends in reducing time load for women's hard job like firewood collection.

The following table shows that the contribution of men had increased in other physical activities like collecting fodder for animals, farming, caring for animals as well as taking care of children. It is interesting to note that more and more men were taking care of their children while the wives attend weekly or monthly meetings in the community.

| Village | Year | Cleani | ng | Fodder Child care | | are | Grinding | | Water fetching | | Farming | | Animal care | | Other works | | |
|----------|------|--------|------|-------------------|-------|------|----------|------|-------------------|------|---------|-------|-------------|------|-------------|------|------|
| | | Male | Fem. | Male | Fem. | Male | Fem. | Male | Fem. | Male | Fem. | Male | Fem. | Male | Fem. | Male | Fem. |
| Taman | 1997 | 2.3 | 37 | 62 | 78 | 0.9 | 28 | 2 | 96 | 0 | 0 | 0 | 0 | 62 | 77 | 1.3 | 2.5 |
| | 2002 | 1.6 | 17 | 53 | 75 | 10.1 | 46 | 3.6 | 20 | 0.47 | 4.1 | 112 | 169 | 46 | 57 | 0 | 0 |
| Sarkuwa | 1997 | 0.95 | 32.9 | 53.7 | 76.1 | 8 | 45.6 | 3.5 | 25.2 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 6 |
| | 2002 | 1.82 | 31.3 | 40.7 | 78.5 | 5.7 | 79.4 | 7.5 | 16.7 | 8 | 25.8 | 84.5 | 116 | 5.7 | 13 | 0.5 | 0.2 |
| Arman | 1997 | 1.4 | 31 | 53 | 60 | 24 | 59 | 1.6 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 6.4 | 1.3 |
| | 2002 | 1.5 | 30.1 | 15 | 17.2 | 25.5 | 55.4 | 4.7 | 5 | 2.4 | 9.7 | 216 | 230 | 0 | 0 | 2.1 | 2.1 |
| Ghumlekh | 1997 | 1.7 | 46.5 | 65.3 | 109.5 | 18 | 108 | 0 | 63 | 0 | 12 | 155 | 104 | 54 | 43 | 0 | 0 |
| | 1999 | 0.8 | 29.6 | 24 | 45 | 9 | 24.5 | 0 | 24.4 | 0 | 11.3 | 138 | 39 | 65 | 57 | 0 | 0 |
| | 2002 | 0.2 | 20.2 | 45 | 45 | 10.3 | 40.3 | 1.7 | 20.6 | 1.2 | 25.3 | 152.6 | 172 | 89 | 20 | 0 | 0 |
| Piughar | 1997 | 0 | 30 | 13 | 47 | 2 | 66 | 0 | 35 | 0 | 14 | 173 | 85 | 52 | 47 | 0 | 0 |
| | 1999 | 0 | 30 | 12 | 42 | 2 | 63 | 0 | 34 | 0 | 14 | 148 | 62 | 51 | 49 | 93 | 35 |
| | 2002 | 0 | 21 | 23 | 32 | 10 | 46 | 14 | 35 | 1 | 14 | 113 | 115 | 22 | 30 | 0 | 0 |

 Table 5.13: Gender Division of Labour for Various Activities (Hours per Month per Household) (by author)

The time for activities like child caring, farming, animal caring, fodder collection, etc. for women had also reduced to some extent. The reasons behind it were learning of new knowledge, skills and awareness of men, which helped women in reducing daily drudgery. This has also given some time for women for being more engaged in community activities.

Furthermore, results on gender division of labour shows that men's labour contribution in other household activities like cooking, cleaning, fetching water and grinding are very insignificant. This signifies no changes in the situation before and after the project. Compared to men, the main responsibilities and burden for household activities were still with the women in rural areas. Women had to spend most of the time for grinding, fodder collection, cleaning house, child care, farming and animal care.

However, the results showed that over the time frame of 5 years of rural energy project implementation, women had saved time in carrying out the above mentioned household activities.

Enormous time saving for women was observed for grinding activities with 76 hours per month in Taman, 30 hours per month in Arman, and 43 hours in Ghumlekh. Grinding is the most tedious and hard work for women in rural areas. The reason for saving such significant amount of time was due to the introduction of electric mills for grinding, hulling, and oil expelling in those areas.



Illustration 5.33: Traditional Grinding with "Janto" is Hard Work for Women (by author)



However, the situation for grinding had not changed in case of Piughar as women had to spend 35 hours per month before and now mainly because there was no electric mill in the area.

Overall Finding (12):

This result gives evidence that, through introduction of new technology and electrical energy, significant amount of work load of women was reduced to a greater extent.

5.6.3 Socio-Political Profile of Women's Position

The majority of women in the rural areas live a dependant life on men's mercy without which they will not survive.

Could community mobilization bring improvement for rural women? To answer this question, various analytical methods were used to investigate:

- Who in the community has access and control over resources?
- Who has the final control?
- How do women and men perceive women's position in the community?

For this, a participatory method was applied to get in-site views of rural people, both men and women, in three villages Ghumlekh, Sarkuwa and Pinthali. Before the community measured the magnitude of impact both on strategic and practical gender needs, the discussion on socio-political profile of women's position compared to men's were analysed by the community in simple measures, i.e. Lower (worst), about Equal and Higher (better).

Before, Community Mobilization results were found to be comparatively same in all villages:

- Women's participation in decision making in household affairs, at the community level, and in the society at large were worst,
- The mobility of rural women was limited only to their village and according to the women in all three villages, there was no chance of going out of the village for any kind of activities,
- Opportunities for women to be organized for sharing their problems and expressing their viewpoint did not exist in the villages.

After five years of Community Mobilization and energy projects, villagers expressed that the scenario had changed to a great extent and the situation for women were changing in a positive way. The conservative traditional attitudes of people were slowly changing. For deeper analysis, the magnitude of impact on both men and women's positions were analysed separately in three villages of Ghumlekh, Piughar and Pinthali.

The position and status of men and women in the following tables show that there is a difference in all aspects. Although equal opportunities were provided for leadership, organization capacity, mobility, decision making power, etc., women still lack behind men. In all three villages, average measurement of all eight indicators with mostly very good positions were on the higher side for men whereas for women, it showed 2 to 3.5 which means still bad to satisfactory positions.

| | Ghum | lekh | Piu | ghar | Pinthali | | |
|--------------------------|-----------------|---------------|--------------|-----------------|------------------------|-------|--|
| Strategic Needs | Magnitu Impa | ude of act | Magni Imp | tude of bact | Magnitude of Impact | | |
| | Men | Women | Men | Women | Men | Women | |
| Leadership | 5 | 3 | 4 | 4 | 5 | 2 | |
| Organization | 4 | 3 | 4 | 3 | 5 | 3 | |
| Mobility | 5 | 3 | 5 | 3 | 5 | 3 | |
| Decision making power | 5 | 2 | 5 | 3 | 5 | 2 | |
| Self esteem | 5 | 3 | 5 | 4 | 5 | 4 | |
| Legal rights | 5 | 1 | 5 | 1 | 5 | 1 | |
| Control | 5 | 2 | 5 | 2 | 5 | 2 | |
| Information | 5 | 3 | 5 | 3 | 5 | 3 | |

(Measurement of impact: 1: very bad; 2: bad; 3: satisfactory; 4: good; 5: very good)

Table 5.14: Impact on Gender Strategic Needs(by author in 2004)

These indicators show that women's positions are still found to be behind men. However, people's confidence and self esteem level are at a good level for both men and women in all villages which showed a positive attitude, motivation and moral boosting of the community members.

Example: Pinthali Village

Women in Pinthali village expressed confidently that they received respect at home and in the community after their active involvement in the development process. Before 1997, women of Pinthali did not dare to go in front of a gathering of men. They felt that their place was in the kitchen though they did the work both inside and outside their houses like collecting fuel wood, rearing animals, assisting in farming, etc. The reason for women being ashamed is nothing other than the culture and tradition of the society as well as lack of education. Among older generation, women above 30 years are 99% illiterate. This reality is expressed in a statement of a local male (name unpublished) who told:

When a woman comes in front of a social gathering, she is regarded as being a shameless woman. We used to think that women should not come to the place where there are men. But now we have realized that they should be encouraged to participate in meetings for the development of our community. We have also realized that women's place is not only in the kitchen` (UNDP/REDP 1998[5], p.7).

This type of self realization of men regarding women's position and value, gives added moral support for the women to boost their self esteem. Consequently, women are actively involved in many social and community development activities with good support and respect from men.

The following table refers to the magnitude of impact on practical gender needs and position. The major indicators considered were technology, credit, health, workload, income and nutrition. In this analysis, there was no big difference between men's and women's positions. The average measurement for men was from 3.5 to 4 whereas for women, it was 3.1 to 3.5 which falls under satisfactory range. Men had good positions in technology and income whereas women benefited more from reduced workload.

Health was considered in bad position by both genders because of no improvement in infrastructure and medical personnel facilities from the government.

| | Ghumle | ekh | Piughar | | Pinthali | | |
|--------------------|-------------------|--------|-----------|-----------|---------------------|-------|--|
| Practical Needs | Magnitu Impact | ude of | Magnitude | of Impact | Magnitude of Impact | | |
| | Men Women | | Men | Women | Men | Women | |
| Technology | 5 | 3 | 5 | 4 | 5 | 4 | |
| Credit | 5 | 4 | 4 | 4 | 5 | 4 | |
| Health | 2 | 2 | 2 | 2 | 3 | 3 | |
| Workload | 3 | 4 | 3 | 4 | 4 | 4 | |
| Income | 3 | 3 | 4 | 4 | 5 | 3 | |
| Nutrition | 3 | 3 | 3 | 3 | 3 | 3 | |

(Measurement of impact: 1: very bad; 2: bad; 3: satisfactory; 4: good; 5: very good)

Table 5.15: Impact on Gender Practical Needs(by author in 2004)

The position and status of practical needs between men and women were almost equal whereas a gap in the position and status of strategic needs was still found.

The findings show that just improving or meeting practical gender needs does not change the relationship which maintains the subordinate status of women. Further, to verify these indicators, community members were asked to analyse themselves on:

Which group of gender (male or female) has access to and control over resources?

The table below represents the detailed access and control profile related to gender issues of Ghumlekh, Sarkuwa and Pinthali villages as conducted through participatory methods by the author.

| Resources | Access Women | Access Men | Control Women | Control Men | Impact |
|----------------------|-----------------|---------------|------------------|----------------|---|
| Land utilization | Yes | Yes | No | Yes | All land is inherited by men. Women have primary responsibility for use and management of natural resources. |
| Land ownership | No | Yes | No | Yes | Women have less or no power and no authority to take decisions related to sale of private land/forest for further investment. Ownership of land and control are with men. The impact on women reduces their status and economic strength as compared to men. |
| Capital | Yes | Yes | No/ Yes | Yes | Mixed results were found depending on the ethnic groups. In Ghumlekh village, women control the capital while men earn money. In Pinthali village, spending of money was done through mutual discussion between husband and wife whereas in Sarkuwa village, men control the money. However, the common aspect found in all villages is that women control whatever money they themselves earned and their gifts from parents. |
| Labour | Yes | Yes | Yes | Yes | Men have less influence on decision of labour contribution among women. But it was found that women control other women in the household: means daughters or daughter-in-laws have to take permission from elderly female (mother or mother- in-law) before going for work. |
| Skill developm. | Yes | Yes | No | Yes | Both men and women feel that skill development is very important. But without permission from husband or father, women are not allowed to go outside their village. But situation is different for men. They do not need any permission. |
| Equipment | Yes | Yes | No | Yes | Women have access to all kind of equipment but control is with men. This confirms gender stereotypes about women having less knowledge on technological aspects. |
| Information | Yes | Yes | Yes | Yes | Women have equal access to information in all three villages. The situation has changed after forming and being a member in community organizations. |
| Education | Yes | Yes | No | Yes | There is no discrimination of providing education to boy and girl at early age. It was found out that the attitudes of people are changing specially on girl child education. More awareness on these issues was found in all villages. But since men are the breadwinners of the family, decision on how long to give education to the children are with men. A majority of women are illiterate and cannot participate equally in the written process involved in several project activities. This increases dependence on men. |
| Health and fertility | Yes | Yes | No/ Yes | Yes | The responsibility of taking care of health during pregnancy period was with women in all villages. But surprisingly, the decision on how many children to have was found to be with men. The preference of boy was found to be more with women and as a result more children were delivered. |
| Credit | Yes | Yes | No | Yes | Women have access to credit. But control was found with men. This is due to social system that whether taking credit, profit or loss the head of the household has to take the responsibilities. The household head are mainly men therefore all decision is taken by men. |

| Employment opport. | Yes | Yes | No | Yes | Women have access to employment opportunities but they have no chance to compete with men. Majority of the women are illiterate and cannot participate equally in the written process involved in several activities. Without permission from men, women cannot take the job. |
|-----------------------|-----|-----|------------|-----|--|
| Livestock | Yes | Yes | No/ Yes | Yes | Women have no decision-making power to buy or sell larger livestock. Men take the decision for buying and selling animals. In some families, they take decision mutually. Women are responsible for raising and feeding animals. |
| Trees | Yes | Yes | Yes /No | Yes | Women have control for small trees nearby house for using as fodder or fuel wood. But in case of bigger trees, men help and take decisions. If the forest belongs to women community forest group, then decision and control is taken by women only. |
| Food | Yes | Yes | Yes | Yes | Since women are responsible for cooking and kitchen work, women have control on what type of food to cook and feed family. It is a tradition and culture of Nepalese society that men and elderly people in the house are served food first then only, women take their food. For women, they accept this situation and men have no influence on this matter. |

Table 5.16:Access to and Control of Resources
(by author in 2004)

The table is self explanatory that women have equal access to all resources with land utilization, education, information, credit, health, income, labour opportunities, etc. like men. But when the question of control over resources come, then, men still have lot of control especially for important aspects like land ownership, education, income, employment opportunities, skill development and credit. The women have to take prior permission from their husbands before taking any decisions on their own. This still shows the dependency of women on men even after Community Mobilization. The main reason behind it may be the strong culture and tradition embedded in the society.

Overall Finding (13):

People's (men and women) confidence and self esteem level was in good position in all villages, showing positive attitude, motivation, and moral boosting of community members.

It was also significantly found that both men and women have access to almost all resources, but still the major control on land ownership, land utilization, employment opportunities, education, skill development, credit, etc., were with the men. The reason behind this fact is the strong culture and tradition as male dominated society and women's lack of legal rights for property. Even though, the situation had improved a lot for women, it is still not equal to men.

5.7 The Village of Pinthali (Part 2): The Peak Phase

The years 1998 – 1999 were already considered as peak phase of socio-economic activities in the research area.

Besides technical manpower, the income generating skill based training was given to selected enthusiastic villagers at the local level. By promotion of various electricity enduses, enterprises were encouraged to establish in the village.

A number of examples were already described in subchapter 5.4. One of the instances was an electric mill with huller and expeller established by a private entrepreneur that contributed significantly to the reduction of drudgery of women.

After electricity generation, a poultry farm was also established with 50-100 chicken and it was quite successful during 1998/99. Taking small credit from their CO, other entrepreneurs also started pig farming successfully as well as goat rearing business.

Various skilled based training was given for villagers to fulfil the aim of REDP with "One household - One enterprise". Almost 40% of the villagers were active in small income generating activities like weaving, knitting sweaters and supplying in cities, tailoring, traditional Thanka painting, etc.

Examples of Success Cases (without Electricity)

Ms. Mahili L. invested successfully to expand her teashop from the CO loan. She initially took loan of NRs 600 and commented: "With the amount, I bought additional commodities required for the shop. This enabled me to earn profit of NRs 1000 in a month. With the increased profit, I further invested NRs 2000 in the business including loan. This granted me profit of NRs 1200. This way, I have been able to earn NRs 1800 in three months. I have paid back the loan as well as interest from the earning".

In total, she earned about NRs 5000 and Mahili is now considered as an example of a successful business woman in her neighbourhood. "Initially I was lazy in joining the group, but I slowly understood different advantages that an individual as well as the group, as a whole, can get through Community Organization. The loan from the weekly saving has been advantageous both for me as well as the group. This way we are bringing hopeful changes in our village gradually."



It was already described that the construction of the canal for the micro hydro project has been a boon for the farmlands because of availability of water for irrigation. Before 1997, just few rich (about 10) households used to do garlic farming, now the scenario has changed in the village with about 80% of the villagers doing garlic farming due to the good irrigation system.





1999: Inauguration of Daune Khola Micro Hydro Demonstration Scheme Official ceremony was held on 14th October 1999 for the inauguration of 12 kilowatt plant named "Daune Khola Micro Hydro" Demonstration Scheme at Pinthali, Managaltar VDC of Kavrepalanchowk District.



Illustration 5.38: Inauguration of Cooperative (UNDP/REDP 2001[2], p.7)

2001: Inauguration of Daune Khola Micro Hydro Cooperative Ltd.

In September 2001, the community of Pinthali village officially inaugurated Daune Khola Micro Hydro Cooperative Ltd. which was formulated with 11 board of directors, of which 5 were women.

The Pinthali villagers had taken loan from the Agricultural Development Bank of Nepal for Daune Khola Micro Hydro Project scheme which was successfully repaid by 2000 and thus, they formed the Cooperative.

Success Case (with Electricity)

Example: Pinthali Village

Success with electricity: like other villagers, Mr. Sunil B., a 22 year old resident of Pinthali took six months (self paid) training in one of the furniture factories in Kathmandu. Thereafter, he worked as a helper for one year in the same furniture factory earning NRs 3,000 per month.



Illustration 5.39: Village Furniture Workshop (by author)

He was not very satisfied with his job so he decided to return to his village as a carpenter and opened a furniture workshop in Pinthali village. Because of the availability of electricity in the village, he could fulfil his idea with furniture production like beds, racks, TV racks, etc. on demand for villagers. He pays NRs 500 per month for electricity. The prices of furniture are ranging from NRs 900 to 8,500. According to Mr. Sunil, he has a net profit of NRs 5000 per month.

Other Findings:

There was no significant difference in the villages regarding employment opportunities. All rural enterprises found in the villages were family based. So, there were no extra employment opportunities beside family members. Few jobs were created like two Micro Hydro Operators and one Micro Hydro Manager in each village. After electricity generation in the village, only few villagers were attracted to come back to Pinthali village and start some business like the already described rural carpenter or Thanka painters.

In the other villages like Taman, Sarkuwa, Piughar, and Ghumlekh, the tendency of the younger generation to migrate to foreign countries or to the cities was found quite high.

Overall Finding (14):

- The energy project brought improved income for most of the households. The better income was mainly based on agriculture through improved irrigation, as a by-product of a canal system to provide water for the micro hydro power plant.
- Only few new economic or productive activities have been initiated.
- Dependence on agriculture as income source is even more than before.
- A structural change of the local economy from subsistence agriculture to more productive orientated economy is not visible.
- Trend of migrating to foreign or urban jobs is unbroken or even increasing for better educated persons.
Chapter 6 Conclusions

6.1 The Village of Pinthali (Part 3)

Pinthali in 2004:

When someone reaches Pinthali village, he/she can see the whole settlement with tiled, corrugated iron or concrete roofing. In the eyes of the community, this is a big step in development considering the fact that until 7 years' ago, there was only thatched roofing in the village. At the least, it shows that more money is available in the hands of the villagers.



Illustration 6.1: "Modernization" of Roofing Material as Status Symbol (by author)

Additionally, other changes can also be observed:

- The COs are still existing but just for namesake because the members hardly meet or conduct any meetings, and as a consequence, the weekly savings also do not exist anymore. The community members, in turn, collect money either once a month or every two months,
- The micro hydro power plant is still operating but by an untrained operator because the formerly trained person migrated to a nearby city and opened a technical service centre on a commercial base,

- The trails which women and men of Pinthali had dug in the beginning of the project do not exist anymore or are no longer maintained,
- The village, which was renowned for its cleanliness during project implementation, now seems to be dirty everywhere,
- Even more surprising is that income generating activities, which were initiated in 1998/99, do not exist anymore; the village is blessed with fertile land and so garlic farming has expanded which helps to keep up the people's income whereas an economic boom directly or indirectly from electricity was not seen in the village.

During the interviews and group discussions, the main reason observed for this trend was that the villagers feel their development process is over after having fulfilled their aim of providing electricity to the village and, therefore, no further improvement is required. The enthusiasm of the villagers was no longer visible and only few women were able to talk in the group whereas the majority of the women seemed to be still (again) shy and did not speak much, especially in front of men.

A negative external influence in the background was that the villagers themselves had become victims of the unstable political situation. Maoists targeted villages for cash, food and new recruits to join the Maoist Army while, on the other hand, the police and the army were accusing the villagers for hiding Maoists groups as well as being involved in their activities. So the villagers are caught in between two hostile fronts. In the same context, the building of the Village Development Committee in Pinthali was burnt down incurring property loss of more than NRs 500,000. Furthermore, individual hassling for cash contribution and forcefully asking young people to join the Maoist group are a very common daily routine in the villages. People now seem to be very terrified in Pinthali village.

A positive surprising matter is that the Maoist group has not destroyed the hydro power project because the policy of transparency and accountability is well maintained while implementing any kind of project in the village. The Maoists were even seen to work for the construction and implementation of the project.



Illustration 6.2: The VDC Building bombed by Maoists (by author)

6.2 Testing the Hypothesis

After the analysis, the final question still remains on whether the hypothesis could be proved or not. The answer is not a simple YES or NO but should be looked upon through more gradations.

Therefore, the final findings will be based on reflections of:

- Achievement of project goals,
- Hypothesis in its components and as a whole,
- Hypothesis against the vision of development for Nepal.

6.2.1 Achievement of Project Goals

The goals of REDP were defined as **objectives** of the project in the "Energy Wheel", showing introduction and implementation of energy related technologies as its main objectives and a decisive pre-requisite to achieve an enhanced livelihood. Targets, in this context, were given as:

- Employment,
- Income generation,
- Environment protection,
- Drudgery reduction,
- Labour saving,
- Resource conservation and utilization.

These **objectives** were related to the overall **Paradigms** of the project, shortly formulated as:

- i. **Productivity:** employment oriented income generating activities,
- ii. Equity: male and female equally involved in activities,
- iii. Empowerment: community organizations to take decisions,
- iv. Sustainability: development sustained for future generations as well.

It was already commented that from these four paradigms, only the paradigm of "**Productivity**" could be identified to be related to the objectives of the Energy Wheel. This does not automatically result in failure of the objectives. The analysis of the quantitative data had already shown diversified findings which can be summarized as follows:

| Programme Objectives achieved | Programme Objectives not achieved |
|--|---|
| Employment: Few new productive activities were initiated. | Employment: Trend to migrate for foreign or urban jobs is unchanged or even increasing. New entrepreneurial activities mostly could not sustain. |
| Income Generation: Increased income was achieved based on improved agriculture through irrigation as a by-product of the micro hydro power plant. | Income Generation: Dependence on subsistence agriculture as income source is not reduced and still is the main source of income. Structural changes were not identified. |
| Environment Protection / Health: Introduction of improved cooking stoves resulted in saving of firewood and kerosene. Health and sanitation had improved but still in some places, the main diseases had not changed. | Environment Protection / Health: Fuel wood is still the main source of energy for cooking / heating purposes; there is no change in dependence on fuel wood. There was no improvement in the medical and clinical facilities because villagers were not aware of options and so, had not applied to get better medical facilities and infrastructure. |
| Drudgery Reduction / Labour Saving: New technology and electrical energy had significantly reduced the work load of women and made processing of agricultural products (rice) easier. | Drudgery Reduction / Labour Saving: |
| Resource Conservation and Utilization: Replacing kerosene for lighting through electricity saved time and financial sources in the villages. | Resource Conservation and Utilization: Fuel wood is still the main source of energy for cooking / heating purposes; there is no change in dependence on fuel wood. |

Table 6.1: Achievement of Project Goals(by author)

The **Paradigms** of the project were interpreted as the philosophy of the project and also covered, besides economic and productive aspects, more non-technical and socio-cultural aspects.

| Paradigms of Project | Paradigms achieved | Paradigms not achieved |
|--|---|---|
| (i) Productivity: employment, income generating activities | Higher productivity was achieved in subsistence agriculture. | Structural change from subsistence agriculture to more productive economy is not visible. |
| (ii) Equity: male and female are equally involved in activities | During project implementation women had equal access to all resources with education, land utilization, information, credit, health, income generating opportunities, etc. | Men still have more control over resources especially for important aspects like land ownership, skill development and credit. The women have to take prior permission from husbands before taking own decisions, showing the dependency of women on men even after community mobilization. |
| (iii) Empowerment: COs to take decisions | During project period, the members of COs and FGs were motivated and empowered through Community Mobilization to decide about their activities and energy projects. | The determination and motivation of the members of COs and FGs decreased over the years as they accomplished their activities and energy projects in their villages. |
| (iv) Sustainability: development is sustained for future generations as well. | | Villagers seem to be united only for few village activities but after implementation, tending more towards individual family affairs than to development of the community. People feel that their mission was accomplished which leaves the CO behind as a temporary initiative. |

Table 6.2: Achievement of Project Paradigms (by author)

It must be acknowledged that the overall target of "enhanced livelihood", up to a certain grade, was achieved. Not all objectives and paradigms could fulfil the expectations, and if it did, only with certain limitations:

1. Economic aspects: it was proved that the target of increased income was achieved, and the example of Pinthali village clearly showed positive impacts. Encouraging was also the money saving scheme for loans and financial investment of the CO members.

Limitation of success lies in the non-structural changes of economic sectors for all villagers because subsistence agriculture is still the main source of income while new and innovative income generating activities are coming up only in negligible scale, if any, and are not sustainable.

2. Gender related aspects: the situation, the empowerment, the equity and the role of women in the communities had changed to a certain degree which is a remarkable impact on the social and cultural environment of a traditional society.

But the "new" role of women again finds its limitations in daily life routines after the project was implemented. This is especially seen under aspects of control of resources and decision making. The traditional role of gender could not be overcome just within a project cycle. Moreover, it cannot be expected that a traditional society in a rural environment can go further than the national legislation where women still do not have the same (property) rights like men.

3. Organizational aspects: the formation of COs and FGs to decide about priorities and projects in the communities was an attempt of bottom-up instead of top-down decision making. The organizations lost their active function after project implementation and also could not achieve more than a negligible role for a kind of "grass-root democracy".

4. Sustainability of development: the situation in the community before, during and after project implementation was different. The initiation for this process came from outside, and as already discussed earlier, traditional societies might not be able to break up traditional attitudes, social restrictions, taboos and role of gender. The initial phase with community mobilization was very promising and showed all success in forming the above mentioned COs and conducting their project initiatives.

But the active process of development is not self-sustained but rather only a temporary action. All related initiatives, activities and processes of change came to a standstill after the project implementation was finished.

Final Finding and Interpretation (1):

The programme initiated limited positive developments as socio-economic changes and enhanced livelihood. This process of changes, then again, stagnated on a "higher" level; a continuous self-sustained process of on-going development in the community was not achieved.

6.2.2 The Hypothesis

6.2.2.1 Testing on Findings

The hypothesis was formulated as:

"For development in rural Nepal, 'energy' is a tool for motivation and combined with community mobilization, it is a strategy for sustainable development."

To analyse the proof of the hypothesis, it is differentiated into three segments which are expanded stepwise:

1st Segment:

The first part of the hypothesis: "**energy is a tool for motivation**" can be reflected on the background of community mobilization and formation of COs and FGs to take decisions for development of the community. The founding process of the COs itself is a success because it was observed as the first step for the community to learn and practice organizing themselves.

It was also proved in the overall findings that the driving force behind people's organizing themselves was the perspective of electrical energy for the rural community. And as a kind of side-effect, the community initiated a number of additional activities with positive results in the field of literacy education, health and sanitation.

The first segment is supporting the hypothesis.

2nd Segment:

The second segment is the extension of the first segment of the hypothesis: "energy is a tool for motivation and combined with community mobilization, it is a strategy".

This statement can be reflected with the already introduced principles of community mobilization which were given as:

- 1) Organization development,
- 2) Skill enhancement,
- 3) Capital formation,
- 4) Technology promotion,
- 5) Environmental management,
- 6) Women's empowerment.

The principles under 1) to 4) can be looked at as a pre-requisite to turn motivation (electrical energy) into practical activity whereas principles 5) and 6) are not based on

motivation of the communities, but more a kind of external (donors') view of development, and so were not initiated by the communities in their traditional environment.

Based on the overall findings of chapter 5, it can be summarized for:

1. Organization development:

- Electricity for the village was the highest motivation for technology promotion, human resource development and project management.
- People (male and female) in the villages were able to organize themselves, take decisions in consensus and implement the project.

2. Skill enhancement:

- Education in the project was taken as basic skills in reading and writing.
- Training of small entrepreneurship helped to initiate a limited number of new income generating activities for local village market demand.

3. Capital formation:

- Members found an economic benefit of the COs in their daily lives. The weekly meetings with savings from the members worked like a "rural banking" system which was transparent in accounting, book-keeping and money lending for individual members.
- The attraction was found to be even more in female groups as they could easily get a loan with fair conditions from their COs for starting small income generating activities or for household needs without having to sell property or doing away with a plot of land. "Guarantee" for paying back the money to the CO was given against the membership in the CO and the related social pressure within the group.
- The villagers do not have to depend anymore on money lenders who charged high interest rates and unfair exploiting conditions of providing loans, so, it was also no wonder that the money lenders in the villages tried to oppose these activities without much success.

4. Technology promotion:

- Information dissemination on new energy technologies was possible and accepted in the initial phase as part of the project.
- Technical awareness and capacity building was related to technologies used in the project (i.e. micro hydro).

5. Environmental management:

- Electricity helped in reducing dependency on commercial fuels like kerosene that was found to be positive in saving money and time in all villages.
- It can be concluded that the consumption of firewood was affected by the use of improved cooking stove which had positive influences in saving firewood and financial sources within the village.

6. Women's empowerment:

- For female villagers, it is the first time that they are allowed to attend village meetings, expressing needs and ideas among other female members which boosted their status and moral.
- On the question of helping the economically weaker members, it was said by the women members that they give first preference to such weaker members to take loan and also provide necessary help to start up a business.

The results are generally positive. This extended part of the hypothesis with its above principles combined with the quantitative and qualitative results are fulfilling the expectations:

The second segment is also supporting the hypothesis.

3rd Segment:

Finally, combining all three segments of the hypothesis, "energy is a tool for motivation and combined with community mobilization, it is a strategy for sustainable development" must reflect achievements of "sustainable development" at the village level.

Main findings were:

1. Organization development:

- Villagers seemed to be united only for limited village activities and after implementation of the project, they tended to be more interested towards individual day-to-day affairs than towards development of the community that gave the COs a passive status.
- After achieving the "modern" form of energy, the mission was fulfilled at least from the point of view of the communities. This meant temporary engagement of the members of

the COs which later decreased after project implementation leaving the COs behind as temporary initiatives.

2. Skill enhancement:

- After implementation of the technology, there was no further information flow or access to information the villagers might need.
- Technical awareness and capacity building was related to technologies used in the project (i.e. micro hydro) but limited to basic operation which was not sufficient for repair and maintenance.
- The female members showed lower capability compared to their male counterpart because of lack of basic literacy skills.

3. Capital formation:

- After implementation members hardly met or conducted any meetings, and as a consequence, the weekly savings did not exist and the community members collected money either once a month or once in two months.
- The funds/savings of the COs (which had risen to remarkable amounts in the villages) were still kept as cash under village conditions. There was no safety of the savings and also no guarantee of avoiding misuse of the money credited by the members.
- There were no plans or further targets on how the funds of the COs could be spend for other development activities.

4. Technology promotion:

- Technical upgrading or follow-up was not requested or initiated by the community and also not provided by the project.

5. Environmental management:

- Health and sanitation had improved but still in some places, the main diseases had not changed. There was no improvement in the medical and clinical facilities because villagers were not aware of options and so, had not applied to get better medical facilities and infrastructure.
- It could be concluded that villagers in all areas still used fuel wood as the main source of energy for cooking and heating purposes. There was no change in the dependence and use of firewood.

6. Women's empowerment:

- The situation had improved for women but still was not equal to men. Men and women had access to almost all resources but still, control on ownership, land utilization, employment opportunities, education, credit, etc., is with the men.
- Empowerment of women had increased during project implementation but then stagnated.

After reflecting all three segments of the hypothesis as a whole: "energy is a tool for motivation and combined with community mobilization, it is a strategy for sustainable development" under achievements of "sustainable development", it is evident that a main problem lies here - all experiences show that the process of development itself is coming to a standstill. Community Mobilization taking energy as an initial spark to ignite a fire demand for further development as sustainable process has not become reality.

Final Finding and Interpretation (2):

As far as all segments are taken as a total it must be stated that the hypothesis is not supported – at least not under the above given views.

But before accepting this as a final and absolute result (that is to say that the hypothesis as such is rejected) additional answers must be found for questions such as:

- Is this result related to the hypothesis or to the project?
 or
- Is it related to the role of external assistance of the mobilization process?
 or
- Is it because the origin of motivation (electrical energy) had come true?

At least, the following result is unequivocal: the "mission of development" was believed to be completed after electrical energy was available for the community. Further plans of development were not taken into consideration after the self-felt "new level of development" had been reached. In the first glance, this could be interpreted as, "a process towards sustainable development cannot be achieved". However, with more critical scrutinizing, it could be argued in a different direction as it brings back the question of common understanding of sustainable development:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

(United Nations 2006[3], printed from internet 21.01.2006)

Let's consider the fundamental question: Which society is more sustainable?

- The rural society in Nepal with its newly achieved "higher level" of development,
- or

- The industrialized society in the already developed countries?

When we observe the present global race for gaining access to the last resources of fossil energy in the form of oil, then it is easy to predict that the rural community in Nepal will be less affected and could easily sustain than the more energy dependant industrialized "developed" communities.

So can it be concluded that the rural communities in Nepal having achieved and perceived higher level of enhanced livelihood with self-defined and self-accepted level of development is already more on a path of "sustainable development" compared to the socalled developed industrialized societies?

Are rural communities in Nepal an example on how to practice sustainable development for the coming generations with self-restriction of consumption, without exploiting or overstressing natural resources?

It was already stated in the first chapter that over the last half century, under the 'Myth of Development', mere four countries (out of these two city states) could succeed in economic development. Targeting more than 130 other "backward" countries, de Rivero states that it is more important to establish a balance between population growth and vital resources like food, water and energy (de Rivero 2003, p.159). "The fact that poverty in the underdeveloped world is beginning to change its rural environment to become increasingly urban is a matter for grave concern, since this new poverty will be more destabilizing than the traditional rural sort. This urban poverty is concentrated in a space where the lack of food, water and energy is more acutely felt and where poverty lives in close proximity to wealth" (de Rivero 2003, p.162).

Taking food, water and energy as decisive factors in combination with reduced population growth as a pre-requisite for countries to survive for another one or two generations until technical progress might result in more productivity would find support by projects like Rural Energy Development Programme, because it helps to improve the traditional subsistence agriculture with higher yields and better income, water supply for irrigation and drinking water and renewable energy.

Although it is targeting the rural population and not the urban dwellers, it is an indirect support in keeping people in rural villages as long as possible instead of them migrating to cities. It helps to make the food supply in the country more sustainable and to extend the use of renewable sources of energy (which even might later be connected to national grids).

Final Finding and Interpretation (3):

So asking again - are these rural communities an example on how to practice sustainable development for the coming generations with self-restriction of consumption and without exploiting or overstressing global natural resources?

In this context, the project and also the hypothesis are supported.

6.2.2.2 Proof of Hypothesis against Vision of Development

Finally, the hypothesis must be reflected with the author's own vision of development for Nepal which was already given as:

- 1) Leading to fulfilling basic needs with income above poverty line, food, water and shelter,
- 2) Better access to health and education, social justice and equality,
- 3) Change of awareness,
- 4) Change of attitudes,
- 5) Change of the situation by its people with self-motivation and self-initiation.

The target under 1) was achieved to a certain level by the chosen strategy of the project. The project results also underline the correctness of this vision.

The target under 2) at the village level was partially achieved through limited means. However, it is also more or less out of the sphere of influence of the rural community itself and mainly dependant on national health and education policy and the related community funds. A rural community can overcome deficits in this sector only in a marginal way like basics in literacy and better sanitation. But the deficits in the project results again underline the necessity of this part of the vision of development.

It was already stated earlier that pre-requisition for sustainable development lies in the targets 3) to 5) with change of awareness, change of attitudes and change of situation by the people with self-motivation and self-initiation. It was shown that the level of awareness before and after project implementation has changed by project impact and by external input through community mobilization.

Comparing the historical development process of the so-called developed industrialized countries with the "developing" countries, it must be stated that there was no similar process of development assistance in the past which brought up the "developed" countries. Obviously in history, the process of development was a process of evolution of or within a society, and there's no doubt that the evolution also had temporary phases of political and technological revolution. But at least, the societies had more time and so were able to accept and adapt to those changes in a process which was measured in generations or centuries. Changing a society through community mobilization in a time span of 3 to 5 years of project implementation is not comparable with this change of situation over generations.

Therefore the question emerges - Is the project with community mobilization

- a process of development in the sense of evolution,

or

- is it more or less a kind of socio-economic and awareness revolution,
- or
- is it neither this nor that but just a kind of (with best intention) manipulation?

This question can only be answered by understanding the "quality" of awareness before and after project implementation.

The analysis of data regarding awareness/social changes and change of attitudes/selforganization and self-initiation of development activities had already resulted in the following findings:

- Members found an economic benefit in their daily lives,
- For female villagers, it was the first time that they were allowed to express needs and have access to resources although the major control was still with the men,
- The situation had improved a lot for women but not equal to men.

It was shown that these changes were limited in its reach, intensity and time but were, more likely and unknowingly, an attempt to integrate the rural community into the "modern" system of socio-economic life of a pre-industrialized society through technology transfer. The technology brought a modern form of electrical energy to the village which was transferred as a kind of "technical genetic material" created in the industrialized society and then transplanted into the traditional society with the intention of changing (developing) the community.

This is acceptable if the society which gets the transplantation is ready to be the receiver of the transplant. There is no doubt that the society (the rural community in this context) was demanding for it.

This is also acceptable if the society which gets the transplantation is aware of the impact of transplantation. It is obvious that the level of awareness was not created with an intention of critical thinking or understanding of the situation people are living in. It is more of an attempt to prepare the traditional society to use the technical transplant instead of making them aware of the genetic impact of this technology on the socio-economic, cultural or political system they are living in. One of the most famous and critical interpreter of creating and changing "awareness" was Paulo Freire who stated that the process of awareness creation contains the process of changes and that the human being is not a creature of adaptation but of changes (Freire 1978, p.19, translated by author).

Freire's method to educate the people in this sense had two stages: firstly, the people need to realize and become conscious of their oppression and secondly, action is needed to reform the structures. "He offers a simple, concrete and yet profound 'way out' for the 'have-nots'. His educational method is a liberation or humanization for the marginalized classes of society from what he calls 'cultures of silence.' ... Passivity is fatal and only serves to 'keep down' and limit the resources of the already marginalized." (Flanagan 2002, p.62).

Freire's understanding of awareness was based on his experience in Latin America which caused him to postulate political reforms. From his perspective, a process of awareness in a kind of idealism, expecting that people can be changed without changing the situation by class struggle, is an illusion and counter-productive (Freire 1978, p.14, translated by author). In this context of Freire's understanding of awareness, it can be stated that this was not part of the process of awareness creation in the project in Nepal.

In this critical sense, it must be stated that the process of change of awareness was not part of the project and consequently, not a deep-rooted process.

Then the question arises: Why was it not a deep-rooted process?

The answer can be found in the "Six Principles of Community Mobilization" of the project: "The main purpose of REDP Community Mobilization is to enhance the local capacity of community based organizations for the implementation and management of rural energy systems at the community level and institutionalization of the rural energy programme at the district level......REDP emphasizes community mobilization as an essential vehicle for self-governance to ensure active participation of local people to manage and operate rural energy systems and other community development efforts in a sustainable manner." (UNDP/REDP, 1998[2], p.2). So the confusion still remains - what is serving for which target?

- Energy as an entry point for sustainable development of the community,

or

- Sustainable development through community mobilization,
- or
- Energy as an entry point for community mobilization for sustainable development?

It is nothing of above but:

The project used community mobilization for sustainability of technology of rural energy system - but not for creating critical awareness.

It is not surprising any more that the perspective and understanding of "development" is limited in this context. It even turns the relation of energy and community mobilization topdown; community mobilization is more a tool for a technology based project taking energy as motivation and also as the target.

Final Finding and Interpretation (4):

Community mobilization, in the sense of creating critical awareness, was not part of the project philosophy, so the process of change of awareness was not a deeprooted process in the community.

This result even more underlines the indispensable target of creating awareness of the communities in a sense of understanding and changing their own situation.

In this context, it must be stated that the hypothesis is strongly supporting the vision of development !

6.2.3 Reviewing the Vision of Development for Nepal

What is the lesson to learn as a consequence of project experience and testing of hypothesis for a vision of development for a country like Nepal?

First of all, it must be stated that it is unrealistic to create universal statements on this kind of project work or to formulate new concepts for development work based on still limited experience. On the other hand, it must also be stated that the findings are not untypical but perhaps were not yet analysed in a comparable way like in the context of this research.

Reviewing the already stated vision of development for Nepal, it can be related to the wellknown Pyramid of Maslow with its physiological needs, i.e. deficits in organism expressed through hunger, thirst, etc. and its psychological needs, i.e. deficit in social relations expressed through feelings of safety, protection, love, success, etc. (Maslow 1943, p.370). With this background, the vision of development can be taken as fulfilled by looking for physiological needs. It was shown that this demand was satisfied, but it might be only temporary because satisfying a demand once does not necessarily mean that the demand is satisfied for all future. It is normally the opposite - after fulfilling the demand, new demands come up.

Especially in the backdrop of improved livelihood through electrical energy, experience shows that after climbing up on the "energy ladder" from traditional to modern energy, new demands are growing for other technical appliances (after electricity, then radio, then TV, video, fridge....). The economic perspective of the community based on improved subsistence agriculture alone cannot fulfil those growing demands in the future which might result in an ongoing process of rural migration.

When reviewing the historical process of urbanization in the industrialized countries and realizing the global trend of urbanization, it cannot be expected that this trend in a developing country like Nepal can be changed or stopped. Furthermore, Nepal, located between the new upcoming super powers of India and China, ironically does not participate in the economic development of its neighbours, like the Chinese economy as a state-owned capitalistic system which is exactly going through all the phases of Rostow's theory of development. It has already gone through the stages of "Traditional Society" and "Transitional Stage". It is now in the "Take Off" stage with more workers changing from agriculture to manufacturing as industrialization increases. The growth is self-sustaining as investment lead to better incomes generating more savings to finance further

investment. China is already moving onto the fourth stage, "Drive to Maturity", diversifying its economy and producing new type of goods and services while technology and innovation provide investment opportunities. Moreover, it is already expected to reach "High Mass Consumption" stage within a relatively short time and thus taking global economical leadership.

"Never before has the world seen such sustained growth;While this has reduced poverty, inequality has been increasing with growing disparities between cities and rural areas, and between coastal regions and the interior" (Stieglitz 2006, p.7). Similar view is shared by Hongfu (Hongfu 2006, p.5) when he states that "many of the unfortunate side effects of rapid economic growth, including the widening wealth gap between rich and poor, rising unemployment resulting from massive layoffs, deteriorating social services and worsening environmental problems, need to be addressed." This again shows that economic growth alone does not mean development or sustainable process.

Nepal's potential cannot be compared with a country like China. But if the global trend proceeds in the same direction, then the consequence for the vision of development should still be:

Development in rural Nepal is related to creating awareness and being motivated by using energy as a tool for improving as well as changing one's situation as a precondition to fulfil basic needs and participate in socio-economic development.

But what is then the link of development to urban Nepal? The efforts of rural development can be taken as a kind of interim solution, but knowing that the process of development will include urbanization like in all countries. Also, stating that a poor country like Nepal can never provide its entire people in rural areas with sufficient supply in education, infrastructure, health, production or market potentials could make sense.

In addition, in the long run, a continuous rural exodus has to be accepted as a fact whether we like or not and it might be more realistic to concentrate on modernization and production in few urbanized places of the country instead of trying to keep the major part of the population in rural and remote areas.

In this context, it may be stated that the former negative result of "trickle-down" effect might be a solution for Nepal while concentrating efforts on modernization of agricultural production and industrialization of limited number of urban areas. So the condemned "trickle-down" effect as illustrated in the left part of the illustration could then be modified as illustrated in the right part by modern islands as entry points for expanding economic development.



But an equal distribution of economic development in rural and urban areas cannot be achieved in short term. All those still cover more economic aspects as part of physiological needs but less of psychological needs of a society that is also related to poverty. To really break the cycle of poverty, intervention is required and it can be made at various stages but "the preferred entry point would be upon perceiving deprivation, and prior to the 'depression' stage.....Interventions that are intended to break the cycle of poverty and social failure must incorporate empowerment mechanisms. Empowerment of people, or 'people power', has to result in the psychological transformation of individuals or the group" (Ortigas 2000, p.42-43).



Again in the understanding of Paulo Freire, this requirement can only be fulfilled by people's awareness and understanding their own situation which leads to people's action in changing their own situation.

In this sense, the overall finding of the research is taken as follows:

1.) The existing rural energy programme cannot meet all requirements of the vision of development and the hypothesis, because it is orientated to sustainability of energy systems and not to sustainable development through people's critical awareness and their capability for understanding and then changing their own situation.

2.) The vision of development for Nepal by targeting rural communities is a useful attempt in the sense of a "temporary" solution to slow down rural migration and to reduce urbanization. In this context, the rural energy programme can fulfil substantial requirements.

3.) The finding of the hypothesis with "energy" as a tool for motivation, and in combination with community mobilization, as a strategy for sustainable development is thereby supported.

Final Note:

It might be an irony of history that during those years of research, the already mentioned People's Movement of Maoists in Nepal (who might be closer to Freire's postulation of awareness) had already come to political power in 2006.....

....but the result for Nepal's development was still open at the time this dissertation was submitted.

Nepal/Germany, October 2006

<u>Glossary</u>

The following list shows definitions of local terminologies and key words used for the research purpose.

Caste System

One integral aspect of Nepalese society is the existence of the Hindu caste system, modeled after the ancient and orthodox Brahmanic system of the Indian plains. The caste system did not exist prior to the arrival of Indo-Aryans in Nepal. Its establishment became the basis of the emergence of the feudalistic economic structure of Nepal: the high-caste Hindus began to appropriate lands - particularly lowlands that were more easily accessible, more cultivatable, and more productive - including those belonging to the existing tribal people, and introduced the system of individual ownership.

The fourfold caste divisions are Brahmin (priests and scholars), Kshatriya or Chhetri (rulers and warriors), Vaisya (or Vaisaya, merchants and traders), and Sudra (farmers, artisans, and laborers).

(http://countrystudies.us/nepal/31.htm, printed on 18.04. 2006)

Community

The term community as referred by REDP project are the people that include men, women and children living in the villages. This is a group of people with same order of living together under similar set of living condition.

(UNDP/REDP, 1998[2]: Community Mobilization Guidelines, Kathmandu, Nepal, p.10)

Community Organization

The community organization is an organization of people living in close vicinity having common interests and goals for their continued socio-economic development. Normally, residents living in such close proximity with certain resources have similar interests and necessities.

(UNDP/REDP, 1998[2]: Community Mobilization Guidelines, Kathmandu, Nepal, p.10)

District Development Committee

District Development Committee is the district level administrative and service delivery unit in the country's administrative framework. They are 75 DDCs in Nepal.

Environment Management

The environment management, for research purposes, covers fuel and fodder supply from forests, environmental health and sanitation, environmental education and micro watershed management.

Kirat

The religion of the ethnic group of Rai is Kirat religion which worships Sumnima as archetypal proto-female and Paruhang as proto-male. Worshiping of ancestors is very significant, and as a form of land worship, Rais perform the Sakela Puja (Chandi Puja) in the months of Baisakh and Mangsir.

Malla Dynasty

"By the early <u>12th century</u>, leaders were emerging whose names ended with the Sanskrit suffix malla ("wrestler"). <u>Arimalla</u> was the first king of this dynasty, which was initially marked by upheaval before the kings consolidated their power over the next 200 years. <u>Thirteenth-century</u> Nepal was occasionally pillaged by the <u>Delhi Sultanate</u> of <u>northern</u> <u>India</u>, and was marked by increased militarization. By the late <u>14th century</u> much of the country came under the rule of the king <u>Jayasthitimalla</u>, who managed to unite most of the fragmented power bases. This unity was short-lived: in <u>1482</u> the kingdom was carved into three: <u>Kathmandu</u>, <u>Patan</u>, and <u>Bhadgaon</u>. The Malla dynasty lasted till mid 18th century." (http://en.wikipedia.org/wiki/History_of_Nepal_ printed on 18.04.2006)

Mul Mantra

In Nepali terminology "Mul Mantra" means principles.

Panchyat System

"....Adopted on the second anniversary of the royal coup under King Mahendra father of present king Gyanendra, the new constitution of December 16, 1962, created a four-tier panchayat system. At the local level, there were 4,000 village assemblies (gaun sabha) electing nine members of the village panchayat, who in turn elected a mayor (sabhapati). Each village panchayat sent a member to sit on one of seventy-five district (zilla) panchayat, representing from forty to seventy villages; one-third of the members of these assemblies were chosen by the town panchayat. Members of the district panchayat elected representatives to fourteen zone assemblies (anchal sabha) functioning as electoral colleges for the National Panchayat, or Rashtriya Panchayat, in Kathmandu. In addition, there were class organizations at village, district, and zonal levels for peasants, youth, women, elders, laborers, and ex-soldiers, who elected their own representatives to

assemblies. The National Panchayat of about ninety members could not criticize the royal government, debate the principles of partyless democracy, introduce budgetary bills without royal approval, or enact bills without approval of the king. Mahendra was supreme commander of the armed forces, appointed (and had the power to remove) members of the Supreme Court, appointed the Public Service Commission to oversee the civil service, and could change any judicial decision or amend the constitution at any time. To many of the unlettered citizens of the country, the king was a spiritual force as well, representing the God Vishnu upholding dharma on earth. Within a span of ten years, the king had, in effect, reclaimed the unlimited power exercised by Prithvi Narayan Shah in the eighteenth century...."

(http://countrystudies.us/nepal/19.htm, printed on 17.03.2006)

Pratinidhi Shaba

Nepal has adopted constitutional monarchy after the popular movement for multiparty democracy and a new constitution based on democratic principles was promulgated on November 1990. The country is divided into 205 electoral constituencies, the representatives of which form the lower house of parliament, called "Pratinidhi Sabha", for a term of five years.

Raiya Shaba

The upper house of parliament, called "Rajya Sabha", is a 60 member assembly elected on the basis of electoral rights with 10 members nominated by the King.

Rana Regime

In 1846, Jung Bahadur Rana had himself designated prime minister and later "Maharajah" with powers superior to those of the king. He established an oligarchy which would last 104 years. The country was kept in isolation and the people were deprived of political and social rights. Enemies were assassinated or persecuted and the power structure and state moneys were directed solely to the self interest of the Ranas. The King was there but he was kept under complete control of the Ranas.

(http://internet.cybermesa.com/~rotto/hist4.html printed on 17.04.2006)

Rural Energy Technology

There are various types of energy technologies- from very sophisticated (high tech.) to simple technologies. The research focuses only on those technologies available and used in rural context. The rural energy technologies discussed in this research are mainly, micro-hydro power plan, solar home systems, and family biogas systems and improved cooking stoves which was promoted by Rural Energy Development Programme (REDP) in rural Nepal. These technologies are based on renewable source of energy available in the rural areas.

Shah Dynasty: Shah Period (1769 to date)

There were about 500 small states in India and about 50 states in Nepal during the middle of the 18th Century. The most of the states were fighting each other to expand their territory. Prithvi Narayan Shah, the King from the state of Gorkha (home of the now famous Gurkha soldier), about 100 km west of Kathmandu believed that unless Nepal was unified, it was in danger of going into the hands of British India. He started the process by unifying the small states. In 1768, after ten years of preparation, siege, and attack, Kathmandu fell to Gorkha on the day of the festival of Indra and the Virgin Goddess. Prithvi Narayan died in 1775 and was succeeded on throne by his family till today in Nepal.

(http://internet.cybermesa.com/~rotto/hist4.html, printed on 17.04.2006)

Social Capital

Social capital refers to social norms and network that people use to solve common problems. It is not physical capital, but is conceptualized as capital living in social relations. They are mutual trusts, reciprocity and collective action. When people in communities unite to perform certain task they trust each other; trust calls for reciprocity and reciprocity, in turn, brings collective action. This causes completion of task, even with very small physical assets.

Village Development Committee

Village development Committees (VDCs) is the lowest-level administrative and service delivery unit in the country's administrative framework. The VDC is the elected governing body at the grassroots level. There are about 4,000 Village Development Committees in Nepal.

Ward

Taking into account the geographical situation, the village development areas are divided into nine Wards consisting of equal population to the extent possible. Therefore, each VDC consists of 9 wards. It's the lowest unit of administration on village level. A Ward Committee shall be constituted comprising of the Ward Chairman and Ward Members as follows elected by the Nepalese citizens who are in possession of the qualifications to become voters under the prevailing law, of each Ward of the Village Development Committee, from amongst the persons having possessed the required qualifications to become a Member of the Village Council.

Ministry of Local Development (Self-Governance Act 2055 (1999) 2006,

http://www.mld.gov.np/pdf_downloadable_file/local_self_governance_act_2055(1999)_en glish.pdfLocal), printed on 6.04.2006

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UNDP/REDP 2006[3]: Rural Energy Development Programme http://www.redp.org.np/annual/annual02/an1j.pdf, printed on 6.04.2006

UNDP/REDP 2006[4]: Rural Energy Development Programme http://www.redp.org.np/annual/annual02/an1g.pdf, printed on 6.04.2006

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Declaration

I hereby certify that this paper/thesis was independently written by me. No material was used other than that referred to. Sources directly quoted and ideas used, including figures, tables, sketches, drawings and photos, have been correctly denoted. Those not otherwise indicated belong to the author.

Place, date:

Signature:

Annexes

Annex 1

Baseline Survey Forms Used by REDP in 1996/97

ग्रामीण उर्जा विकास कार्यक्रम (नेप/९५/०१६) घरधुरी ऊर्जा सम्बन्धी तथ्यांक संकलन फाराम

| जिल्ला गाउँ | | | गा.ति | व.स. : | | | |
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| | | ····· | | | | | |
| क) घ | र परिवार विवरण | | | | | | |
| १) घर | १) घर धनीको नाम : | | | | | | |
| २) अन | २) अन्तरवार्ता दिने व्यक्तिको नाम : | | | | | | |
| ३) शि | क्षा तथा पेशाः | | | A: 2790 | | | |
| सि. नं. | नाम | महिला/पुरुष | वर्ष | पेशा | शिक्षा १-६ *) | | |
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 अशिक्षित - १, पढ्न जान्ने - २, प्राथमिक शिक्षा - ३, निम्न माध्यामिक शिक्षा - ४, माध्यामिक शिक्षा - ४, विश्व विद्यालय - ६

ख) कृषि तथा उत्पादन

४) तपाईको जग्गा जमीन कति छ ? हेक्टर/रोपनीमा उल्लेख गर्नुहोला ।

| खेत (सिचाई सुबिधा प्राप्त) | बारी | पाखो | खर बारी | चरन | वन वृक्षारोपण | अन्य |
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९) गाईवस्तुहरु कसरी पाल्न भएको छ ? छ भने संख्या उल्लेख गर्ने

भैंसी/राँगा गाई/गोरु कुखुरा/हाँस भेंडा/बाखा अन्य

८) पशु पंक्षि पालन (संख्या) :

कृषिजन्य वस्तु गाई भैंसीलाई खुवाउने कम्पोष्ट मल बनाउने खाना पकाउन तथा बाल्ने अन्य प्रयोग मकैको ढोड गहुँको छ्वाली पराल धानको भुस

७) कृषिजन्य वस्तुहरु जस्तै पराल, भुस, मकैको ढोड आदिको प्रयोग (भारी/के.जी.) :

सरकारी सेवा

| ६) | आम्दानीका श्रोतहरु (रू.) : | |
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व्यापार

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| वाला | লবদাল | उत्पादन | परिमाण | आम्दानी | परिमाण | मुल्य |
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वैदेशिक नोकरी

मजदुरी

अन्य

५) बाली र उत्पादन (आर्थिक वर्ष) :

१०) गाईबस्तुहरुको चरन कहाँ उपलब्ध छ ?

| वन | चरन | पाखो बारी |
|------|------|-----------|
| दुरि | दुरि | दुरि |

११) पशुहरुलाई ख्वाउन आवश्यक पर्ने घाँस कहाँबाट ल्याउनु हुन्छ ?

| आफ्नै खेत | खरबारी | पाखो | जगल | चरन | खरिद गरेर |
|-----------|--------|------|-----|-----|-----------|
| | | | | | |

१२) पशुपालनमा देखिएका समस्याहरु के के हुन् ?

| डाले घाँसको अभाव | उन्नत जातका पशुहरु उपलब्ध नभएको | रोग | उपचारको अभाव | बजारको अभाव | अन्य |
|---------------------|------------------------------------|-----|-----------------|----------------|------|
| | | | | • | |

ग) स्वास्थ तथा सरसफाई

१३) खानेपानी कहाँबाट ल्याउनु हुन्छ र कति टाढा जानु पर्दछ ?

| श्रोत | कुवा | मूल | खानेपानीको धारा | खोला |
|-------|------|-----|-----------------|------|
| दुरी | | | ener attack the | |

१४) तपाईको घरमा चर्पी छ कि छैन ? छ () छैन ()

छ भने स्थायी () अस्थायी ()

१४) भान्छा तथा घरायसी फोहरहरुलाई कहाँ फाल्ने गर्नु हुन्छ ?

खाल्डो खनेर () जथाभावी () मलको रासमा ()

१६) बिरामी हुँदा कसरी उपचार गर्नु हुन्छ ?

| जडी बुटीहरु प्रयोग गरेर | धामी फ्राँकीबाट | डाक्टरबाट | आयुर्वेदिक औषधी | अन्य |
|-------------------------|-----------------|-----------|-----------------|------|
| | | | | |

१७) हालसम्म परिवारका सदस्यहरुलाई लाग्ने गरेका मुख्य रोगहरु के के हुन् ?

(3)

घ) लैंगिक विभाजन (Gender Division)

१८) तपाईको परिवारका महिला तथा पुरुष सदस्यहरुले दैनिक करीब कति घण्टा काम गर्नु हुन्छ ?

| कामको किसिम | पुरुष | महिला |
|----------------------|-------|-------|
| खाना पकाउन | | |
| घरायसी सरसफाई | | |
| पानी ल्याउन | | |
| दाउरा संकलन | | |
| घाँस काट्न | | |
| पशु स्याहार | • | |
| केटाकेटीको हेर विचार | | |
| कूटानी पिसानी | | |
| अन्य | | |

१९) परिवारका सदस्यहरु कुनै उपभोक्ता समिति अथवा अन्य विकास सम्बन्धी समूहमा संलग्न हुनु हुन्छ ?
 महिला :- छ () छैन () पुरुष :- छ () छैन ()
 यदि संलग्न छन् भने, कस्तो किसिमको संस्थामा आवद्ध छन् ?
 महिला :- पुरुष :-

२०) परिवारका महिला/पुरुष सदस्यहरुले कुनै उद्योग संचालन गर्नु भएको छ ? यदि छ भने तलको विवरण दिनुहोस् । सिलाई बुनाई () म/पु डोको नाम्लो बुन्ने () म/पु धागो काट्ने () म/पु राडी पाखी र गलैंचा बुन्ने () म/पु जाम तथा अन्य खानेकुरा बनाउने () म/पु अन्य () म/पु

- ङ) काठ दाउरा आपुर्ति
- २१) घरको दैनिक प्रयोगको लागि चाहिने इन्धनको रुपमा के के प्रयोग गर्नु हन्छ ? काठ दाउरा () गोवर ग्याँस () बिजुली () मट्टीतेल () कृषिजन्य वस्तु ()
- २२) खाना पकाउनको लागि दाउरा प्रयोग गरिरहनु भएको छ भने १ महिनामा अन्दाजी कति भारी चाहिन्छ ?

...... भारी (१ भारी बराबर के.जी.)

२३) दाउराको आपुर्ति कसरी भइरहेको छ र दाउरा संकलन गर्न कति टाढा जानु पर्दछ ?

| सामुदायिक वनबाट | किनेर | सरकारी वनबाट | आपनै खेतबारीबाट | निजी वनबाट |
|-----------------|--------|--------------|-----------------|------------|
| घण्टा | घण्टा | घण्टा | घण्टा | घण्टा |
| कि.मी. | कि.मी. | कि.मी. | कि.मी. | कि.मी. |

(8)

२४) दाउरा संकलन कहिले गर्नु हुन्छ ?

दिन्दिनै () हप्ता हप्तामा () महिनाको १ पटक () वर्षको १ पटक ()

- २५) एक पटकमा कति भारी दांउरा संकलन गर्नु हुन्छ ? भारी
- २६) दाउरा संकलन गर्ने काम कसले गर्दछ ?
 - केटाकेटी () लोग्ने मान्छे () स्वास्नी मान्छे () अन्य ()
- २७) दाउरा संकलनमा परिवारको कति जना संलग्न हुन्छन् ? जना
- २८) एक भारी दाउराको कति रुपैयाँ पर्दछ ? रू.

२९) घर बनाउन तथा अन्य कामको लागि काठ कहाँबाट ल्याउनु हुन्छ र कति टाढा जानु पर्दछ ?

| श्रोत | सामुदायिक वनबाट | निजी वनबाट | सरकारी वनबाट | आफ्नै खेतवारीवाट |
|-------|-----------------|------------|--------------|------------------|
| ਟਹੀ | घण्टा | घण्टा | घण्टा | घण्टा |
| 3.1 | कि.मी. | कि.मी. | कि.मी. | कि.मी. |

३०) यदि तपाइको आफ्नो खेतमा काठ दाउराको लागि रुखहरु छन् भने तिनको विवरण दिनुहोस ।

| प्रजाति | संख्या | काठ दाउरा काट्ने समय | उत्पादन (दाउरा) भारी | वार्षिक उत्पादन |
|------------|---------------------------------------|----------------------|----------------------|--|
| सीसौ | | | | • |
| साल | | | | |
| सल्ला | | | | |
| चिलाउने | P. 31.55 | 1 | | |
| बकाइनो | a Dana Corporation and | | | |
| बोट धँगेरो | | | | |
| उतिस | | | | |
| गिदरी | · · · · · · · · · · · · · · · · · · · | | | and the second |
| सीरीस | | | | |
| पैयुँ | | | | |
| सिमल | | | | |
| अन्य | | | | |

२१) तल उल्लेखित प्रमुख २, वटा श्रोतहरुबाट तपाईको दाउरा आपूर्ति कसरी भइरहेको छ ?

| श्रोत | चौथाई $\frac{9}{8}$ | आधा १ | तिन भाग 🖁 | सबै |
|------------------|---------------------|-------|-----------|-----|
| वन जंगलबाट | | | | |
| आफ्नो खेतवारीबाट | | | | |
| | | (y) | | |

३२) समय अनुसार दाउराको खपत 9 हप्तामा हति हुन्छ ?

| मौसम | जाडो | गर्मी | वर्षा |
|-------------------|------|-------|-------|
| परीमाण भारी/हप्ता | | | |

३३) तपाईको आफ्नो उपभोगको जग्गामा औषधिमा काम लाग्ने बोट विरुवाहरु छन् भने तिनीहरुको नाम दिनुहोस् ।

| विरुवाको नाम | जम्मा संख्या | प्रयोग |
|--------------|--------------|--------|
| | | |
| | | · |

३४) यदि तपाईको आफ्नो बारीमा डाले घाँसका बोट विरुवाहरु छन् भने तिनीहरुकां नाम तथा संख्या दिनुहोस् ।

| प्रजाति | जम्मा संख्या | कैफियत |
|---------|--------------|--------|
| | | |

३४) तपाईको आफ्नो जग्गामा भएका फलफुलका बोटका नाम तथा संख्या दिनुहोस् ?

| प्रजाति | जम्मा संख्या | कैफियत |
|---------|--------------|--------|
| | | |
| | | |

च) गोवर ग्याँस

| ३६) | तपाईले गोवर | ग्याँसको बारेमा | सुन्नु भएको छ ? | छ () | छैन () |
|-----|-------------|-----------------|-----------------|-------|--------|
| | | | | | |

| ३७) | तपाईको घरमा गोबर ग्याँस प्लान्ट छ ? | छ, () | छैन् () |
|-----|-------------------------------------|--------|---------|
| | | | |
| | छ भने, चर्पी जडान | छ () | छैन () |

३८) गोवर ग्याँस केका लागि प्रयोग गर्नु हुन्छ ?

खाना पकाउन () बत्ती बाल्न () . अन्य ()

३९) गोबर ग्याँस प्लान्टको क्षमता कति छ ? घन मिटर

(8)

| | 20 1 | 0 | | | · · | 20 |
|-----|-------|-----|-----------|-----------------|---------------|------|
| 801 | देनिक | कति | गावरको | आवश्यकता | UGEO ? | क जा |
| 001 | 41.14 | | 11 1 / 11 | 11 1 1 1 1 1 11 | 120. | |

४१) गोवर ग्याँस कसले संचालन गर्दछ ?

केटाकेटी () लोग्ने मान्छे () स्वास्नी मान्छे () अन्य ()

- ४२) गोबर ग्याँस संचालन गर्न दैनिक कति घण्टा काम गर्नु पर्दछ ?
- ४३) गोबर ग्याँसको लेदो (Slurry) के मा प्रयोग गर्नु हुन्छ ?
 - खेतवारीमा () ' कम्पोष्ट मल बनाउन () अन्य ()
- ४४) गोवरबाट गुइँठा बनाउनुहुन्छ कि बनाउनुहुँदैन ? बनाउँछौं () बनाउँदैनौं ()
- ४५) यदि गुइँठा बनाउनु हुन्छ भने केका लागि बनाउनु हुन्छ ?
- खाना पकाउन () ४६) वर्षको कुन कुन महिनामा गोबर ग्याँसको प्रभावकारीता बढ्ने अथवा घट्ने गर्दछ ?
 - बढ्ने महीनाहरु
- छ) महितेल

४७) तपाईको घरमा मट्टितेल के कामका लागि प्रयोग हुन्छ ?

| खाना पकाउन () बत्ती बालन (|) | अन्य () |
|--|--------|--------------------|
| ४८) महिनामा कति लिटर मट्टितेल खर्च हुन्छ ? | - Mais | लिटर प्रति महिना । |
| ४९) तपाईको गाउँमा १ लिटर मट्टितेलको कति पैसा पर्दछ ? | रह | प्रति लिटर । |

- १०) महितेल किन्न जानु पद सबभन्दा नजिकको ठाउँ कुन हो र त्यहाँ पुग्न कति समय लाग्दछ ?
- स्थान : घण्टा मिनेट
- ज) ब्यारी
- ४१) घरमा ब्याटी प्रयोग हुन्छ ? हुन्छ () हुँदैन ()
- यदि हुन्छ भने कुन प्रयोजनको लागि व्याट्री प्रयोग हुन्छ ? टर्च लाइट () रेडियो () अन्य ()
- ४२) महिनामा कति जोडा ब्याट्री प्रयोग हुन्छ ? जोडा
- ४३) कुन किसिमको ब्याट्री प्रयोग गर्नु हुन्छ ? ड्राइसेल ब्याट्री () लिड एसीड ब्याट्री ()
- ४४) एक जोडा ब्याट्रीको मुल्य कति पर्दछ ?
- र ०) एक जाडा व्याट्रीका मुल्य कात पदछ ? ड्राइसेल व्याट्री रू. लिड एसीड व्याट्री रू.
- १५) ब्याट्री पाइने नजिकको ठाउँ कुन हो र त्यहाँ पुग्न कति समय लाग्छ ? स्थान : समय :- घण्टा मिनेट

(19)

भग) शौर्य शक्ति

| र्ष्र ६) | सौर्य शक्ति बारे सुन्नु भएको छ ? छ () छैन () |
|--------------|---|
| ५७) | तपाईको घरमा सौर्य शक्तिद्वारा बिजुली निकाल्ने प्रविधि जडान गर्नु भएको छ ? छ () छैन () |
| <u> ሂ</u> ፍ) | यदि छ भने कति क्षमताको फाटोभोल्टेक (PV) जडान गर्नु भएको छ ? |
| X9) | सौर्य शक्तिद्वारा उत्पादिन बिजुली के काममा प्रयोग गरिरहनु भएको छ ? |
| | बक्ती बाल्न () रेडियो सुन्न () टेलिभिजन हेर्न () अन्य () |
| ६०) | सौर्य शक्तिद्वारा उत्पादित विजुली पर्याप्त छ छैन ? छ () छैन () |
| ञ) | विविध |
| ६१) | विजुली भएको नजिकको गाउँ कुन हो र त्यहाँ पुग्न कति समय लाग्छ ? |
| • | स्थान : घण्टा मिनेट |
| ६२) | धान कुट्ने, गहुँ तथा मकै पिस्ने र तेल पेल्ने काम कहाँ गर्नु हुन्छ ? . |
| | घरमा () घट्टमा () मिलमा () |
| ६३) | यदि घरमा गर्नु हुन्छ भने के को प्रयोग गर्नु हुन्छ ? |
| | ढिकी () जाँतो () अन्य () |
| ६४) | दैनिक/हप्तामा कति घण्टा काम गर्नु पर्दछ ? |
| | ढिकी () जाँतो () अन्य (.) |
| ६५) | यदि मिलमा गर्नु हुन्छ भने गाउँबाट कति टाढा जानु पर्दछ ? |
| | घिण्टा मिनेट |
| ६६) | मिलमा कुटानी पिसानीको लागि महिनामा कति खर्च हुन्छ ? रू |
| ६७) | घरायसी प्रयोगको लागि बैंक तथा अन्य संस्थाबाट ऋण लिनु भएको छ ? छ () छैन () |
| ६८) | ऋण लिनु भएको छ भने के कामका लागि कति रकम लिनु भएको छ ? |
| | क) रू ख) रू |
| | ग) रू |
| ६९) | घरायसी आम्दानीबाट बचत गर्ने गर्नु भएको छ ? छ () छैन () |
| 90) | यदि बचत गर्नु भएको छ भने मासिक अथवा वार्षिक वचत कति गर्नु हुन्छ ? |
| | |
| ଓ୩) | बचत रकम कहाँ जम्मा गर्नुहुन्छ ? घरमा () बैंकमा () साहुमहाजन () |
| | (5) |
| | |

Annex 2

Household Questionnaire (English)

Rural Energy Development Programme Household Energy related Data Collection Form

| District: | | | Subdistr.: | | | | | |
|---|--|-------------|------------------------|-----------------|--|--|--|--|
| Village: | | | Place: | | | | | |
| VDC Village Development Committee: | | | | | | | | |
| Geographical location: m altitude ; | | | | | | | | |
| Distance f | Distance from nearest market:km from place | | | | | | | |
| Climatic c | onditions: | max / mi | n °C in winter /summer | monsoon/ | | | | |
| sunny day | s / a:; | rainfall in | mm in wintersummer | monsoon | | | | |
| I.) Household Information 1. Name of house owner: | | | | | | | | |
| Ser. No. | male/female | age | profession | education 1-6*) | | | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | 7 | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

*) illiterate: 1 / literate: 2 / prim. school: 3 / sec. school: 4 / high. sec. school: 5 / university: 6.

4. Source of income per year

| | agricu | lture | cottage industries employment | | foreign job | | labour | | | |
|---------------|--------|-------|-------------------------------|----|-------------|----|--------|----|------|----|
| male: | Rs | | Rs | | Rs | | Rs | | Rs | |
| time (months) | from | to | from | to | from | to | from | to | from | to |
| female: | Rs | | Rs | | Rs | | Rs | | Rs | |
| time (months) | from | to | from | to | from | to | from | to | from | to |

5. Do you have saving from household income ? yes () no ()

6. How much can you save per month ? _____Rs

7. Have you taken loan (bank or any institution) for household use ? yes () no ()

if yes: for what purpose ? a.)

c.)

II.) Agriculture and Production

8. Landholding

| irrigated farming: | gardening: | non-farming: | bush land: | grazing land: | forest land: | others: | |
|--------------------|------------|--------------|------------|---------------|--------------|---------|--|
| ha | ha | ha | ha | ha | ha | ha | |

b.)

d.)

9. Crops planted and production

| crops | season | area | production | selling | profit | buying | price/cost |
|----------|-------------|------|------------|---------------|--------|---------------|------------|
| | (mark) | | p.a. | quantity p.a. | p.a. | quantity p.a. | p.a. |
| paddy | (w) (s) (m) | ha | kg | kg | Rs | kg | Rs |
| corn | (w) (s) (m) | ha | kg | kg | Rs | kg | Rs |
| wheat | (w) (s) (m) | ha | kg | kg | Rs | kg | Rs |
| bat | (w) (s) (m) | ha | kg | kg | Rs | kg | Rs |
| potatoes | (w) (s) (m) | ha | kg | kg | Rs | kg | Rs |
| soyabean | (w) (s) (m) | ha | kg | kg | Rs | kg | Rs |
| mustard | (w) (s) (m) | ha | kg | kg | Rs | kg | Rs |
| others | (w) (s) (m) | ha | kg | kg | Rs | kg | Rs |

10. Grinding, expelling, hulling takes place in your house () mill house ()

11. Which type of traditional technology do you use at home for above mentioned work ? hand / leg grinder Dhikki () hand grinder Janto () others ()

12. Distance of the mill house ? _____ km or _____ hrs

13. How much money spent in agro processing ? _____Rs

14. Use of agriculture residues

| source | available in | animal feeding | compost making | cooking | others | | | | | |
|---------------|---------------|----------------|----------------|---------|--------|--|--|--|--|--|
| | season (mark) | | | | | | | | | |
| corn residue | (w) (s) (m) | kg | kg | kg | kg | | | | | |
| wheat residue | (w) (s) (m) | kg | kg | kg | kg | | | | | |
| straw | (w) (s) (m) | kg | kg | kg | kg | | | | | |
| rice husk | (w) (s) (m) | kg | kg | kg | kg | | | | | |

15. Livestock

| type | no. | rearing of animals: | | | plac | place for grazing: | | | problems in rearing: | | |
|--------------|-----|---------------------|--------|------|--------|--------------------|-------|--------|----------------------|------------|--------|
| | | stall | grass- | both | forest | grass- | near | fodder | animal | veterinary | lack |
| | | feed. | land | | | land | house | | disease | service | of |
| | | | | | | | | | | | market |
| cow/ox | | no: | no: | no: | no: | no: | no: | () | () | () | () |
| buffalo | | no: | no: | no: | no: | no: | no: | () | () | () | () |
| sheep/goat | | no: | no: | no: | no: | no: | no: | () | () | () | () |
| chicken/duck | | no: | no: | no: | no: | no: | no: | () | () | () | () |
| pig | | no: | no: | no: | no: | no: | no: | () | () | () | () |
| horse/donkey | | no: | no: | no: | no: | no: | no: | () | () | () | () |
| others | | no: | no: | no: | no: | no: | no: | () | () | () | () |

16. Details and type of trees

| / | | | | | | | |
|---------|-----|------------------------|--------|-----------------------------|--|--|--|
| species | no. | harvest / cutting time | | mark the use for | | | |
| • | | | fuel | fodder fruits timber others | | | |
| | | | (fuel) | (fodder) (fruits) (timber) | | | |
| | | | (fuel) | (fodder) (fruits) (timber) | | | |
| | | | (fuel) | (fodder) (fruits) (timber) | | | |
| | | | (fuel) | (fodder) (fruits) (timber) | | | |
| | | | (fuel) | (fodder) (fruits) (timber) | | | |
| | | | (fuel) | (fodder) (fruits) (timber) | | | |
| | | | (fuel) | (fodder) (fruits) (timber) | | | |
| | | | (fuel) | (fodder) (fruits) (timber) | | | |

17. Herbal plants available and their names

| name | no. | use |
|------|-----|-----|
| | | |
| | | |
| | | |
| | | |
| | | |

III. Health and Sanitation

18. Distance to next clinic_____km or ____hrs

19. Source of water and distance to bring water

| source | well | | spring | | water ta | aps | strear | n |
|---------------------|---------|-----|---------|-----|----------|-----|---------|-----|
| distance or time | km | hrs | km | hrs | km | hrs | km | hrs |
| available in season | (w) (s) | (m) | (w) (s) | (m) | (w) (s) | (m) | (w) (s) | (m) |

20. Do you have toilet at home? temporary () permanent () no ()

21. Where do you keep the household waste ? By duging pit () just outside ()

22. Do you make compost from household waste ? yes () no ()

23. How do you take care of sick people in your family ? (mark)

| using herbs | village healer | doctor | homeopathic |
|-------------|----------------|--------|-------------|
| | | | |

24. What are the main diseases ?_____

IV. Gender Division

25. How many hours per day do the family members work in the following activities ?

| type of work | men (m) | women (w) | boys (b) | girls (g) | others |
|-----------------------|---------|-----------|----------|-----------|--------|
| cooking | hrs | hrs | hrs | hrs | hrs |
| household cleaning | hrs | hrs | hrs | hrs | hrs |
| firewood collection | hrs | hrs | hrs | hrs | hrs |
| fodder collection | hrs | hrs | hrs | hrs | hrs |
| take care of children | hrs | hrs | hrs | hrs | hrs |
| grinding | hrs | hrs | hrs | hrs | hrs |
| water fetching | hrs | hrs | hrs | hrs | hrs |
| farming | hrs | hrs | hrs | hrs | hrs |
| animal grazing | hrs | hrs | hrs | hrs | hrs |
| others | hrs | hrs | hrs | hrs | hrs |

26. Any family members actively involved in users committee or any development groups ? woman: (y) (n) man: (y) (n) if yes, which type of institution:

27. Any family member involved in cottage industry ? mark: (m)male/(f)female/(b)boy/(g)girlstiching/knitting:(m) (w) (b) (g);spinning/weaving:(m) (w) (b) (g);carpet weaving:(m) (w) (b) (g);rope, basket making:(m) (w) (b) (g);others:(m) (w) (b) (g);

| <u>V. Energy</u> <u>use</u> pattern | Purpose: (L)Lighting; (C) Cooking; (H) Heating; (R) Radio/TV; (M) Motor or Motorpump; (O)Others | If this energy is not yet used: have you heard about it ? | Source and seasonal availability from: (O) Own sources (C) Community (M) Market (O) (C) (M) | Distance to source in km time for coll. frequency of collecting per month | a) Consumption <u>per month</u> in units b) Cost per <u>month</u> | Additional required information Remarks, used items/technology and related problems |
|---|---|--|--|---|---|--|
| Firewood | (L) (C) (H) () () (O) | | $\begin{array}{cccc} (w) & (w) & (w) \\ (s) & (s) & (s) \\ (m) & (m) & (m) \end{array}$ | km hrs times/m | bhari in (w) bhari in (s) | 1 bhari is equivalent tokg Moisture Content (wet basis) : winter % summer % |
| Agricultural Residues | (L) (C) (H) () (O) | | $\begin{array}{cccc} (w) & (w) & (w) \\ (s) & (s) & (s) \end{array}$ | km hrs | | Remark: |
| Cowdung | (L) (C) (H) () () (O) | | (w) (w) (w) (s) (s) (s) | km hrs | | Remark: |
| Charcoal | () (C) (H) () () (O) | | (w) (w) (s) (s) | km hrs | kg/m | Remark: |
| Kerosene | (L) (C) (H) () () (O) | | (w) (s) | km hrs | litres/m | Remark: |
| Diesel | (L) (C) (H) () () (O) | | (w) (s) | km hrs | litres/m | Remark: |
| Biogas (Gobar Gas | (L) (C) (H) () (M) (O) Use of slurry: (y) (n) | (Y) (N) | (w) (w) (s) (s) (m) (m) | km hrs times/m | m³/m | Capacity: Type: Who operatesGG: (m) (f) (b) (g) Who collects dung / water for GG: |
| LPG | (L) (C) (H) () (M) (O) | | | km hrs | kg/m | Remark: |
| Battery (dry | (L) () () (R) () (O) | | | km hrs | no./m | Use of old cells: |
| | <u>Purpose</u> : (L)Lighting; (C) Cooking; (H) Heating; (R) Radio/TV; (M) Motor or Motorpump; (O)Others | If this energy is not yet used: have you heard about it ? | Source and seasonal availability from: (O) Own sources (C) Community (M) Market (O) (C) (M) | Distance to source in km time for coll. frequency of collecting per month | a) Consumption <u>per month</u> in units b) Cost per <u>month</u> | Additional required information Remarks, used items/technology and related problems |
| Battery (car) | (L) () () (R) (M) (O) | | | km hrs | charg./m | Remark: |
| Solar PV: SHS | (L) () () (R) (M) (O) | (Y) (N) | | | | Capacity: Type: Remark: |

| Solar PV: | | | | | Type: Remark: |
|---------------|-----------------------------------|---------|------|----------|-------------------------------|
| Lantern | (L) () () (R) () (O) | (Y) (N) | | | |
| Solarwaterhea | | | | | Remark: |
| ter | () () () () (0) | (Y) (N) | | | |
| Solarcooker/- | | | | | Remark: |
| drier | () (C) () () (O) | (Y) (N) | | | |
| Electricity | (L) (C) (H) (R) (M) (O) | | | kWh/m | cost p. kWh + fixed cost p.m. |
| (MHP) | if (C): Low Wattage (y) (n) | (Y) (N) | | Rs/month | |
| Electricity | (L) (C) (H) (R) (M) (O) | | | kWh/m | cost p. kWh + fixed cost p.m. |
| (grid) | if (C): Low Wattage (y) (n) | (Y) (N) | | Rs/month | |

VI. Others:

• Top 3 priorities of interviewed household: (i.e. income, water, energy, health, food, shelter, education etc.)

1.______ 2._____ 3._____

- Remarks, comments of interviewed household:
- Remarks of interviewer:

Date, name of interviewer, signature:

Annex 3

Example of Household Survey

| | REDP - Household | Rural En Energy relat | ergy Development Program ed Data Collection Form – Vers | ime sion 1999 |
|--|---|------------------------------------|---|--|
| District:_ | Bagling | | DDC: Taman | |
| Village:_ | Taman | | Ward No.: # 4- | |
| VDC Vil | lage Development | Committee: | Taman | |
| Geograph | nical location: tarai | / hills / moun | itains 2000 m altitude ; | |
| listance f | from nearest marke | t: 5 | km from place Bur Hbans | C M |
| Climatic | conditions: | max / min ° | C in winter 8°c / -3°c summer 3°c/1 | cmonsoon 27/ 24° |
| unny day | ys/a:; | rainfall in m | m in winter 10 m summer 20 m | monsoon tom |
| .) House | hold Information | Itim a | ETEL STE | Margine (a moldle |
| . No.of r | ooms in the house: | 4 | stable: (y) (n); seasonal change | of place: (y) $(n);$ |
| | | | | |
| . Educat | ion and profession: | | | |
| . Educat Ser. No. | ion and profession: | age | profession | education 1-6*) |
| . Educat Ser. No. 1 | ion and profession: male/female | age 60 ^{°°} | profession Agriculture | education 1-6*) |
| . Educat Ser. No. 1 2 | ion and profession: male/female Dhak (curnori Dal Bahadur | age 60* 37 | profession Agriculture Service | education 1-6*) |
| Educat Ser. No. 1 2 3 | ion and profession: male/female Jhak (cumari Dal Bahadur Yam Maya | age 60* 37 40 | profession Agriculture Service Nerviculture | education 1-6*) |
| Educat Ser. No. 1 2 3 4 | ion and profession: male/female Dal Calmari Dal Cahadur Yam maya Rey Buhadur | age 60" 37 40 29 | profession Agriculture Service Nerviculture Service | education 1-6*) |
| Educat <u>Ser. No.</u> 1 2 3 4 5 | ion and profession: male/female Dhak (cumari Dal Bahadur Yam maya Rey Buhadur Rey Buhadur | age 60° 37 40 29 28 | profession Agriculture Service Agriculture Service Agriculture | education 1-6*) 1 5 2 5 4 |

*) illiterate: 1 / literate: 2 / prim. school: 3 / sec. school: 4 / high. sec. school: 5 / university: 6.

| | agriculture . | cottage industries | employment | foreign job | labour • |
|---------------|---------------|--------------------|--------------|-------------|----------|
| male: | Rs | Rs 20000 | Rs 1,00,000. | Rs | Rs |
| time (months) | from to | from to | from to | from to | from to |
| female: | Rs (0,000 | Rs 10,000 | Rs | Rs | Rs |
| time (months) | from to | from to | from to | from to | from to |

b.)

d.)

5. Do you have saving from household income? yes (V) no ()

6. How much you can save per month ? 2000 Rs

7. Have you taken loan (bank or any institution) for household use ? yes () no ()

if yes: for what purpose ? a.)

II.) Agriculture and Production

| irrigated | gardening: | non-farming: | bush land: | grazing land: | forest land: | others: |
|---------------|------------|--------------|------------|---------------|--------------|---------|
| farming: khet | bari | pakho | kharbari | charan | ban | anva |
| 25 Ropanipa | - ha | ha | 1 ha | ha | ha | ha |

9. Crops planted and production

| crops | season (mark) | area | production p.a. | selling quantity p.a. | profit p.a. | buying quantity p.a. | price/cost p.a. | |
|----------|------------------|------|--------------------|--------------------------|----------------|-------------------------|--------------------|----|
| paddy | (w) (s) (m) | ha | kg | kg | Rs | Saulks | 35 6 Rs | 90 |
| com | (w) (s) (m) | ha | 10 Minks | 4 Min kg | 60 Rs | kg | Rs | |
| wheat | (w) (s) (m) | ha | 2 Marks | own kg | Rs | kg | Rs | |
| bat off | (w) (s) (m) | ha | 5 Mikg | Consciption | Rs | kg | Rs | |
| potatoes | (w) (s) (m) | ha | 2 Minkg | // kg | Rs | kg | Rs | |
| soyabean | (w) (s) (m) | ha | 15 partikg | r, kg | Rs | kg | Rs | |
| mustard | (w) (s) (m) | ha | - Dath kg | • / kg | Rs | kg | Rs | |
| others | (w) (s) (m) | ha | kg | Own kg | Rs | kg | Rs | |

10. Grinding, expelling, hulling takes place in your house () mill house ()

11. Which type of traditional technology do you use at home for above mentioned work ? hand / leg grinder Dhikki (1/7 hand grinder Janto 6/7 others ()

12. Distance of the mill house ? _____ km or ____ 1/2 hrs

13. How much money spent in agro processing? _______ SODD -_____ Rs

14. Use of agriculture residues

| source | available in season (mark) | animal feed | ting | compost mak | cing | cooking | | others | |
|---------------|-------------------------------|-------------|------|-------------|------|---------|----|--------|----|
| corn residue | (w) (s) (m) | 150 | kg | 200 | kg | 200 | kg | - | kg |
| wheat residue | (w) (s) (m) | | kg | NA | kg | - | kg | / | kg |
| straw | (w) (s) (m) | NA | kg | NA | kg | | kg | / | kg |
| rice husk | (w) (s) (m) | NA | kg | NA | kg | 400 | kg | - | kg |

15. Livestock

| type | no. | rear stall feed. | ing of ani grass- land | mals: both | pl fores | ace for st gra lan | grazi ss- id ł | ng: near nouse | fodder | animal disease | in rearing: veterinary service | lack of market |
|--------------|-----|------------------------|------------------------------|---------------|-------------|--------------------------|----------------------|----------------------|--------|-------------------|--------------------------------------|----------------------|
| cow/ox | 2 | no: | no: 🦯 | no: 🗸 | no: | no: | inc | 1 I | () | (20) | (\) | () |
| buffalo | 5 | no: | no: | no: / | no: | no: | /-nc | e: | () | (*) | (\mathbf{x}) | () |
| sheep/goat | 7 | no: | no: | по: | no: | / по: | no | C. | () | (+) | (x) | () |
| chicken/duck | 15 | no: | no: | no: | no: | по: | nc | c I | () | (4) | (x) | () |
| pig | | no: | no: | no: | no: | no: | no | 0 | () | (S) | () | () |
| horse/donkey | - | no: | no: | no: | no: | . no: | no | 4 | () | () | () | () |
| others | | no: | no: I | no: | no: | no: | no | : | () | () | () | () |

16. Details and type of trees

| species | no. | harvest / cutting time | | ma | rk the use for |
|---------|-----|------------------------|--------|----------|----------------------------|
| | | | fuel | fodder | fruits timber others |
| | | ~ | (fuel) | (fodder) | (fruits) (timber) (others) |
| | | | (fuel) | (fodder) | (fruits) (timber) (others) |
| | | | (fuel) | (fodder) | (fruits) (timber) (others) |
| | | | (fuel) | (fodder) | (fruits) (timber) (others) |
| | | | (fuel) | (fodder) | (fruits) (timber) (others) |
| | | | (fuel) | (fodder) | (fruits) (timber) (others) |
| | 1 | | (fuel) | (fodder) | (fruits) (timber) (others) |
| | | | (fuel) | (fodder) | (fruits) (timber) (others) |

17. Herbal plants available and their names

| name | no. | use |
|------|-----|-----|
| | | |
| | | |
| | | 1 |
| | / | / |
| | | |

III. Health and Sanitation

18. Distance to next clinic <u>5</u> km or <u>4</u> hrs

19. Source of water and distance to bring water

| source | well | | | spring | water ta | aps | stream | n |
|---------------------|---------|-----|-----|---------------|----------|-----|---------|-----|
| distance or time | km | hrs | 10m | KATT 2 michts | km | hrs | km | hrs |
| available in season | (w) (s) | (m) | (w) | (s) (m) | (w) (s) | (m) | (w) (s) | (m) |

20. Do you have toilet at home? temporary () permanent () no ()

21. Where do you keep the household waste? By duging pit () just outside (-)

22. Do you make compost from household waste? yes () no ()

23. How do you take care of sick people in your family ? (mark)

| using herbs | village healer | doctor | homeopathic |
|-------------|----------------|--------|-------------|
| V | | L | |

24. What are the main diseases ?_

IV. Gender Division

25. How many hours per day do the family members work in the following activities ?

| type of work | men (m) | women (w) | boys (b) | girls (g) | others |
|-----------------------|---------|-----------|----------|-----------|--------|
| cooking | hrs | 3 hrs | hrs | 1 hrs | / hrs |
| household cleaning | hrs | Vo hrs | hrs | V hrs | / hrs |
| firewood collection | 5 hrs | 5 hrs | 1 hrs | E hrs | hrs |
| fodder collection | hrs | (hrs | / hrs | hrs | hrs |
| take care of children | hrs | 4 hrs | hrs | 4 hrs | hrs |
| grinding | hrs | Vo hrs | hrs | - hrs | hrs |
| water fetching | hrs | 5 minhrs | — hrs | 5 min hrs | hrs |
| farming | 6 hrs | 6 hrs | hrs | _ hrs | hrs |
| animal grazing | 5 hrs | hrs | i hrs | hrs | hrs |
| others: | hrs | hrs | hrs | hrs | hrs |

Any family members address involved in users contrainer of any development groups."

| | | 0 | 27 M | ushinu | 2 | カビナ | () [| |
|----|---------|--------|------|-------------------|-----------|-----------------------|---------------|---|
| L. | DW | 15. | - | 4110 | (41 | 9. (11.(1 | (hour) | and the state of the second sector of the |
| | 100.0 | | | ianian fatisti | idiae). | on ang canao Spina | unterseas int | (a) (w) (b) (z) |
| | ei xee | rių. | | (m) (w) | (0) (2) | . Real | production | (m) (w) (b) (s): |
| 62 | e basi. | N 7.72 | | $(20)(\infty)$ | (b)(c) | other | κ , | (10) (W) (b) (e), |

Ein BIJIA (m/(m)

| | | A His | Courses and assesses | | | |
|--------------------|---|---------------------------------------|--|--|--|--|
| <u>Cnergy</u> | Purpose: (L)Lighting; (C) Cooking; (H) Heating; (R) Radio/TV; | energy is not yet | availability from: (O) Own sources | Distance to source in km time for coll. | a) Consumption <u>per month</u> in units | Additional required information |
| 11ern | (M) Motor or ,Motorpump; (O)Others | used: have you heard about it ? | (C) Community (M) Market (O) (C) (M) | - frequency of collecting per | b) Cost per <u>month</u> | Remarks, used items/technology and related problems |
| poows | (L) (CF (H) () () (O) if (C): traditional () or improved (A-Chulha | • • • • • • • • • • • • | (m) (m) (m) (m) (m) | www.km 4 hrs times/m | $\frac{UO}{30}$ bhari in (w) $\frac{30}{30}$ bhari in (s) $\frac{30}{30}$ bhari in (m) | 1 bhari is equivalent to 3 kg Moisture Content (wet basis) : winter % summer % |
| cultural sidues | (L) (C) (H) () (O) | | (w) (w) (w) (s) (s) (s) (m) (m) | km hrs times/m | <u>5.0 NSOURALI</u> | monsoon % |
| gunpa | (L) (C) (H) () (0) | | (w) (w) (w) (s) (s) (s) (m) (m) | km hrs times/m | | Remark: |
| arcoal | () (C) (H) () (0) | | (w) (w) (s) (s) (m) (m) | km hrs times/m | kg/m Rs/kg | Remark: Before REDP. |
| osene | (LFY (C) (H) () (-) (0) | · | (w) (m) (m) | km hrs times/m | 3 Titres/m 3 | Remark: Use outy Tule? Secouse their is not aveilable a oberbricity. |
| iesel | (L) (C) (H) () (-) (0) | | ···· (w) ···· (s) ···· (m) | km hrs times/m | litres/m Rs/lit | Remark: |
| ogas Gas GG) | (L) (C) (H) () (M) (O) Use of slurry: (y) (n) | (X) | (w) (w) (s) (s) (m) (m) | km hrs times/m | uu/£m | Capacity: Type: Who operatesGG: (m) (f) (b) (g) Who collects dung / water for GG: (m) (f) (b) (o) |
| Ðď | (L) (C) (H) () (M) (O) | | | km hrs times/m | kg/m Rs/kg | Remark: |
| (dry cell) | (L) () (-) (R) () (O) | | - | km hrs times/m | no /m Rs/cell | Use of old cells: Remark: |

20

Remarks, comments of interviewed household;

Remarks of interviewer:

Date, name of interviewer, kignature.

Annex 4

Rural Community Questionnaire

Rural Community Questionnaire (Check Lists)

Gender Disparities

Stress: mental or physical tension or strain

- 1. How does community and individuals perceive stress? What types of stress? Reasons? Who are affected with stress?
- 2. Who feels more stress for managing household energy needs?
- 3. The severity of stress? To what extent?
- 4. How do people feel stress before the project intervention?
- 5. Has the situation changed after project intervention?
- 6. What are the positive benefits for the reduction of stress?

Self-esteem: to value or regard highly

- 1. How do people feel regarding their self-esteem before and after project intervention? Any changes in perception of within the communities and among neighbours?
- 2. How does the community in total feel their self-esteem compared to neighbouring VDC?

Autonomy: freedom / right of self determination

- 1. Are women and men free to decide themselves? Decision on what ? On money to spend for what ? How to spend time and activity? Where and when to go, which Functional Group to join ? Access to productive resources ?
- 2. Who controls the community? At home? In the community activities?

Capabilities: the quality of being capable

- 1. How do people perceive themselves about their capabilities? Capability for what?
- 2. Are communities confident on their projects?
- 3. Are there enough capable technical manpower in the village?
- 4. How do people see the capabilities of women compared to men? Before and after project intervention?
- 5. Do women still feel they are incapable than menfolks?
- 6. Do they (women) get support and encouragement at home to participate in skill development trainings?

Rights: just or legal claim

- 1. How do people perceive rights in the community?
- 2. What does the constitution of COs and FOs say regarding rights for women and men in the community?
- 3. Do women feel they have equal rights in participation and decision making in their activities (projects)
- 4. Are there any changes in attitude among men folks? Positive or negative? How do women in particular feels?

Poverty Concerns

Income, purchasing power

- 1. More and/or additional income created ?
- 2. More money available for daily allowances ?
- 3. More money from family pocket going to the project than expected ?
- 4. More consumer goods purchased than before ?

5. Access to productive resources

Health

- 1. Health situation before and after project intervention?
- 2. Significant improvement if any, reasons?
- 3. Community initiatives to improve health conditions?

Food

- 1. Food sufficienty?
- 2. Increase in production?

Shelter

1. Type of shelter?

Education

- 1. Change in education enrolment? For girls and boys?
- 2. Quality of education?
- 3. Drop outs in school- boys or girls, give reasons?

Security

1. Mechanisms, Initiations, Systems in the village regarding:

- 1. Social (and political) security? -pension, age allowance, health medicines, education for children (free), village and community security robbery etc.?
- 2. Economic security? Disparity in wages-labour intensive activities? Any special focus for poor people?
- 3. Technological security? repair, maintenance, spare parts, technical manpower, knowledge for new technology?

2. Which group of the community are more concerned and taken initiative for the improvement of the security systems?

Access to productive resources

- 1. Which group of the community has access to productive resources?
- 2. Who are directly benefited?
- 3. Do women have equal rights to have access?

Other aspects of living standards

Structural Changes

Democratic participation: *upholding equal rights*

- 1. Do you know what participation means? For what purpose?
- 2. Who decides for participation? Who has the power to decide?
- 3. Is women's participation by force or individual will?

Grass-root organizations

- 1. How many COs are there in the village?
- 2. What are different types of COs for which purposes?
- 3. Are you satisfied with your COs? Why or why not?
- 4. What are the main works done in CO meetings?
- 5. How was CO meeting 4 or 5 years before and now?
- 6. What are the main constrains?
- 7. What are the significant works done by your COs?
- 8. How do you help financially poor members in your COs? Any specific mechanism?

- 9. Do you have any co-ordination with other COs (male, female?)
- 10. Do you think your CO will be alive for the coming years or it could also be closed withuout disadvantage for the community?

Functional Organizations

- 1. How many Functional Organizations exists in the village? Which types?
- 2. What are the main functions?
- 3. Are these FOs effective?
- 4. How does the FOs help for its members and for the community for its development?

Consensus Decision Making

- 1. Are the decisions taken always based on consensus?
- 2. If not consensus what mechanism do you take so as to avoid conflicts?
- 3. Are women able to take equal parts in decision making?
- 4. How women address their voices in the forum? And how they do?

Accountability: *being responsible*

- 1. Are community, Community Organizations, Functional Organizations aware of what accountability means?
- 2. Who are accountable for community owned projects?
- 3. How do people perceive accountability?

Transparency: the state of being transparent (clear, easily seen through)

- 1. Are all decisions related to community development base on transparency?
- 2. Are all community members informed about the projects or activities?
- 3. What mechanism exists to maintain transparency among CO, FOs etc.?
- 4. Are there conflicts regarding transparency?

Bottom-up planning mechanism

- 1. How do the projects formulate at grass-root level?
- 2. Are community people involved in planning their own projects?
- 3. How do the projects financed?
- 4. Who decides? Community or Outsiders?
- 5. Are women also involved in planning phase?
- 6. If yes, what percentage?
- 7. Is there still some planning for other projects in VDC or is the earlier enthusiasm gone?

Annex 5

Organizational Capacity

Organisational Capacity

| | Piughar | | Ghumlekh | | Taman | | Sarkuwa | | Pinthali | |
|-------------------------------------|---------|------|----------|------|--------|------|---------|------|----------|------|
| Qualitative indicators | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male |
| 1. Level of Participation | | | | | | | | | | |
| Formulation of rules | | | | | | | | | | |
| Community development | | | | | | | | | | |
| Sub-total (1) | | | | | | | | | | |
| 2. Leadership | | | | | | | | | | |
| Honesty | | | | | | | | | | |
| Dedication | | | | | | | | | | |
| Capability | | | | | | | | | | |
| Sub-total (2) | | | | | | | | | | |
| 3. Consensus decision making | | | | | | | | | | |
| Selection of chairman and manager | | | | | | | | | | |
| Formulation of rules | | | | | | | | | | |
| Programme selection | | | | | | | | | | |
| Implementation | | | | | | | | | | |
| Monitoring and evaluation | | | | | | | | | | |
| Sub-total (3) | | | | | | | | | | |
| 4. Transparency | | | | | | | | | | |
| All decisions | | | | | | | | | | |
| Saving and investment | | | | | | | | | | |
| Funds | | | | | | | | | | |
| Sub-total (4) | | | | | | | | | | |
| 5. Accountability | | | | | | | | | | |
| Leadership accountability to groups | | | | | | | | | | |

| Members' accountability | | | | | | |
|------------------------------------|--|---|--|---|--|--|
| Accountability of | | | | | | |
| stakeholders | | | | | | |
| Sub-total (5) | | | | | | |
| 6. Mutual Trust | | | | | | |
| Team work | | | | | | |
| Tolerance | | | | | | |
| Harmony | | | | | | |
| Sub-total (6) | | | | | | |
| 7. Conflict Management | | | | | | |
| Capability | | | | | | |
| Manage inter group | | | | | | |
| conflicts | | | | | | |
| Manage intra group | | | | | | |
| conflicts | | | | | | |
| Working together in | | | | | | |
| narmony | | | | - | | |
| Sub-total (7) | | - | | | | |
| 8. Partnership | | | | | | |
| Village Development | | | | | | |
| Committees | | | | | | |
| District Development committees | | | | | | |
| District line agencies | | | | | | |
| Financial institution/Banks | | | | | | |
| Donor organisations | | | | | | |
| NGOs/INGOs | | | | | | |
| Sub-total (8) | | | | | | |
| Total Average | | | | | | |

(Measurement of impact: 1: very bad; 2: bad; 3: satisfactory; 4: good; 5: very good)

Annex 6

Socio-Political Profile of Women's Position

SOCIO-POLITICAL PROFILE OF WOMEN'S POSITION

| | | Before C | M and E | nergy | After C | I and En | ergy |
|----------|---|------------------|----------------|--------------------|---------|----------------|--------------------|
| Wo co | omen's socio-political position mpared to men's | Lower (worse) | About equal | Higher (better) | Lower | About equal | Higher (better) |
| 1. | Change in Women's Participation in decision-making: - in the household | | | | | | |
| | household expenses (small items) | | | | | | |
| | household expenses (big items) | | | | | | |
| | 8. children's education/marriage | | | | | | |
| | 9. use of own labor | | | | | | |
| | 10. choice of work/profession/occupation | | | | | | |
| | 11. credit taking/its use/enterprise choice | | | | | | |
| | 12. participation in public meetings/organizations | | | | | | |
| | Articulation of priorities/viewpoints in public meetings/organizations | | | | | | |
| | at community levelsociety at large | | | | | | |
| 2. | (Self) image:self image of womenimage of women in society | | | | | | |
| 3. | Change in leadership, participation and Organizational capacity group membership membership in the executive body participation in collective action leadership in collective action expression of viewpoints attendance in the meeting | | | | | | |
| 4. | Change in Mobility Pattern - movement to new/different sites - movement in dark | | | | | | |

| | staying out overnight distance travel alone distance travel in group | | | |
|----|---|--|--|--|
| 5. | Change in incidence of Violence against women verbal abuse physical abuse alcohol abuse Exploitation (unpaid labor) | | | |

Magnitude of impact of the intervention on men and women's strategic gender interests and position.

| Change in position (status) | Magnitude of im | npact | Remarks |
|-----------------------------|-----------------|-------|---------|
| | Men | women | |
| Parameters: | | | |
| 1. leadership | | | |
| 2. organization | | | |
| 3. mobility | | | |
| 4. decision making power | | | |
| 5. self esteem | | | |
| 6. legal rights | | | |
| 7. control | | | |
| 8. information | | | |
| 9. others | | | |
Magnitude of impact of the intervention on men and women's practical gender needs and their position.

| Change in position. | Men | women | Remarks |
|---------------------|-----|-------|---------|
| Parameters : | | | |
| 1. technology | | | |
| 2. credit | | | |
| 3. health | | | |
| 4. workload | | | |
| 5. income | | | |
| 6. nutrition | | | |
| | | | |

Measurement of impact:

| 1: very bad | 2: bad | 3: satisfactory | 4: good | 5: very good |
|-------------|--------|-----------------|---------|--------------|
| 1. Very bud | 2. 544 | o. outloidotory | 1. good | 0. vory good |

| | | | Before CM and Energy | | After CM and Energy | | nergy | |
|---------|-----------------------------------|--|----------------------|----------------|---------------------|-----------|----------------|--------------------|
| W co | ome mpa | n's socio-political position ared to men's | Lower (worse) | About equal | Higher (better) | Lowe r | About equal | Higher (better) |
| 1. | Ch in - | hange in Women's Participation decision-making: in the household | | | | | | |
| | 1. | household expenses (small items) | | | | | | |
| | 2. | household expenses (big items) | | | | | | |
| | 3. | children's education/marriage | | | | | | |
| | 4. | use of own labor | | | | | | |
| | 5. | choice of work/profession/occupation | | | | | | |
| | 6. | credit taking/its use/enterprise choice | | | | | | |
| | 7. | participation in public meetings/organizations | | | | | | |
| | 8. | Articulation of priorities/viewpoints in public meetings/organizations | | | | | | |
| | - | at community level society at large | | | | | | |
| 2. | (S - - | elf) image: self image of women image of women in society | | | | | | |
| 3. | Ch pa - - - - - | nange in leadership, rticipation and Organizational pacity group membership membership in the executive body participation in collective action leadership in collective action expression of viewpoints attendance in the meeting | | | | | | |
| 4. | Cr - - | nange in Mobility Pattern movement to new/different sites movement in dark | | | | | | |

SOCIO-POLITICAL PROFILE OF WOMEN'S POSITION

| | staying out overnight distance travel alone distance travel in group | | | |
|----|---|--|--|--|
| 5. | Change in incidence of Violence against women verbal abuse physical abuse alcohol abuse Exploitation (unpaid labor) | | | |

Magnitude of impact of the intervention on men and women's strategic gender interests and position.

| Change in position (status) | Magnitude of im | Pomarks | |
|-----------------------------|-----------------|---------|---------|
| Change in position (status) | Men | women | Remarks |
| Parameters: | | | |
| 1. leadership | | | |
| 2. organization | | | |
| 3. mobility | | | |
| 4. decision making power | | | |
| 5. self esteem | | | |
| 6. legal rights | | | |
| 7. control | | | |
| 8. information | | | |
| 9. others | | | |

Magnitude of impact of the intervention on men and women's practical gender needs and their position.

| Change in position. | Men | women | Remarks |
|---------------------|-----|-------|---------|
| Parameters : | | | |
| 1. technology | | | |
| 2. credit | | | |
| 3. health | | | |
| 4. workload | | | |
| 5. income | | | |
| 6. nutrition | | | |
| 7. potable water | | | |
| 8. others | | | |
| | | | |

Measurement of impact :

| 1: very bad 2: bad 3: satisfactory 4: god | od 5: very good |
|---|-----------------|
|---|-----------------|

SOCIO-POLITICAL PROFILE OF WOMEN'S POSITION

| | Before CM and Energy | | After CM and Energy | | nergy | |
|--|----------------------|----------------|---------------------|-----------|----------------|--------------------|
| Women's socio-political position compared to men's | Lower (worse) | About equal | Higher (better) | Lowe r | About equal | Higher (better) |
| Change in Women's Participation in decision-making: in the household | | | | | | |
| 1. household expenses (small items) | | | | | | |
| 2. household expenses (big items) | | | | | | |
| 3. children's education/marriage | | | | | | |
| 4. use of own labor | | | | | | |
| 5. choice of work/profession/occupation | | | | | | |
| 6. credit taking/its use/enterprise choice | | | | | | |
| 7. participation in public meetings/organizations | | | | | | |
| 8. Articulation of priorities/viewpoints in public meetings/organizations | | | | | | |
| at community levelsociety at large | | | | | | |
| 2. (Self) image: self image of women image of women in society | | | | | | |
| 3. Change in leadership, participation and Organizational capacity group membership membership in the executive body participation in collective action leadership in collective action expression of viewpoints attendance in the meeting | | | | | | |
| 4. Change in Mobility Pattern - movement to new/different sites - movement in dark | | | | | | |

| | staying out overnight distance travel alone distance travel in group | | | |
|----|---|--|--|--|
| 5. | Change in incidence of Violence against women verbal abuse physical abuse alcohol abuse Exploitation (unpaid labor) | | | |

Magnitude of impact of the intervention on men and women's strategic gender interests and position.

| Change in position (status) | Magnitude of in | Pomarks | |
|-----------------------------|-----------------|---------|------------|
| Change in position (status) | Men | women | Rellial K5 |
| Parameters: | | | |
| 1. leadership | | | |
| 2. organization | | | |
| 3. mobility | | | |
| 4. decision making power | | | |
| 5. self esteem | | | |
| 6. legal rights | | | |
| 7. control | | | |
| 8. information | | | |
| 9. others | | | |

Magnitude of impact of the intervention on men and women's practical gender needs and their position.

| Change in position. | Men | women | Remarks |
|---------------------|-----|-------|---------|
| Parameters : | | | |
| 1. technology | | | |
| 2. credit | | | |
| 3. health | | | |
| 4. workload | | | |
| 5. income | | | |
| 6. nutrition | | | |
| 7. potable water | | | |
| 8. others | | | |
| | | | |

Measurement of impact :

| 1: very bad | 2: bad | 3: satisfactory | 4: good | 5: very good |
|-------------|--------|-----------------|---------|--------------|
|-------------|--------|-----------------|---------|--------------|

Annex 7

Access to and Control of Resources

Access to and Control of Resources

| Resources | Access | Women | Access | Men | Control | Women | Control | Men | Impact |
|---------------|--------|-------|--------|-----|---------|-------|---------|-----|--------|
| Land | | | | | | | | | |
| Utilisation | | | | | | | | | |
| Land | | | | | | | | | |
| Ownership | | | | | | | | | |
| Capital | | | | | | | | | |
| Labour | | | | | | | | | |
| Skill | | | | | | | | | |
| Development | | | | | | | | | |
| Equipment | | | | | | | | | |
| Information | | | | | | | | | |
| Education | | | | | | | | | |
| Health and | | | | | | | | | |
| Fertility | | | | | | | | | |
| Credit | | | | | | | | | |
| Employment | | | | | | | | | |
| Opportunities | | | | | | | | | |
| Livestock | | | | | | | | | |
| Trees | | | | | | | | | |
| Food | | | | | | | | | |

Annex 8

Nepal Country Data

file:///Cl/Documents and Settings/SESAM/My Documents/SESAM/SESA...ubmission 2006-09-20/Annex8 Nepal Data Worldbank 2006-06-08.htm

THE WORLD BANK GROUP

A World Free of Poverty



| Nepal Data Pr | ofile | | |
|---|-------------------|-------------------|-------------------|
| Click on the indicator to view a definition | 2000 | 2003 | 2004 |
| People | | | |
| Population, total | 24.4 million | 26.1 million | 26.6 million |
| Population growth (annual %) | 2.3 | 2.1 | 2.0 |
| Poverty headcount ratio at national poverty line (% of | | 30.9 | |
| population) | | | |
| Life expectancy at birth, total (years) | 60.5 | 61.7 | 62.2 |
| Fertility rate, total (births per woman) | 4.0 | 3.6 | 3.5 |
| Mortality rate, infant (per 1,000 live births) | 69.0 | | 58.6 |
| Mortality rate, under-5 (per 1,000) | 95.0 | | 76.2 |
| Births attended by skilled health staff (% of total) | 11.9 | | 15.0 |
| Malnutrition prevalence, weight for age (% of children under 5) | | | |
| Immunization, measles (% of children ages 12-23 months) | 71.0 | 75.0 | 73.0 |
| Prevalence of HIV, total (% of population ages 15-49) | | 0.5 | |
| Primary completion rate, total (% of relevant age group) | 65.6 | 70.5 | 71.0 |
| School enrollment, primary (% gross) | 108.8 | 112.2 | 113.9 |
| School enrollment, secondary (% gross) | 35.3 | 42.7 | |
| School enrollment, tertiary (% gross) | 4.1 | 4.9 | 5.6 |
| Ratio of girls to boys in primary and secondary education (%) | 77.2 | 84.5 | |
| Literacy rate, adult total (% of people ages 15 and above) | | | 48.6 |
| Environment | | | |
| Surface area (sq. km) | 147.2 thousand | 147.2 thousand | 147.2 thousand |
| Forest area (sq. km) | 39,000.0 | | |
| Agricultural land (% of land area) | 29.3 | 29.5 | |
| CO2 emissions (metric tons per capita) | 0.1 | | |
| Improved water source (% of population with access) | | | |
| Improved sanitation facilities, urban (% of urban population with access) | | | |
| Energy use (kg of oil equivalent per capita) | 334.2 | 335.9 | |
| Energy imports, net (% of energy use) | 12.6 | 10.9 | |
| Electric power consumption (kWh per capita) | 57.6 | 67.9 | |
| Economy | | | |
| GNI, Atlas method (current US\$) | 5.4 billion | 5.9 billion | 6.6 billion |
| GNI per capita, Atlas method (current US\$) | 220.0 | 230.0 | 250.0 |
| GDP (current US\$) | 5.5 billion | 5.9 billion | 6.7 billion |
| GDP growth (annual %) | 6.1 | 3.1 | 3.5 |
| Inflation, GDP deflator (annual %) | 4.6 | 4.5 | 4.5 |
| Agriculture, value added (% of GDP) | 40.8 | 40.6 | 40.3 |
| Industry, value added (% of GDP) | 22.1 | 21.6 | 23.0 |
| Services, etc., value added (% of GDP) | 37.0 | 37.8 | 36.7 |
| Exports of goods and services (% of GDP) | 23.3 | 16.7 | 17.5 |
| Imports of goods and services (% of GDP) | 32.4 | 28.8 | 31.3 |

file:///Cl/Documents and Settings/SESAM/My Documents/SESAM/SESA...ubmission 2006-09-20/Annex8 Nepal Data Worldbank 2006-06-08.htm

| Gross capital formation (% of GDP) | 24.3 | 25.8 | 26.3 |
|---|---------------|---------------|---------------|
| Revenue, excluding grants (% of GDP) | 10.6 | 11.8 | 12.2 |
| States and markets | | | |
| Time required to start a business (days) | | 21.0 | 21.0 |
| Market capitalization of listed companies (% of GDP) | 14.4 | 8.5 | 8.6 |
| Military expenditure (% of GDP) | 1.0 | 1.7 | 1.7 |
| Fixed line and mobile phone subscribers (per 1,000 people) | 11.3 | 16.2 | 21.8 |
| Internet users (per 1,000 people) | 2.0 | 3.8 | 6.6 |
| Roads, paved (% of total roads) | | 53.9 | |
| High-technology exports (% of manufactured exports) | 0.0 | 0.1 | |
| Global links | | | |
| Merchandise trade (% of GDP) | 43.3 | 41.3 | 39.2 |
| Foreign direct investment, net inflows (BoP, current US\$) | 0.0 | 15.0 million | 0.0 |
| Long-term debt (DOD, current US\$) | 2.8 billion | 3.2 billion | 3.3 billion |
| Present value of debt (% of GNI) | | | 36.7 |
| Total debt service (% of exports of goods, services and income) | 7.0 | 6.0 | 5.5 |
| Official development assistance and official aid (current US\$) | 389.6 million | 465.4 million | 427.3 million |
| Workers' remittances and compensation of employees, received (US\$) | 111.0 million | 771.1 million | 822.6 million |
| Source: World Development Indicators database, April 2 | 006 | | |

Annex 9

UNDP HDR 2005 - Country Fact Sheets



The Human Development Index – going beyond income

The human development index (HDI) focuses on three measurable dimensions of human development: living a long and healthy life, being educated and having a decent standard of living. Thus it combines measures of life expectancy, school enrolment, literacy and income to allow a broader view of a country's development than does income alone.

Although the HDI is a useful starting point, it is important to remember that the concept of human development is much broader and more complex than any summary measure can capture, even when supplemented by other indices. The HDI is not a comprehensive measure. It does not include important aspects of human development, notably the ability to participate in the decisions that affect one's life and to enjoy the respect of others in the community.

It is also important to note that the HDI is constructed using data from international sources. Sometimes more up-to-date data are available nationally, and sometimes there are slight differences in definitions between international and national data. For these and other reasons, discrepancies with national sources may occur.

| | HDI rank 2003 (177 countries) | GDP per capita rank 2003 (177 countries) | GDP per capita (PPP US\$) rank minus HDI rank (higher means better on HDI) | GDP per capita value (PPP US\$) 2003 | HDI value 2003 | |
|---|--|---|---|---|----------------------|--|
| Nepal | 136 | 151 | 15 | 1,420 | 0.526 | |
| South Asia Countries | - | - | - | 2,897 | 0.628 | |
| Best performer in South Asia (Sri Lanka) | 93 | 110 | 17 | 3,778 | 0.751 | |

| Worst performer in South Asia | 120 | 120 | 1 | 1 770 | 0 5 2 0 |
|-------------------------------|-----|-----|-----|-------|---------|
| (Bangladesh) | 139 | 130 | - 1 | 1,770 | 0.520 |

Nepal is ranked 136th in the 2005 Human Development Report, with an HDI value of 0.526. Sri Lanka ranks first in the region, with a value of 0.751.

| Life expectancy at birth (years) 2003 | Combined primary, secondary and tertiary gross enrolment ratio (%) 2002/2003 | GDP per capita (PPP US\$) 2003 |
|--|---|--------------------------------------|
| 1. Japan (82.0) | 1. United Kingdom (123) | 1. Luxembourg (62,298) |
| 2. Hong Kong, China (SAR) (81.6) | 2. Australia (116) | 2. Ireland (37,738) |
| 3. Iceland (80.7) | 3. Belgium (114) | 3. Norway (37,670) |
| 126. Bangladesh (62.8) | 127. São Tomé and Principe (62) | 143. Moldova, Rep. of (1,510) |
| 127. Turkmenistan (62.4) | 128. Guatemala (61) | 144. Côte d'Ivoire (1,476) |
| 128. Solomon Islands (62.3) | 129. Lao People's Dem. Rep. (61) | 145. Uganda (1,457) |
| 129. Nepal (61.6) | 130. Nepal (61) | 146. Nepal (1,420) |
| 177. Swaziland (32.5) | 173. Niger (21) | 170. Sierra Leone (548) |

Human poverty in Nepal: focusing on the most deprived in multiple dimensions of poverty

• The HDI measures the average progress of a country in human development. Human Development Report 1997 introduced the human poverty index (HPI), which focuses on the proportion of people below a threshold level in basic dimensions of human development - living a long and healthy life, having access to education, and a decent standard of living, much as the poverty headcount measures the proportion of people below a certain income level. The HPI-1 measures human poverty in developing countries.

• The HPI-1 value for Nepal, 38.7%, ranks 74th among 103 developing countries for which the index has been calculated.

| | HPI-1 rank | HPI-1 value |
|--|-----------------|-------------|
| | (103 countries) | (70) |
| Nepal | 74 | 38.7 |
| Best performer in South Asia (Iran, Islamic Rep. of) | 36 | 16.4 |
| Worst performer in South Asia (Bangladesh) | 86 | 44.1 |
| Best performer in the world (Uruguay) | 1 | 3.6 |
| Worst performer in the world (Niger) | 103 | 64.4 |

Building the capabilities of women

| | GDI rank (140 countries) | GDI value | HDI rank minus GDI rank | HDI value |
|--|-----------------------------|-----------|-------------------------------|-----------|
| Nepal | 106 | 0.511 | -2 | 0.526 |
| Best performer in South Asia (Sri Lanka) | 66 | 0.747 | 7 | 0.751 |
| Worst performer in South Asia (Pakistan) | 107 | 0.508 | -4 | 0.527 |
| Best performer in the world (Norway) | 1 | 0.960 | 0 | 0.963 |
| Worst performer in the world (Niger) | 140 | 0.271 | -4 | 0.281 |

The HDI measures average achievements in a country, but it does not incorporate the degree of gender imbalance in these achievements. The gender-related development index (GDI), introduced in Human Development Report 1995, measures achievements in the same dimensions using the same indicators as the HDI but captures inequalities in achievement between women and men. It is simply the HDI adjusted downward for gender inequality. The greater the gender disparity in basic human development, the lower is a country's GDI relative to its HDI.

• The GDI value for Nepal ranks 106th, with a value of 0.511.

The gender empowerment measure (GEM) reveals whether women take an active part in economic and political life. It focuses on gender inequality in key areas of economic and political participation and decision-making. It tracks the share of seats in parliament held by women; of female legislators, senior officials and managers; and of female professional and technical workers- and the gender disparity in earned income, reflecting economic independence. Differing from the GDI, the GEM exposes inequality in opportunities in selected areas.

• The GEM value for Nepal can not be calculated because some data are missing.

| Seats in parliament held by women (% of total) | Female administrators and managers (% of total) | Female professional and technical workers (% of total) | Estimated female earned income (PPP US\$) | Ratio of female earned income to male earned income |
|--|---|--|---|---|
| 1. Rwanda (45.3) | 1. Philippines (58.1) | 1. Barbados (71.3) | 1. Luxembourg (34,890) | 1. Kenya (0.93) |
| 2. Sweden (45.3) | 2. Fiji (50.6) | 2. Lithuania (69.7) | 2. Norway (32,272) | 2. Switzerland (0.90) |
| 3. Norway (38.2) | 3. Tanzania, U. Rep. of (49.1) | 3. Estonia (69.2) | 3. United States (29,017) | 3. Cambodia (0.76) |
| 138. Mongolia (6.7) | 4. United States (45.9) | 4. Mongolia (65.6) | 129. Kenya (1,001) | 89. Singapore (0.51) |
| 139. Chad (6.5) | 5. Barbados (44.9) | 5. Moldova, Rep. of (65.5) | 130. Burkina Faso (986) | 90. Colombia (0.51) |
| 140. Albania (6.4) | 6. Bahamas (40.4) | 6. Russian Federation (64.5) | 131. Rwanda (985) | 91. Namibia (0.51) |
| 141. Nepal (6.4) | | | 132. Nepal (949) | 92. Nepal (0.51) |

HDR 2005 - Country Fact Sheets

| 162. Yemen (0.3) | 85. Pakistan (2.4) | 86. Saudi Arabia (6.4) | 154. Sierra Leone (325) | 154. Oman (0.19) |
|------------------|--------------------|------------------------|-------------------------|------------------|
| | | | | |

Nepal in the report

Nepal was mentioned in the report in pages 124, 125, 127, 128, 163, 56, 57, 62 and 90.

Curriculum Vitae

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Educational Background:

- 1971-1981 SLC at St. Mary's High School, Kathmandu
- 1982-1984 I.Sc. at Amrit Science College, Kathmandu
- 1985-1989 Bachelor of Engineering and Technology in Agricultural Engineering (B.E Agricultural Engineering), Orissa University of Agriculture and Technology, Bhubaneswor, India
- 1994-1996 Master of Science (MSc) in Appropriate Rural Technology and Extension Skills (ARTES), Universität Flensburg, Germany
- 2000-2007 PhD, Universität Flensburg, Germany

Professional Experience:

| 1990 | Small Irrigation and Water Utilization Division, Kathmandu, |
|------------|--|
| | Position: Assistant Agricultural Engineer |
| 1991-1994 | Centre for Rural Technology (CRT), Kathmandu, |
| | Position: Senior Energy Development Officer |
| 1996-2000 | Rural Energy Development Programme (REDP) of United |
| | Nations Development Programme (UNDP), Nepal |
| | Position: District Energy Advisor / Human Resource |
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| 2003-2005 | University of Flensburg, Germany |
| | Position: guest lecturer (specific seminars) on gender analysis, |
| | community mobilizations for MSc course in Sustainable Energy |
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| | |