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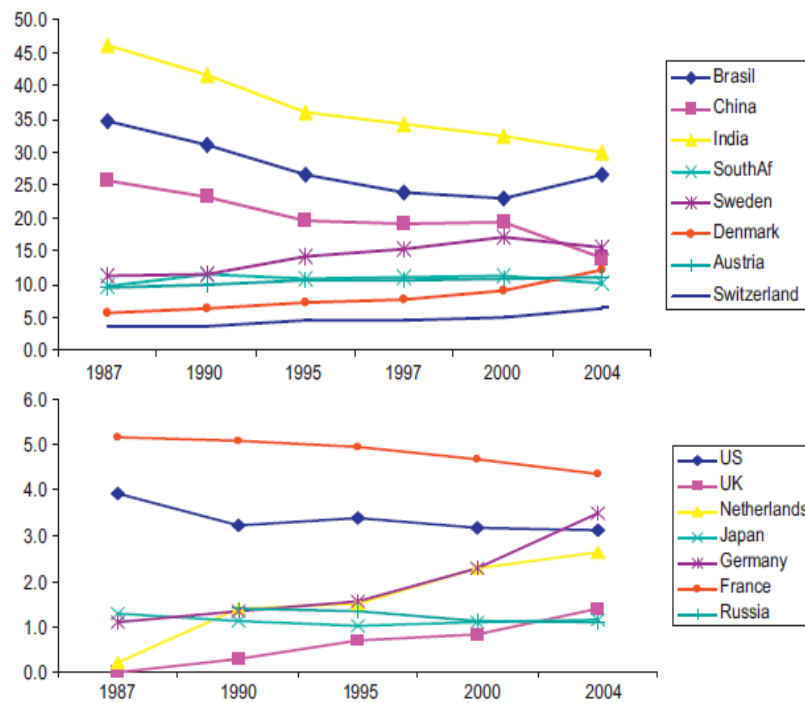
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Appendix: Figures and Tables

Figure 9.1: Share of combustible renewables and waste on total energy in the BRICs and some developed countries (World Bank, 2005)



Graph 1. Share of combustible renewables and waste on total energy, in the BRICS and some developed countries, 1987–2004.

Source: World Bank Indicators. Note: Combustible renewables and waste comprise solid biomass, liquid biomass, biogas, industrial waste, and municipal waste, measured as a percentage of total energy use.

Figure 9.2: Ranking of the world leaders in existing renewable energy capacity and production in 2006 and 2008 (REN21, 2007; 2009)

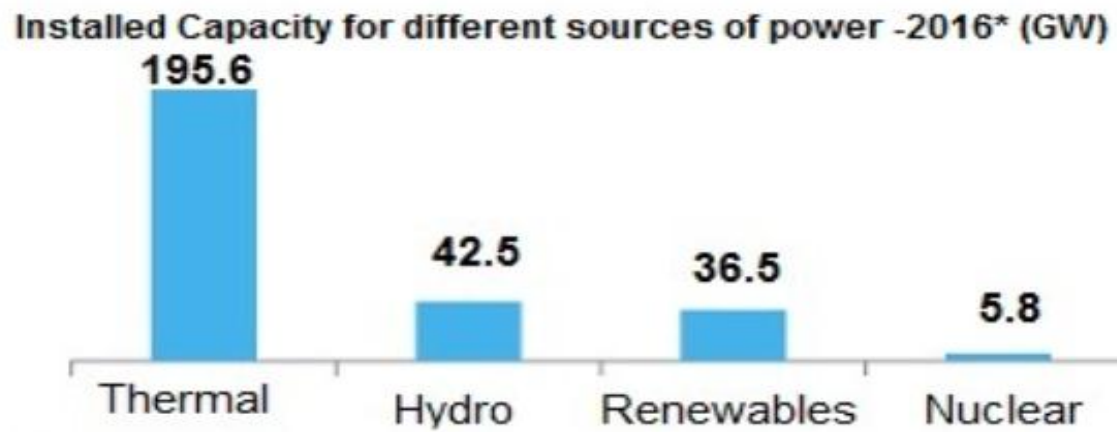
Table 2

Ranking of the world leaders in existing renewable energy capacity and production in 2006 and 2008.

Source: REN21 (2007, 2009).

Top five countries										
	1		2		3		4		5	
	2006	2008	2006	2008	2006	2008	2006	2008	2006	2008
Existing capacity										
Renewables power capacity	China	China	Germany	United States	United States	Germany	Spain	Spain	India	India
Small hydro	China	China	Japan	Japan	United States	United States	Italy	Italy	Brazil	Brazil
Wind power	Germany	United States	Spain/United States	Germany	Spain/United States	Spain	India	China	Denmark	India
Biomass power	United States	United States	Brazil	Brazil	Philippines	Philippines	Germany/Sweden/Finland	Germany/Sweden/Finland	Germany/Sweden/Finland	Germany/Sweden/Finland
Geothermal power	United States	United States	Philippines	Philippines	Mexico	Indonesia	Indonesia / Italy	Indonesia / Italy	Italy	
Solar PV (grid-connected)	Germany	Germany	Japan	Spain	United States	Japan	Spain	United States	Netherlands/Italy	South Korea
Solar hot water	China	China	Turkey	Turkey	Germany	Germany	Japan	Japan	Israel	Israel
Annual production										
Ethanol production	United States	United States	Brazil	Brazil	China	China	Germany	France	Spain	Canada
Biodiesel production	Germany	Germany	United States	United States	France	France	Italy	Argentina	Czech Republic	Brazil

Figure 9.3. Installed capacity for different sources of power (IBEF, 2015)



Source: Ministry of Coal, NHPC, Central Electricity Authority (CEA), Corporate Catalyst India, TechSci Research

Notes: MW - Megawatt, GW – Gigawatt

* - Data is for April-October 2015

Table 9.1. Effects of Entrepreneurship: Interventions on Wealth Creation in rural areas – Intellectual, Social, Individual, Natural, Built, and Financial Capital

Intellectual	Social	Individual	Natural	Built	Financial
<ul style="list-style-type: none"> • Increased creativity and innovation among entrepreneurs • Creation of knowledge networks within the kitchen incubator • Building local knowledge of sustainable development practices • Creation of learning laboratories for preservation-based development in the region 	<ul style="list-style-type: none"> • Increased trust among players new to sustainable development • Facilitation of new partnerships • Creation of a broader, more diverse leadership pool • Collaboration of people, businesses, non-profits, 	<ul style="list-style-type: none"> • Increased skills for entrepreneurs, community members in collaboration, leadership, preservation, etc. • Enhanced opportunity for community gatherings and celebrations • Increased pride of craft associated with selling to an expanded market • Increased pride of place associated with regional branding • Increased individual empowerment 	<ul style="list-style-type: none"> • Increased use of local produce • Expanded use of organic or sustainable processes • Increased stewardship of the natural environment • Preservation of the natural environment through nature tourism • Preservation of unique regional assets through regional branding 	<ul style="list-style-type: none"> • Creation of a 12,000 sq. ft. kitchen incubator • Restoration, rehabilitation and reuse of historic properties • Expansion of water treatment facility to keep up with demand associated with business expansion • Expanded infrastructure at community college 	<ul style="list-style-type: none"> • Increased financial investments by entrepreneurs • Increased value of entrepreneurial ventures • Creation of grant and loan pools to assist business clients • Capturing wealth transfer through community foundations • Enhancing the performance of existing

<ul style="list-style-type: none"> • Enhanced pool of leadership capacity • Built pool of knowledge about innovative practices in community development • Transforming individual farmer knowledge into “community property” through sharing strategy for standards’ compliance • Strengthening knowledge and innovation through coaches and mentors network 	<p>and government, many of whom were once competitors</p> <ul style="list-style-type: none"> • Intentional service provider network created • Creation of cooperative with both bridging and bonding social capital. • Building coaching relationships based on trust <p>Building relationships between youth and community elders</p>	<p>associated with building financial and business skills</p> <ul style="list-style-type: none"> • Increased hope for the future being developed in and passed on by youth 			<p>CDFIs through entrepreneur education and coaching</p>
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Table 9.2. Summary of potential energy sources in India and their future outlook

Energy Source	Key constraints
Solar	<ul style="list-style-type: none"> • High upfront cost • Intermittency due to weather conditions
Coal	<ul style="list-style-type: none"> • Pollution, rising costs, mining and transportation infrastructure bottlenecks • Energy security (i.e. import dependence) and detrimental effect on balance of payments of rising import of coal
Nuclear	<ul style="list-style-type: none"> • Makes India dependent on the Nuclear Suppliers Group (NSG) (The NSG is a multinational agency tasked with stopping nuclear proliferation by controlling the trading of materials that could be used in nuclear weapons and mitigating risks involved in the civil nuclear industry) • Security concerns (e.g. Fukushima) • Environmental concerns around waste disposal

	<ul style="list-style-type: none"> • Very long plant gestation period. Commissioning of nuclear plants is fraught with protests causing delays. For example, <u>the Kudankulam nuclear power plant in Tamil Nadu was delayed by seven years</u> (Nuclear Power Corporation of India Limited, http://bit.ly/1mXevCz) • History of under achievement (targets for new capacity additions in all five year plans were missed by a long margin)
Wind	<ul style="list-style-type: none"> • More than 95% of India's wind energy potential is concentrated in just five states in the South and West: Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, and Gujarat, giving rise to transmission issues (Tamil Nadu, which has the highest installed capacity of wind in the country, is unable to evacuate all the wind power generated, as the grid's current infrastructure lacks the strength to evacuate the peak generation. In 2013, 2.1 billion kWh was wasted due to insufficient evacuation infrastructure. Source: Indian Wind Power Association, 2014: http://bit.ly/MPlnBf) and grid management issues due to the variability of wind power • On-shore wind potential estimated at 100 GW by MNRE (C-WET, http:// goo.gl/IGolTB)

	<ul style="list-style-type: none"> • Wind plants have high intermittency due to unpredictability of wind availability • Not suitable for distributed generation • Off shore wind options not yet explored
Hydro	<ul style="list-style-type: none"> • Limited potential (149 GW OF WHICH 40 GW has already been tapped) (Source: Review of greenhouse gas emissions from the creation of hydropower reservoirs in India", World Bank, 2008, http://bit.ly/1capFzp) • Social and environmental concerns with respect to largest projects involving dams • Long project gestation periods are often further delayed due to protests • Infrastructural challenges such as access roads and power evacuation with respect to remote sites
Gas	<ul style="list-style-type: none"> • The dependence on imports is rising. India is currently the sixth largest LNG importer in the world and is expected to move up to third place by 2020 (Petronet LNG: http://bit.ly/N6Cnns) • Significant infrastructure improvement required, including

	<p>transportation and port infrastructure</p> <ul style="list-style-type: none"> • As per current data, India has only limited technically recoverable shale gas reserves (96 tcf). These are less than 10% of the recoverable reserves in China or the USA. (“World Shale gas and oil resource assessment”, US Energy Information Administration, published June 2013, http://bit.ly/1f08C2k)
Biomass	<ul style="list-style-type: none"> • Seasonal power source • Only waste biomass can be used in India (conflict with food production) • Limited overall potential of around 18 GW (“Energy Statistics”, Ministry of Statistics and Planning, published 2013, http://bit.ly/1n0YQoL). The Indian Biomass Atlas (India Biomass Atlas, http://bit.ly/1eZlTs5)by the Indian Institute for Science estimates that 145 million tons can effectively be used for energy generation

Table 9.3. Projected capacity addition to each renewable energy source (TATA Power Solar, 2014)

Categories	Definition
Solar Bees	Under this scenario, India installs 8.3 million solar rooftop systems of an average size of about 3 Kw to achieve a total of 25 GW by 2024.
Solar Pigeons	Under this scenario, India installs 100,000 systems of an average size of 250 kWp to achieve a total of 25 GW by 2024. These will largely be industrial and commercial installations.
Solar Horses	Under this scenario, India installs 1,250 utility scale power plants with an average size of 20 MW each to achieve a total of 25 GW by 2024.

Solar Elephants	Under this scenario, India installs 13 ultra-mega scale solar power plants of size between 1 to 3 GW each to achieve a total of 25 GW by 2024. These power plants can either be individual projects or they can be clusters of projects in one location (akin to a solar park).

Table 9.4: Institutional arrangements for receiving Renewable Energy Technologies (a look at different stakeholders involved in the process)

Institutional Basis (receivers)	Characteristics	Pros and Cons
Central Government	Financed and constructed through national budget	Funding takes place outside market places, political priorities can change
State Government	Financed and constructed through national budget	Compete for political priorities, lack expertise to arrange project financing, arrange construction

Local Government	Smallest formal unit concerned with basic infrastructure development issues	Lack expertise to demonstrate need besides inadequate resources to arrange construction
Rural areas (villages)	Non-formal governing system	No formal legal entity with which to negotiate, limited ability to plan, limited skills
NGOs	Financed through contributions or third party	Limited financing available
Private Companies	Invest in projects with adequate return on investment	Must have commercial potential and be attractive or capital investment, often managed by elite for profit
Rural households/families	Basic unit of society, basic unit of production in agricultural societies	Low capital, low skills

Table 9.5: Fourteen dimensions of the difference between the model of the entrepreneurial and the managed economy

Category	Entrepreneurial economy	Managed economy
Underlying forces	Localization Change Jobs and high wages	Globalisation Continuity Jobs or high wages
External environment	Turbulence Diversity Heterogeneity	Stability Specialisation Homogeneity
How firms function	Motivation Market exchange Competition <u>and</u> cooperation Flexibility	Control Firm transaction Competition <u>or</u> cooperation Scale
Government Policy	Enabling Input targeting Local locus Entrepreneurial	Constraining Output targeting National locus Incumbent

Figure 9.4. Framework of entrepreneurship policy areas.

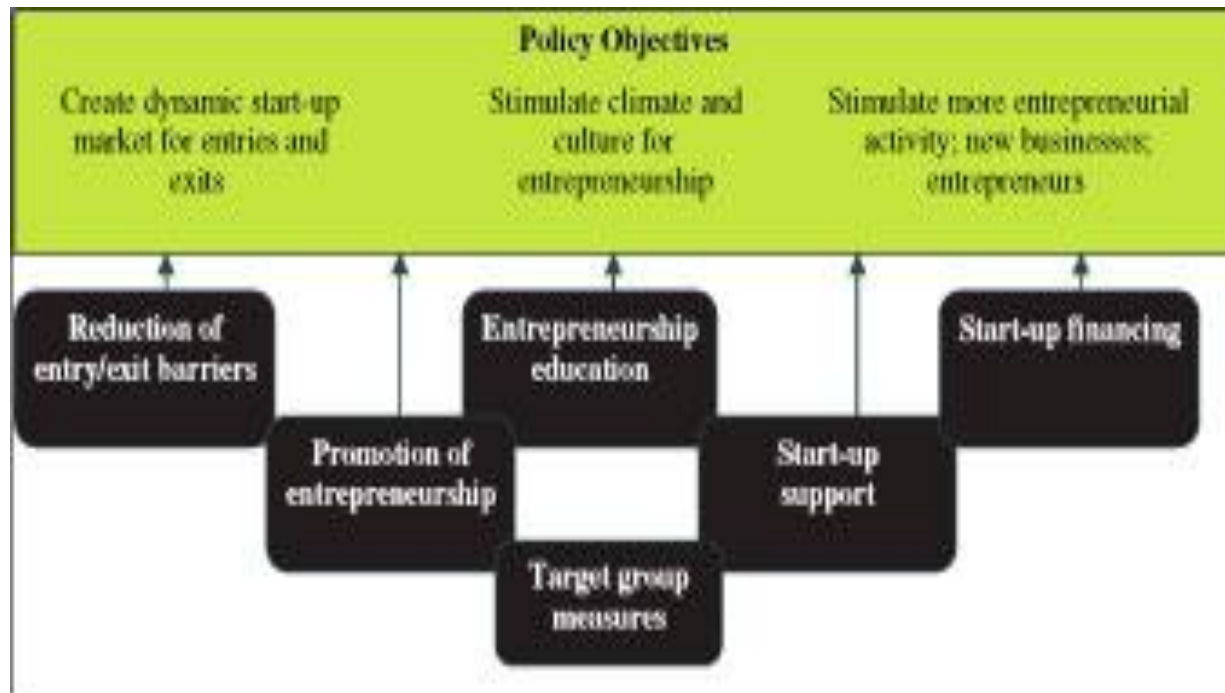


Figure 9.5. Factors of significance to entrepreneurial performance

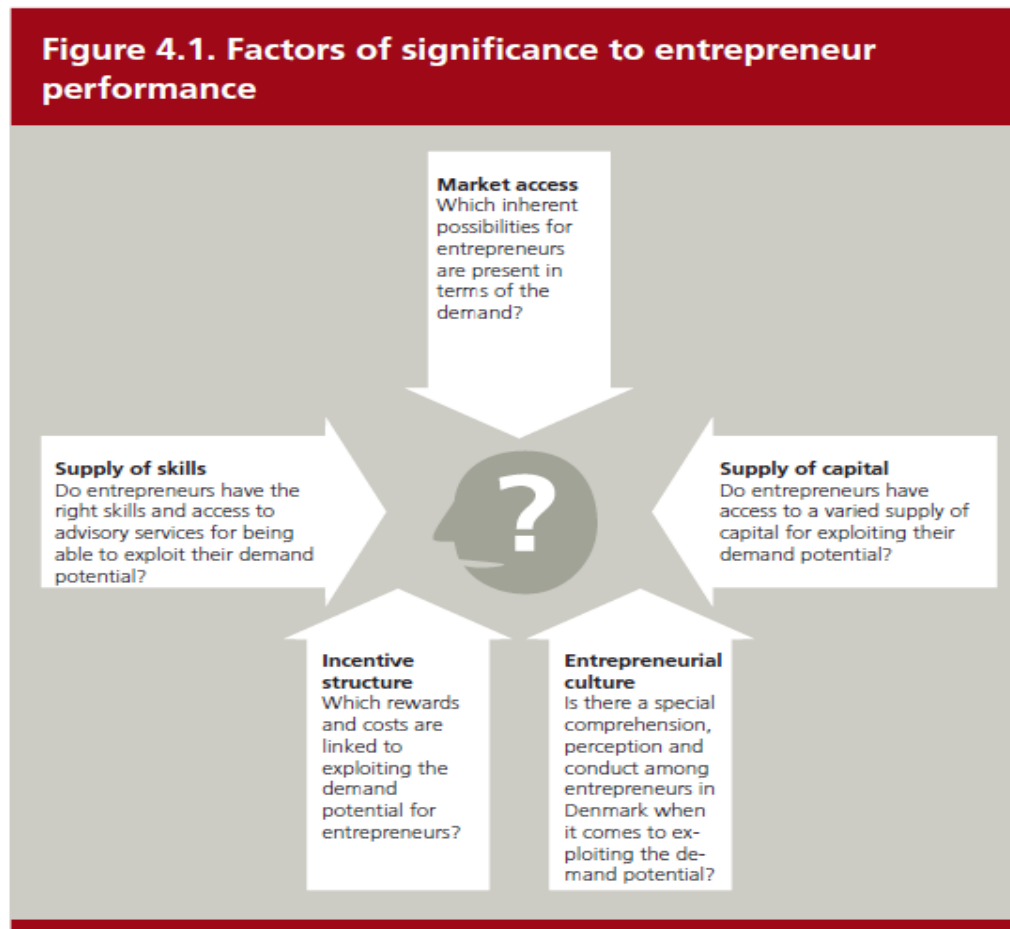


Table 9.6. Codes identified from conceptual framework

Elements in the conceptual framework	Code(s) generated
<ol style="list-style-type: none"> 1. Actors – selected public and private sector players in the RE sector in India 2. Action situation – in what setting do the different actors perform 3. Patterns of interaction 4. Outcomes 	<ol style="list-style-type: none"> 1. Nature of interaction, deliverables, role and functionality, nature of operation 2. Role of MNRE, state level RE agencies, relationship with RE based entrepreneurs 3. Nature and role of partnership, project deliverables 4. Results of working together, how collaboration of actors help support entrepreneurs

5. Determinants	5. Role of credit, training and development, regulatory agencies, marketing and business knowledge, capacity building
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Table 9.7. Institutions studied during fieldwork

Institution	Name	Location
1	Ministry of New and Renewable Energy, Government of India (MNRE)	New Delhi
2	Centre for Science and Environment (CSE)	New Delhi
3	The Energy Research Institute (TERI)	New Delhi, Bangalore
4	Jawaharlal Nehru University (JNU)	New Delhi
5	Lighting a Billion Lives (LaBL), TERI	New Delhi, Bangalore
6	All India Women's Conference (AIWC)	New Delhi, Bangalore
7	Indian Institute of Technology	New Delhi

	(IIT)	
8	Department of Science and Technology (DST)	New Delhi
9	TATA Power Solar	New Delhi
10	Solar Electric Light Company India Private Limited (SELCO India)	Bangalore
11	Vendors and energy based micro businesses	New Delhi, Bangalore (villages)

Table 9.8: Reasons for selecting the institutions studied

	TERI	AIWC	MNRE	SELCO
Founded in	1974	1927	1992	

Based in	New Delhi, Bangalore	New Delhi, Bangalore	New Delhi	Bangalore
Organisation	Private	Mixed	Government	Private
Organisational aim	Research for sustainable development of India and the global south	Empower women and prepare them for taking up leadership roles	Energy availability, access, affordability, equity and security	Empowering clients by providing a complete package of product, service and consumer financing through micro-finance institutions
Focus	Clean energy, water management,	Emancipation, education and empowerment of	Cost competitive, reliable new	Creating products based on end user

	sustainable agriculture, climate resilience	women	and renewable energy supply options	needs, incubation of other firms
Initiatives	Works with the Government, acts as a 'last mile' agent, wide network of local partner institutions in several states, possess triple helix functionality	Nodal agency for the MNRE for dissemination of RETs led women managed micro businesses, promotes and trains women in running RETs led businesses, sponsor programmes	One of a kind ministry in the world, provides 30% subsidy on RETs at all levels, supports building green entrepreneurs hip, provides funding through IREDA and	Largest reach in Karnataka villages, builds and sustains green entrepreneurs, increasingly growing partnership with suppliers and local manufacturers,

			functions through extension ministries through SREDAs, works with private RETs firms, academic and industry expert on a continued basis	
Key reasons for selection	Range of operations, scale of reach, multiple stakeholder partnerships, 'last	Works with national and local Governments, work with academic and	Continuous partnership with industry, academic and RETs firms,	Doesn't work with the Government, manages the entire supply

	mile' agent through LaBL initiatives, planner for major policy level decision making	industry, multiple stakeholder partnership	contractual arrangement with major RETs manufacturers , multiple stakeholder partnership, policy and RETs sector planner	chain and value chain of their products, heavy reliance on local suppliers and manufacturers, creates RETs based entrepreneurial ventures, treat customers as business 'clients'
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Table 9.9. List of interviewees and methods chosen in New Delhi and Bangalore

Interview	Institution	Position	Location	Methods chosen
1	Jawaharlal Nehru University	Chairman – SSS1	New Delhi	Semi-structured interview
2	Ministry of New and Renewable Energy (MNRE), Government of India	Director- General	New Delhi	Semi-structured interview
3	Jawaharlal Nehru University	Research Scholar	New Delhi	Semi-structured interview
4	Jawaharlal Nehru University	Professor	New Delhi	Semi-structured interview
5	TATA Power Solar	Vice President	New Delhi	Semi-structured interview
6	Department for Science and Technology, Government of	Senior Scientist	New Delhi	Semi-structured interview

	India			
7	All India Women's Conference	President	New Delhi	Semi-structured interview
8	Green Grants India	Associate	New Delhi	Semi-structured interview
9	TERI (Energy Research Institute, India)	Senior Research Fellow	New Delhi	Semi-structured interview
10	Centre for Science and Environment (CSE), Government of India	Director	New Delhi	Semi-structured interview
11	Indian Institute of Technology – Delhi (IIT-D)	Professor	New Delhi	Semi-structured interview
12	Light a Billion	Associate Director	New Delhi	Semi-structured

	Lives (LaBL), TERI			interview
13-20	AIWC	Beneficiaries	New Delhi, Bangalore	Participant observation, key informant interview
21	TATA Power Solar	Technical Executive	New Delhi	Semi-structured interview, participant observation
22	AIWC	Regional Head	Bangalore	Semi-structured interview
23	TERI	Director	Bangalore	Semi-structured interview
24	SELCO India Private Limited	Managing Director	Bangalore	Semi-structured interview
25	SELCO India Private Limited	Principal Analyst	Bangalore	Semi-structured interview
26-28	TERI	Library staff	Bangalore	Semi-structured interview
29	KREDL (Karnataka	General Manager,	Bangalore	Semi-structured interview

	Renewable Energy Development Limited)			
30-34	SKG – Sangha	Field team – vice president, supervisors and field coordinators	Bangalore	Semi-structured interview, key informant interview, participant observation
35	SKG- Sangha	President	Bangalore	Semi-structured interview
36	KOLAR unit, SELCO	Sales Executive	Bangalore	Semi-structured interview, participant observation
37-45	SELCO	Beneficiaries (silk weavers, vegetable vendors)	Bangalore	Semi-structured interview, key informant interview, participant observation

Table 9.10. Data Analysis Structure for SELCO India

Patterns of interaction and outcomes	First order codes	Second order codes	Themes
1. Providing customised products and services, tapping into specific household need	1.Products are customised based on household needs 2.Continuous feedback loop and knowledge sharing 2.Word of mouth communication 3.Interaction between clients and SELCO staff 4.Faster response to RET product issues	1. regular communication between clients and SELCO staff 2. considering the nature of lighting needs at the household level	<i>Knowledge sharing, feedback loop between SELCO and clients, understanding individual lighting needs</i>

2. Developing a financial innovation in offering solar lights	1.Banks interacting with villagers 2.Banks offering loans to RETs based businesses 3.Banks receiving repayments on daily and weekly basis 4.SELCO providing bridging loan 5.SELCO connecting entrepreneurs with bankers	1. SELCO arranging bank loan facilities to their client 2. formation of clients and bank relationship	<i>Availability of start-up finance for RETs enterprises, developing banking practice</i>
3. Ongoing interactive relationship	1.Working with local suppliers 2.Suppliers are flexible and source locally 3.Suppliers working	1. ongoing product refinements tailored to client needs	<i>Faster new product development, quicker response to client issues</i>

with suppliers	<p>on design innovation based on SELCO's client input</p> <p>4. Experimenting with new product and design and allowing trial and error</p>	2. faster response to customer service	
4. Partnerships for Innovation and new product development	<p>1. Identifying new needs</p> <p>2. Working closely with the prospective clients</p> <p>3. New product development</p> <p>4. Working with a voluntary organisation</p> <p>6. Working on a sensitive issue, helps</p>	<p>1. partnering with community level organisations and VOs</p> <p>2. engaging in activities that are considered sensitive to the community in an attempt to get closer to them</p>	<p><i>Working with local communities, creation of new needs, trust building in networks</i></p>

	to nurture trust with the community in the long run		
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Table 9.11. Data Analysis Structure for AIWC

Patterns of interaction and outcomes generated	Codes	Themes
Working with partners to facilitate training and development programmes	1. Practical training 2. Skill based test 3. Simulation programmes 4.Guided and participatory process	Participatory training and learning, simulation opportunities
Engaging with unemployed youth/women who are	1.Support from apprentice to start-up stage	Comprehensive long run entrepreneurial support,

potential 'solar engineers'	<ul style="list-style-type: none"> 2. Participatory learning support 3. Women maintain and repair solar technologies 	women repairing RETs
Working with partners in different regions to replicate the business model	<ul style="list-style-type: none"> 1. Importance of situational factors 2. Inclusion of entrepreneurs as a part of the simulation to share learning 3. Identifying the right business to choose and grow 4. Cultivate entrepreneurial ability 	Situational factors of business, identifying right business and region specific, funding available for start-ups
Develop self-sufficiency in youth/women to run energy-based businesses	<ul style="list-style-type: none"> 1. Early awareness meetings 2. Developing sense of independency 3. Ensuring of stability 4. Support from training stage 	Focus on awareness and knowledge sharing, entrepreneurs developing sense sufficiency

	to business take-off	
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Table 9.12. TERI'S beneficiaries, stakeholders and list of RETs initiatives

Location	Types of RETs	Actors	Activities generated
Village: Mahmuda; District: Nalanda, Bihar	Solar lanterns, solar charging stations	TERI (provision of finance), Lighting a Billion Lives (training and delivery of tech)	Incense sticks, milk, tuition centre
Village: Panchagarh; District: Thane, Maharashtra	Solar lanterns	TERI (training and tech delivery), ICICI (provision of finance)	Renting out lanterns, 'Worli' paintings

Village: Tentala; District: Mayurbhanj, Odisha, Orissa	Solar lamps	Lighting a Billion Lives	Stitching 'sal' leaves together to form 'Kholi', a plate made out of leaves, poultry breeding
Village: Mirgimundi; District: Mayurbhanj, Orissa ;	Solar lanterns	Lighting a Billion Lives with partner organization: Sambandh, TERI's funding support	Extended hours of cycle repairing in the village
Village: Kamlapur; District: Unnao, Uttar Pradesh	Solar lanterns	Lighting a Billion Lives with partner organization: Humana People to People India (HPPI), New Delhi	'Chikan' embroidery designer
Village: Sorispadar; District: Koraput, Orissa	Solar lamps	Lighting a Billion Lives partner organization: Integrated Tribal Development Agency (ITDA), Koraput + gram panchayat's participation	Schooling, tuition, home lighting
Village: Sorispadar;	Solar lanterns	Lighting a Billion Lives	Schooling

District: Koraput , Orissa		partner organisation: Integrated Tribal Development Agency (ITDA), Koraput	
Village: Tentala; District: Mayurbhanj, Orissa	Solar lanterns	Lighting a Billion Lives partner organization, Social Organization On Various Aspects (SOOVA)	Selling dry fish and shrimps

Table 9.13. Data analysis structure for TERI

Patterns of interaction and outcomes	Codes	Themes
<i>Partnering with local community based organisations as well as the MNRE</i>	1. Partnering with local and community institutions as well as national level public institutions 2. Partnering with an energy entrepreneur	Public-private people partnership
	1. Working with financial	

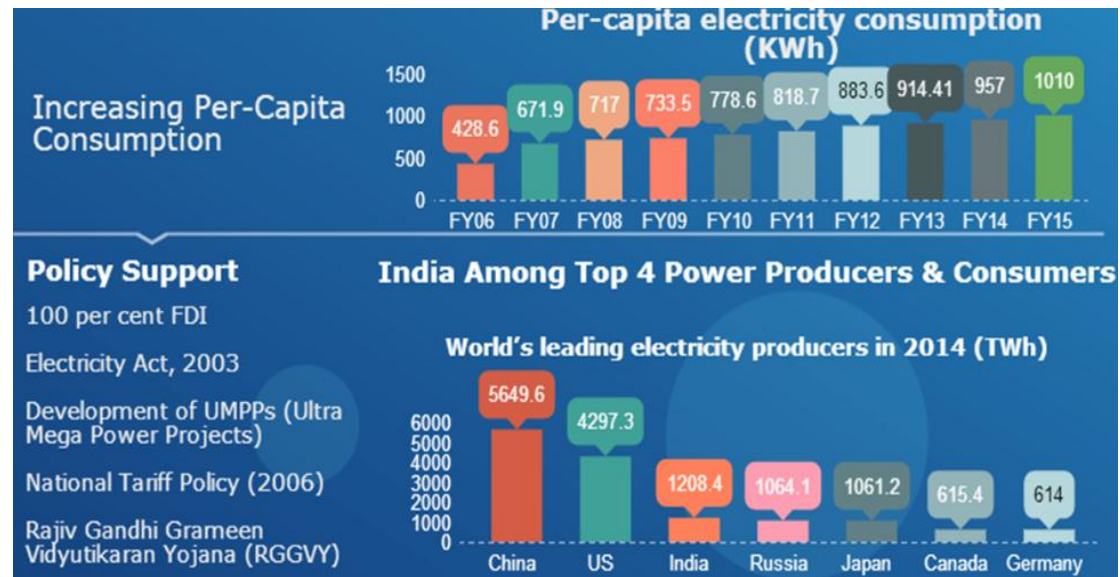
<i>Partnering with financial institutions and offering after-sales service to clients</i>	institutions 2. Door-step financing to entrepreneurs 3. Helping individuals graduate off poverty 4. Forming knowledge partners at different levels 5. Offering faster after-sales service and maintaining communication with clients	Provision of RE based start-up loans, forming knowledge partners
<i>Working with energy entrepreneurs to develop more energy based micro enterprises</i>	1. Partnering with academic and industry experts for developing training and sharing learning 2. Monitoring the use of RETs for multiple purposes while keeping the core purpose intact	Multi-level partnership, monitoring of entrepreneurial performance

Table 9.14. Data Analysis Structure

First order codes	Second order codes	Themes
<ul style="list-style-type: none"> - Marketing products - Idea of scaling up a business - Hiring additional employees 	<ul style="list-style-type: none"> - Scale up in role from procurer to becoming a last mile agent - From entrepreneur to managing a business 	Business acumen
<ul style="list-style-type: none"> - Idea of lighting up more homes - Support community families 	<ul style="list-style-type: none"> - Financial motivation to social impact - Hiring local labor 	Entrepreneurial community impact
<ul style="list-style-type: none"> - Choice of door to door pamphlet distribution - Putting up marketing banners 	<ul style="list-style-type: none"> - Rewarding an introducer for product reference 	Wider application of business acumen and networking

<ul style="list-style-type: none"> - Women making leaf plates - Hiring other women from the same community 	<ul style="list-style-type: none"> - Additional use of RETs on hand made and home produced products 	Women-led vocational activities and social impact
<ul style="list-style-type: none"> - Engaging several families in solar businesses - Use of RETs in <i>community occasions, cultural events, and marriage ceremonies</i> 	<ul style="list-style-type: none"> - RETs application in non-business activities 	Community bridging and empowerment
<ul style="list-style-type: none"> - Use of RETs to protect crops - Keep away animals 	<ul style="list-style-type: none"> - Practical daily applications of the RETs 	Intangible personal and social benefits of the technology
<ul style="list-style-type: none"> - Buying supplies and raw materials to self-make RETs - Self-servicing and maintenance of technology 	<ul style="list-style-type: none"> - Training other members of the business to make and maintain RETs 	Business incubation Knowledge sharing and transfer

Figure 9.6. India's position as a global energy producer and consumer



(IBEF, 2016)

Figure 9.7. MNRE's stakeholder analysis (MNRE, 2013)

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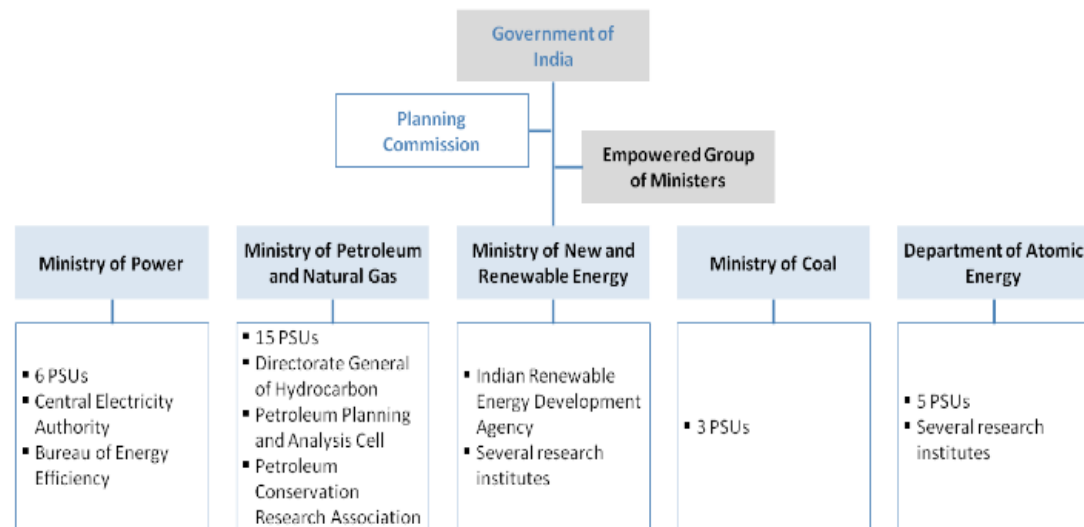
Table 10: Stakeholder Analysis

Group/ Individuals	Power		Stakes	
	How can they help us?	How can they block us?	What would they want from us?	What do we want from them?
Research & Development (R&D)/ Technical Institutions	<ul style="list-style-type: none"> - Engaged in technology development/ indigenisation efforts - Manpower development 	Misuse of assistance/ subsidy	<ul style="list-style-type: none"> - Skill development - Financial support 	Incubating new technologies
Equipment Manufacturers and Technology Providers	<ul style="list-style-type: none"> - Product marketing partners - Technology innovation - Awareness creation among users 	Misuse of assistance/ subsidy	Financial support	Providing high quality products
State Governments	Promotion of renewable energy programs at the state level through conducive policies	<ul style="list-style-type: none"> - Lack of adequate support for RETs - Lack of appropriate fund allocation - Inefficiency in delivery 	<ul style="list-style-type: none"> - Financial support - Timely releases - Skill development 	Facilitating effective implementation of RE programs & schemes
Regulators (CERC, SERCs)	Formulating conducive regulations that would support the RE policy initiatives of the Ministry	Through regulations that have inadequate enforcement measures	Cooperation	Working together at the time of formulation of policies and regulations
Different Ministries of Government of India	Promotion of renewable energy programs in complementary programs	<ul style="list-style-type: none"> - Lack of adequate support for RETs - Sectoral interests can block/hamper growth 	Convergence for inclusive growth	Facilitating large scale off grid applications such as SWH, solar cooking, solar street lighting, solar air-conditioning, kitchen waste processing,

Group/ Individuals	Power		Stakes	
	How can they help us?	How can they block us?	What would they want from us?	What do we want from them?
Indian Renewable Energy Development Agency (IREDA) and other Financial Institutions/ Partner Banks	Concessional financing for RE projects	By not financing RE projects through high cost of finance	Financial support through for instance guarantees	Large scale financing of RE projects through concessional funds
International Financial Institutions	<ul style="list-style-type: none"> - Source of low cost funds - This would be particularly helpful for development of large solar power plants with storage. 	Lack of support		Helping particularly off grid initiatives and rural electrification efforts by providing debt funds at low cost
Developers/Investors (including foreign)	<ul style="list-style-type: none"> - Implementing RE projects & programs - Innovation in business models for inclusive growth 	<ul style="list-style-type: none"> - Availing financial support from the Ministry but not implementing projects - Unfair practices - Sub-optimal monitoring of projects 	<ul style="list-style-type: none"> - Financial support - Conducive policy & regulatory framework 	<ul style="list-style-type: none"> - Implementing RE projects & programs - Innovation in business models for inclusive growth
Non Governmental Organizations (NGOs)	Spreading awareness	Fictitious NGOs Spreading of misinformation	Financial support	Awareness generation
End-users	Large scale use of RE devices	Non cooperation towards usage of RE devices on account of: <ul style="list-style-type: none"> - lack of awareness - high cost - utility factor 	Awareness creation Cost of such devices being made available at same cost or lower cost than conventional systems	Increased usage and promotion of RE systems and devices

Figure 9.8. Institutional structure of energy administration in India (OECD/IEA, 2012)

Figure 3 • Institutional structure of energy administration in India



Note: PSU = Public Sector Undertaking refers to state-owned enterprises in India.

Figure. 9.9. Interplay between the conceptual framework and fieldwork findings

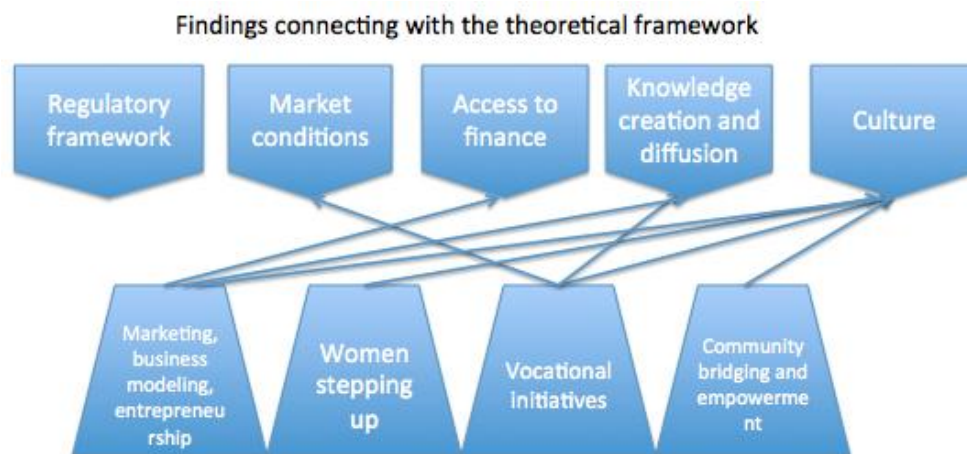




Figure 9.10. Rural Development opportunities arising RE based entrepreneurial initiatives in rural areas.

Table 9.15. RETs based creation of vocational opportunities

Beneficiaries identified	Location	Types of RETs	Activities generated	Rural Development Benefits
Baby Devi, Rinku, Shabir	Village: Mahmuda; District: Nalanda, Bihar	Solar lanterns, solar charging stations	Incense sticks, milk, tuition centre	Local income and job generation, children's education, community safety and bonding
Kishore	Village: Panchagarh; District: Thane , Maharashtra	Solar lanterns	Renting out lanterns, Warli paintings	Income generation, community bonding (returns in kind), preserving a dying art, man-animal conflict avoidance
Hinsi Hazda	Village: Tentala ; District: Mayurbhanj, Odisha , Orissa	Solar lamps	Stitching sal leaves together to form 'Kholi', a plate made out of leaves,	Community bonding, income and local job generation, entrepreneurial spirit, women

			poultry breeding	empowerment
Somnath Singh	Village: Mirgimundi ; District: Mayurbhanj , Orissa ;	Solar lanterns	Extended hours of cycle repairing in the village	Education, income generation, health
Kamlesh Devi	Village: Kamlapur ; District: Unnao , Uttar Pradesh	Solar lanterns	'Chikan' embroidery designer	Income generation, children's education, market access
Benudhar Sahoo	Village: Sorispadar ; District: Koraput , Orissa	Solar lamps	Schooling, tuition, home lighting	Education, school attendance rate, school savings (dedicated to building medical stock to spending on kerosene), health
Alaka Rautaray	Village: Sorispadar ; District: Koraput , Orissa	Solar lanterns	Schooling	Enhanced study hours, vocational training opportunities for adults

Arati Mahanta	Village: Tentala; District: Mayurbhanj , Orissa	Solar lanterns	Selling dry fish and shrimps	Access to three weekly markets, can maintain and service the lanterns, income generation, entrepreneurial spirit
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Annexures

Table 10.1 Overview of interview questions for participant groups 1, 2 and 3

Participant groups	Questions
1. Researcher and Scientists 2. Policy makers and Ministry Staffs 3. RETs manufacturer s and service providers	<ol style="list-style-type: none"> 1. Given the current priorities of the MNRE slated out in its 2012-2017 strategic planning report, and the involvement of a variety of private players in the renewable market and the multi-faceted benefit it carries for rural entrepreneurs who uses the RETs to form income-generating micro enterprises, what is your take and understanding of it? 2. What are the different forms of institutional support provided to RETs based rural entrepreneurs? How do these models work (being critical is okay)? Please use any reference of an example, a case or case studies. 3. When do you say that a success has taken place from a RETs intervention made in a rural area? How do you define success? 4. What rural development implications do these interventions carry in the long run?

	<ol style="list-style-type: none"> 5. Looking at the different layers of costs involved in these programmes and support, do you think that these are affordable and can be sustainable for the same reason? 6. How much is research benefitting the renewable energy technology application planning in rural India? 7. Do research institutions work closely either with the MNRE or SREDA or other private actors in the renewable sector? 8. What are the factors that support the formation of public-private partnership in the renewable market given we have the MNRE at the top?
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Table 10.2. Overview of interview questions for participant groups 4 and 5 only

Participant groups	Theme based questions
4. Entrepreneurs	<i>1. What tangible and intangible effects do these RETs based micro enterprises formed by the entrepreneurs have on households and their livelihoods?</i>
5. NGOs and	<i>2. Do the entrepreneurs migrate out of their communities or they stay back</i>

<p>RETs based institutions</p>	<p><i>after their business has succeeded?</i></p> <p>3. <i>Do most entrepreneurs have another supplementary source of income or these micro enterprises are the sole activity they depend upon for their livelihoods?</i></p> <p>a. <i>Can you refer to some particular cases?</i></p> <p>4. <i>Who takes up most of the loans every year? Women or men?</i></p> <p>5. <i>Whose repayment rate is the highest? Women or men?</i></p> <p>6. <i>If men/women, what are the prime reasons? Entrepreneurial or personal factors?</i></p> <p>7. <i>What form of social security do they have?</i></p> <p>8. <i>What are the effects of the distribution of responsibilities in regards to provision of finance, training and development have when stakeholders fall apart in participation?</i></p> <p>9. <i>How does having MNRE at the national level support your activities? Is there any level of participation involved?</i></p> <p>10. <i>How can your institutional model or the programme delivery mechanism be further developed? Are there any future plans currently being put in place?</i></p>
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10.3. Case study: Gender differences in managing household based businesses

From the project files of AIWC

The following case study compares and contrasts skill and acumen of Shyamlata (female entrepreneur) and Jaljeet Yadav (male entrepreneur).

Profile 1 – Shyamlata

A woman in her 30s, she lives with her four minor children and old *Saas* (mother-in-law) in a suburb in Delhi. Her husband has emigrated to Mumbai where he works as a factory worker. In the absence of any adult male in the household, she takes all necessary day-to-day decision. But all major decisions are taken by her husband. Her *Saas*, being quite old, does not take any interest in household affairs. Shyamlata maintains *ghunghat* (a cover for her head), because her *Saas* is still alive (part of custom and tradition).

Household assets: She has 4.3 acres of cultivable land, of which 3.3 acres she has leased out and the remaining one acre she herself cultivates. She does not have a bullock and plough, but does have a sickle, a spade, a harrow and other small agricultural implements. For ploughing purpose, she hires them often from the one whom she has leased out land. She keeps a cow and two she-goats. In addition to this, she (along with 5 other women from the same community) was provided with a **solar lantern** for her children's education purposes by a private company. Shyamlata rents the lantern out to another household in her neighborhood community, where her sister-in-law lives (and uses it for making handicraft goods) and earns Rs. 4 per day from the same. However, Shyamlata doesn't use the lantern for any productive activity in her home because she is busy raising four kids pretty much alone given her

husband is mostly away (mentioned above). She also has some consumer goods like a watch, a bicycle and coats besides owning some jewelry as well. She lives in a small and partly *kuccha* house with two rooms and one kitchen with a separate cattle shed as well.

Sources of Income: From her own cultivation she could get a net income of Rs. 1200 and from the leased out land she received rent of Rs. 3300. She cultivated paddy on one acre and wheat on 0.25 acres. She also grew potatoes and other vegetable which she sold. The cow remained dry for most of the parts of the year. From goat rearing she could get Rs. 300 by selling goat-kids. Besides, she received remittances of Rs. 6000 during the year. But money order always comes in the name of her *Saas*. Thus, the total income from all sources that she received during the reference year comes to approximately Rs. 11,000. In addition, she earns Rs. 80 from renting out the solar lantern for 20 days a month which her sister-in-law uses for productive purposes.

Daily routine (during agricultural season): In the suburb, a typical day starts at six in the morning. If it is the agricultural season, she immediately starts making arrangements for the day's work, including on the leased out land by supervising them. Otherwise, she will first go and take out the cattle-shed and feed them. She cooks and prepares the children for school. She will then go to the field during forenoon hours otherwise she will take her meals and then rest. In the afternoon, she starts preparation for the night meals after which she will sit with children and teach them wherever possible, as she has been educated upto 8th standard. After eating around 8-8.30 all of them will go to sleep.

Consumption behavior: Her food consumption includes adequate quantities of pulse, vegetables, oil/ghee/masala, besides rice and wheat. She also spends on education of her children, social and religious ceremonies and medicals. For clothing, her husband will bring clothes from Mumbai for everyone in the family. He comes twice in a year and stays for 10-15 days.

More about her: She is educated upto 8th standard and is not an 'ignorant woman'. However, she does not participate in any of the village activities, even if it is among females. This is because, she thinks, people indulge in. She expects her children to complete college and University education. She does not have any

complaint to make either against her *Saas* or husband or anyone else in the village. In times of emergency, she takes help from her neighbor which she readily gets as and when required. She never wanted more than 2 children. But, because of her husband's indifference to family planning she has 4.

Profile 2 – Jaljeet Yadav

Jaljeet is 25 years old belonging to the Yadava community. He lives with her wife, three children, aged father and mother. He parents chose to live with him rather than with his brothers. He has inherited 3.6 acres of land. Except for 0.4 acres which he has mortgaged, he cultivates all his land. He keeps two bullocks and two buffaloes. Besides, he has some goats as well. He also keeps all necessary agricultural implements like ploughs, sickle, harrow, etc. He has also irrigation facilities like well and pumpset. Besides the above, he was provided with a solar lantern for using it for productive purposes but he uses it to run a tuition centre at home twice a week teaching community kids in exchange of a *very* small fee. Jaljeet is educated upto 9th standard and one of the most literate individual in the particular community, for education and health issues, other people often visits him.

Jaljeet grows crops like wheat (2 acres), paddy (1.3 acres), gram (0.3 acres), potato (0.2 acres), and green peas (0.2 acres). He produced 15 quintals of wheat, 8 quintals of paddy, 0.5 quintals of gram, 3 quintals of potato and 0.6 quintals of green peas. The total value of these comes to roughly Rs. 7500.

He has utilized HYV seeds, fertilizers, and irrigation, technology for all the crops, but more prominently for wheat and potatoes. He could generate an income of Rs. 4800. From dairying he could get an income of Rs.3500. They did not engage in wage employment, not because of any social restrictions, as may be the case among Rajputs and Brahmins but because of sufficient work opportunities available on their own farm. While the males, including his father engaged in cultivation activities, female folks looked after the live stocks, including buffaloes. Their children were attending school as well.

Conclusion

It may be observed that both Smt. Subita and Harjeet Yadav are from the same socio-economic strata, as both of them belong to the upper caste and have land holding between 3-4 acres. But, the two differ sharply in the survival strategies, as well as the utilization of existing resources.

Firstly, Smt. Shyamlata prefers to lease out land whereas Jaljeet cultivates all his land himself.

Secondly, Shyamlata could not utilise her land as much as Jaljeet could as may be seen from the crop intensity and cropping pattern of the farm households.

Thirdly, Jaljeet was more enterprising in as much as he used both intensively and extensively all the available modern HYV seed, fertilizer, irrigation, technologies. But, comparatively Shyamlata wasn't enterprising at all. In addition the use of solar lanterns also adds to this conclusion.

The reason perhaps was that while for Jaljeet land was the only resource which he could utilise to get a living for himself and his family of seven. But, Shyamlata had her husband to remit regularly.

Fourthly, while Shyamlata did not have to work so intensively, except giving supervisory services, the females of Jaljeet's household had to work from dawn to dusk to assist their males in making out a living from the limited services they had at their command.

Fifthly, the priorities in the case of Shyamlata was giving education to their children even upto University level, for Jaljeet education of children was not important and he wanted his children to be cultivators only.

Note: though the female wasn't as enterprising but her long-term goals possess more far reaching consequences. Educating children could lift an entire household/family out of a particular underdeveloped setting. Secondly, women are less likely to migrate out given their sense of security while living in a suburb/village with people to reach out more quickly and easily. The above presents a mixed case – if looked at financial output maybe the male counterpart wins in the short run but for a change to come in the long run, women are better managers (even if they just a supervisory role, not an operational one)

Note 2: as observed from most studies, when it comes to education of girl child both the types of households are the same, as neither of them believe in educating the girl, as they think that the girl would go away to another house after marriage, so any investment in their education would be a waste.