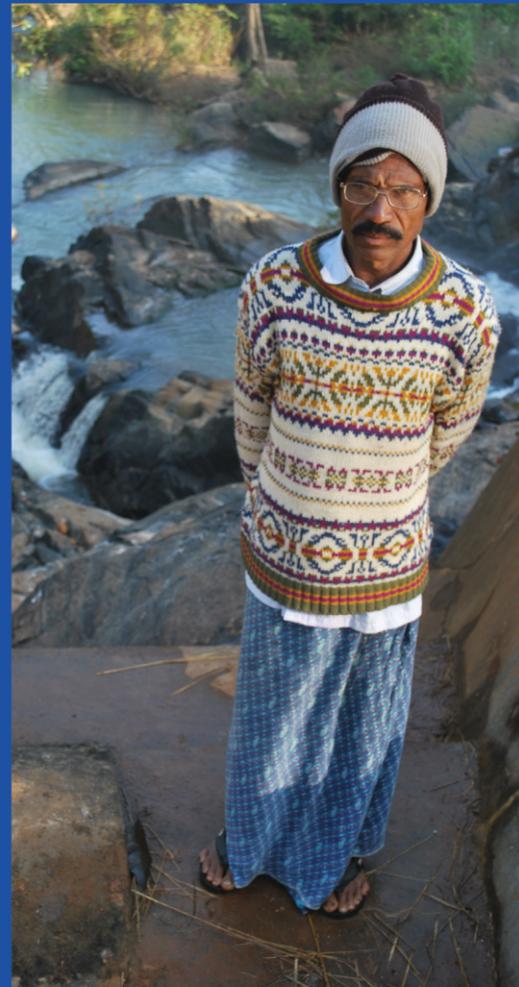


DEVELOPMENT THROUGH A LOW CARBON PATHWAY

8 Case Studies

Microhydro | Solar | Biogas | Smokeless Stove | Cluster Approach
Low Carbon Farming | Afforestation/Reforestation | Waste Management



This document has been prepared by
Indian Network on Ethics and Climate Change (INECC)



INECC is a loosely structured national network comprising of individuals and organisation representatives interested in the climate issue from a micro-macro perspective. It connects the issues of climate change to larger sustainable development and social justice concerns. In this context INECC perceives policy changes in favour of communities who are most impacted by the climate crisis.

Laya, an NGO based in Visakhapatnam, Andhra Pradesh, India, is the Secretariat of INECC.

Documentation: Karuna D'Souza & Nikhil Titus

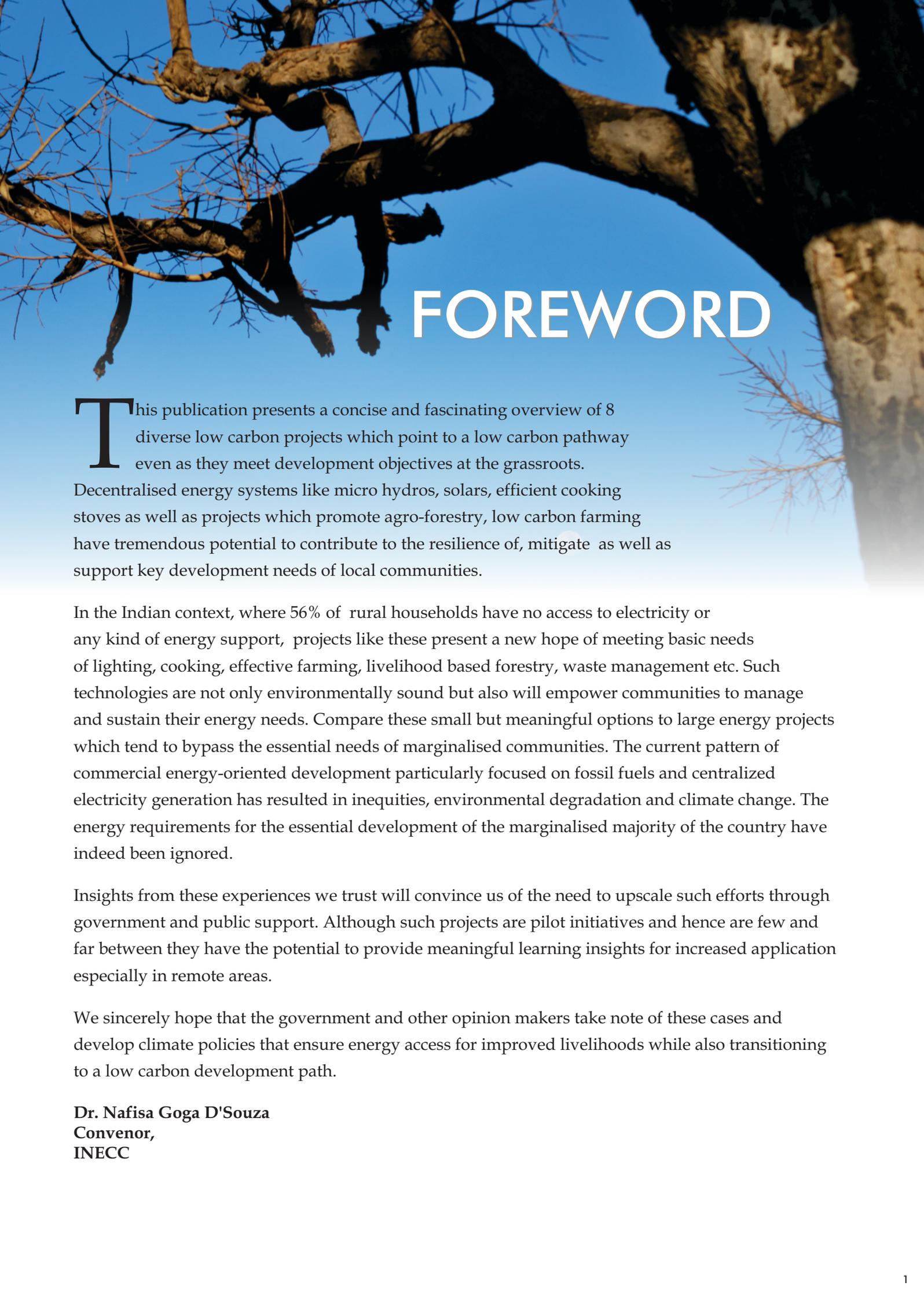
Design, Layout and Execution: Karuna D'Souza

Content Advisors: DEO & Climate Change Desk, Laya

Oversight: Ajita Tiwari Padhi, INECC Facilitator

Year of Publication: 2011

Copyright@INECC



FOREWORD

This publication presents a concise and fascinating overview of 8 diverse low carbon projects which point to a low carbon pathway even as they meet development objectives at the grassroots.

Decentralised energy systems like micro hydros, solars, efficient cooking stoves as well as projects which promote agro-forestry, low carbon farming have tremendous potential to contribute to the resilience of, mitigate as well as support key development needs of local communities.

In the Indian context, where 56% of rural households have no access to electricity or any kind of energy support, projects like these present a new hope of meeting basic needs of lighting, cooking, effective farming, livelihood based forestry, waste management etc. Such technologies are not only environmentally sound but also will empower communities to manage and sustain their energy needs. Compare these small but meaningful options to large energy projects which tend to bypass the essential needs of marginalised communities. The current pattern of commercial energy-oriented development particularly focused on fossil fuels and centralized electricity generation has resulted in inequities, environmental degradation and climate change. The energy requirements for the essential development of the marginalised majority of the country have indeed been ignored.

Insights from these experiences we trust will convince us of the need to upscale such efforts through government and public support. Although such projects are pilot initiatives and hence are few and far between they have the potential to provide meaningful learning insights for increased application especially in remote areas.

We sincerely hope that the government and other opinion makers take note of these cases and develop climate policies that ensure energy access for improved livelihoods while also transitioning to a low carbon development path.

Dr. Nafisa Goga D'Souza
Convenor,
INECC

INTRODUCTION

LOW CARBON PATHWAY TO DEVELOPMENT



Energy production in its current form is universally recognized as one of the significant inputs for economic growth and human development. Further, scientific studies and our experience suggests, that energy production from non-renewable sources is no longer affordable and sustainable in terms of the economy, the environment and future of the planet.

The necessity for energy is often discounted among the various needs that drive human existence. Food, shelter and clothing have been traditionally perceived as the bare minimum that makes decent human living. However, it is important to note that food, shelter and clothing are outputs of energy use. Food crops cannot be grown without energy use, nor can food be cooked without fuel. Housing still requires human labour even in its basic form. The light bulb in our house expands the daylight otherwise limited to the 12 hours that the sun can determine. Cemented houses these days are not livable in extreme heat conditions making the use of fan more a necessity rather than a luxury. And clothes need electricity to fabricate and fashion cloth. Mobility factors in exposure, learning and means to expand work opportunities. In recent times the boom in digital technology has meant that entertainment (another forgotten necessity of human existence) has moved to a new dimension of accessibility and quality hitherto the domain of the affluent few.

The issue remains that the source of this energy predominantly from oil and coal is no longer a sustainable option for the future. We now have

enough proof that Climate Change is a consequence of anthropogenic activity i.e. human induced climate change through unsustainable consumption of energy produced from non-renewable sources.

This is of special significance for India, a country with two faces: high gross domestic product (GDP) annual growth rate, high rise buildings, sprawling highways, mushrooming malls, galloping industrialisation, runaway consumerist culture on the one hand, and on the other, every fourth Indian goes hungry, every third woman in India is malnourished and anaemic, every second child is underweight. Yes, India is nearing 9% GDP growth rates and at the same time the poverty crisis has deepened and enveloped the very structure of the Indian economy. India's current model projects that 'the higher the growth rates the more the poor in India will benefit'. This perspective is contrary to experience. What is clear is that economic growth does not ensure distribution of resources unless the 'marginalised' majority of India becomes the centre of planning processes.

In India, the focus of development largely remains with the expanding choices and resources for the burgeoning middle class. Electricity production is planned to nurture industrialization and increase output to sustain the (middle class) increase in demand for electricity. This is squarely at the cost of rural poor (almost 70% of the population) who receive minimal share of this exponential increase in electricity production. What is more worrying is that thermal power plants (natural gas and coal) are being seen as the sources of energy (electricity)

for the future. As has been stated by the Ministry of Power:

“ India needs to expand manifold the coal production, extract through all possible means, the oil and gas reserves, wherever possible, resort to import of coal, acquire coal and gas reserves abroad, will need to continue substantial dependence on import of oil, and exploit fully the large hydro electric potential which is of the order of over 1,50,000 MW.”¹

The development pathway then seen from the lens of the majority of the population of India would mean in real terms that we re-look at our development trajectory bottoms-up. Basic survival for all is possible even while we pursue a low carbon pathway to development, if we recognize that there are limits to growth. The vision of a low carbon society is an opportunity for us in India to make development choices that will take us along this path, especially since we have a large population, which has yet to have access to energy. Today 54% of the Indian households do



not have access to electricity in India as compared to the emerging elite with an increasingly higher carbon footprint arising out of unbridled conspicuous, luxury based consumption.

Decentralized Energy Options (DEO) from renewable sources is continually being thwarted as idealistic, impractical, inefficient, economically redundant and experimental. However, this myopic view seems to find amnesia, when it is pointed out that government energy distribution in terms of efficiency and subsidy (be it technology and systems) is arguably extremely short of any business or practical logic, notwithstanding the adverse environmental reasoning.

In this context, INECC has sought to document insights into diverse low carbon projects instituted by grassroots based organizations. These projects demonstrate practicality, efficiency and efficacy of DEOs particularly from the perspective of communities based in rural regions of India, where energy solutions need focus. This includes micro-hydro, solar light, bio-gas and energy efficient cook stoves along with an insight into the possibility and potential of low carbon farming. From an environment perspective, not only are these initiatives carbon neutral, but also suggest ways by which communities can adapt to the changing climatic conditions. The fact remains that considering the rapid emission increases in the recent past, the envisaged engagement of high emitting southern countries in the development of an equitable post-Kyoto regime, a comprehensive national mitigation strategy is inevitable.

The study was conducted by a team of two young documentation experts with a background in media and cultural studies, along with a basic experience and knowledge of grassroots initiatives. Commissioned by INECC they travelled to 8 organizations, collecting information about the projects from the various stakeholders. This study is a result of data collation from focused group interviews, discussions with various stakeholders and their own nuanced observation of the projects they witnessed. In addition they also filmed their experience which has resulted in 8 video-films. •

¹Energy Markets and Technologies in India, R.V. Shahi, Secretary, Government of India, Ministry of Power.;www.powermin.nic.in



1 WITHOUT THE GRID

Micro-hydro as a community run initiative for those who cannot access the grid

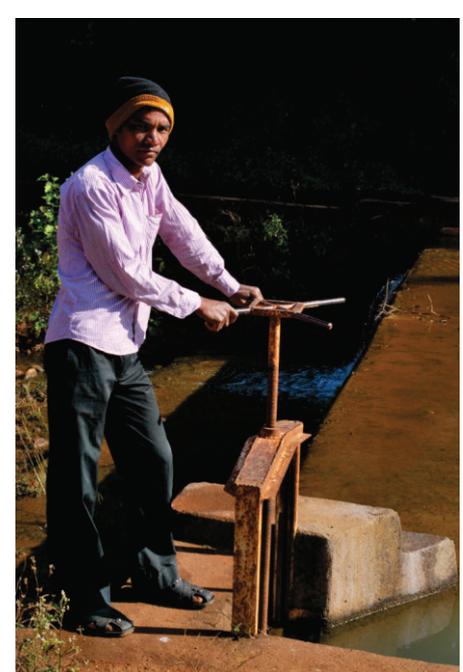
Geographical Location and Context

- Odisha's rural hinterland's access to infrastructure and development is extremely poor and adivasi communities especially the Kondhs, have been consistently neglected in the background of inequitable Govt. policies, Govt. corruption and Naxalism which is rampant in these areas.
- Geographically speaking, Odisha with its abundant natural resources has great potential with its perennial streams as sustainable sources of energy.
- Odisha is officially designated as a power surplus state and exports power to adjoining states. Yet, there is no electricity access for a majority of its rural and tribal habitat.



Harnessing Water to gain Power

- The micro-hydro is relatively the cheapest form of renewable power and Orissa has a huge potential.
- IRDWSI has facilitated the building of three micro-hydros in the villages of Putsil, Bodomanjari and Chickalamari in Potangi District. These three villages do not have access to electricity from the grid.
- A micro-hydro uses the energy of a falling stream (water fall) to produce electricity. The stream needs to be perennial to sustain electricity production throughout the year. The water from the stream is not consumed as it as it passes through the turbine and then back into the stream. The water can also be further directed and be used for agricultural purposes.



Lighting up Villages

- Putsil is the longest standing micro-hydro in the region. It has been running independently and successfully by the community since 1999. Its capacity is 13 Kw/h and the consumption is up to 8 - 9 Kw/h. The village has around 100 households.
- The micro-hydro at Bodomanjari gives a total of 87 households access to electricity



LOCATION
SEMILIGUDA AND POTTANGI DISTRICT, ODISHA

PROJECT FACILITATOR
IRDWSI (INTEGRATED RURAL DEVELOPMENT FOR WEAKER SECTIONS OF INDIA)

TECHNOLOGY
MICRO HYDRO

BENEFICIARIES
HOUSEHOLDS OF THE ADIVASIS, MAINLY THE KONDHS

IMPLEMENTED IN **PUTSIL VILLAGE** SINCE **1999**, PRODUCES **13 Kw/h**, IS ACCESSED BY **100 HOUSEHOLDS**

IMPLEMENTED **BODOMANJARI AND PULPADARU VILLAGES** SINCE **2006**, PRODUCES **30Kw/h**, IS ACCESSED BY **87 HOUSEHOLDS**

IMPLEMENTED IN **CHIKALAMARI (POTTANGI DISTRICT)** SINCE **2004**, PRODUCES **14Kw/h** SERVICES **110 HOUSEHOLDS** IN **3 VILLAGES**

OPERATED BY **BAREFOOT ENGINEERS: YOUTH FROM THESE VILLAGES WHO HAVE RECEIVED TRAINING IN OPERATING AND MAINTAINING THE MICRO HYDRO**

Integrated Rural Development for Weaker Sections of India (IRDWSI)

Semiliguda, Odisha

www.widango.net



which includes the 2 villages of Bodomanjari and Pulpadaru. The micro-hydro produces 30Kw of electricity.

✓ The Chickalamari micro-hydro produces 14 Kw of electricity which is accessed by 3 villages with a total of 110 households.

'Power'ful communities

✓ Local people have been trained to attend to the main powerhouse. They are known as 'barefoot engineers'. In return for their services to the community, the village people offer to volunteer agricultural work in the 'barefoot engineer's' field.

✓ The Mini-hydro Committee is set up in each of the villages along with a bank account for which a small amount is collected from every household – Rs.15/- per month to contribute towards any repair and maintenance work that might occur.

✓ In order to sustain the water flow in the streams, reduce silt load as well as restore the bio diversity the villagers have taken forest protection and plantation of over 300 hectares of forests.



Affecting change

✓ Women have a better quality of life now that they have access to 'light'. Electricity is used for aiding in housework; women and the community now have some time for leisure

✓ In Putsil, besides the mill there is also a Community centre that houses a television and with electricity now accessible they regularly watch television.

✓ Efficiency in work has increased, and so has income.

✓ The catchment area development through agro-forestry has resulted in increase in groundwater and revival of lost species.



'Such small scale projects like the the micro-hydro project in the village has not had any bad impact on the locals or on the environment. According to us such development projects ought to be taken up in other villages as well.'

- Hanak Tading, Bodomanjari, Semiliguda District, Odisha



'We collect Rs.30 per month from every household, whereas an electricity company would collect around Rs. 400 per month.'

- Shubha Desari, Microhydro Committee Member, Putsil, Semiliguda District, Odisha



2 MAKE, MARKET, MAINTAIN

Solar Lanterns illuminate off-grid villages in Jharkhand through the entrepreneurial initiative of Women SHGs

LOCATION

ULTI VILLAGE, LOHARDAGA DISTRICT, JHARKHAND

TECHNOLOGY

SOLAR CHARGED LED LANTERNS

PROJECT FACILITATOR

LOHARDAGA GRAM SWARAJYA SANSTHAN (IMPLEMENTING NGO), DEVELOPMENT FOCUS (RESOURCE NGO)

BENEFICIARIES

TRIBAL VILLAGES IN THE DISTRICT

CURRENTLY 5 CHARGING STATIONS COVER 120 HOUSEHOLDS IN ULTI VILLAGE, LOHARDAGA DISTRICT. COST RS. 15 PER MONTH

OPERATIONS

THE WOMEN HAVE FORMED A SELF HELP GROUP (SHG) WITH THE MOTTO TO **MAKE, MARKET AND MAINTAIN** THE SOLAR L.E.D LANTERNS

THE LANTERN IS SOLD AT RS. 1600 WITH A 20 YEAR GUARANTEE

Geography and Context

✎ The current state of electrification in Jharkhand can be said to be acute thereby impeding the social and economic development of its people. It ranks last among state-wise village electrification status at a meager 31%

✎ Topographically, Lohardaga District is undulated and of hilly terrain. It is a part of Chottanagpur plateau. The area is mostly dominated by the Oraon tribals who are primarily vegetable growers of this region. They have a long history of negligence in spite of abundance of the natural resources in their area.

✎ This area does not have access to the grid and for their lighting needs depend on kerosene from the ration shops which is never adequate.

Lighting entrepreneurs

✎ Alternative and renewable technologies that are appropriate with a proper transference to ensure total adoption to a rural context can develop the quality of life in a rural area especially in the context of women. The aim of this project is to increase access to education and livelihood through appropriate technology which in this case is solar, and skill development.

Entrepreneurs are made

✎ The way out was to promote the technology in a way of entrepreneurial enterprise, which falls in tune with the make, manage and market strategy. This would make the community not to depend on external sources for repair and management.

But, how?

✎ The first step was to do a survey of the existing patterns of energy use (kerosene) in the village involving the community to realize that they can have access to a cheaper source of illumination without its harmful effects.

✎ Then the community was formed into various business groups for smooth functioning - followed by the training and demystifying of technology.



Lohardaga Gram Swarajya Sansthan (LGSS)
www.lgssngo.org

Block Chowk,
Lohardaga,
Jharkhand - 835302

lgss@rediffmail.com



Training to light

✓ The villagers are mostly illiterate, but because in electronics most of the parts are connected through symbols it was easier for the transfer of know-how. The training also involved the identification and handling of the all the various tools and the manner in which to use them followed by the assembling

✓ Inputs on procuring the material, creating a cost-benefit analysis to help them cost the lanterns, labeling and branding the lanterns, as well as opening bank accounts to encourage transparency in transactions. The villagers were encouraged to also test the viability of the solar lanterns in the market by going to the local fairs and putting their product on display. The women realized that there was an existing market, because with their own experience they found the solar light useful.

Make, Market, Maintain

✓ There are 5 charging stations covering the 120 households of this village. The women go to their designated station at 6am with the solar-lanterns and they are kept for charging till 6pm. Each time the lantern is charged 50 paise is collected, which comes to

Rs. 15 per month per lantern. This process is recorded and books are maintained.

✓ To turn this into an economic venture, the SHG members each contributed Rs. 1000 for the Seed Fund for the marketing of the lanterns.

✓ The market cost of similar lanterns but of a reduced quality is only Rs. 200 – 300. But this women's group sells it in the market for Rs. 1600, but with an assured 20 year guarantee!

Clean light, better lives

✓ Kerosene is no longer used and what is received from the ration shop is sold for an extra income. The women are extremely happy and independent and determined to market these lanterns.

✓ This initiative ensures reliable, kerosene-free illumination therefore reducing the drudgery of women leading to a safe environment and better health.

✓ It empowers the rural women SHG members to assemble solar lanterns and enables them to address future maintenance issues within the village.

✓ It allows access to efficient light for agricultural purposes.

✓ It enables children to study beyond daylight hours.



" There was soot deposited in our eyes because of kerosene lamps being lit inside the house. This one of the major reasons why we wanted a better lighting option."

- Uma Kujur, Member of the Self Help Group in Ulti Village, Lohardaga District, Jharkhand



'Our personal assurance of the quality of the lanterns is what encourages customers to buy them. We offer them a 20 year guarantee!'

- Punyo Orao, Member of the Self Help Group in Ulti Village, Lohardaga District, Jharkhand



3 NO SHIT!

Bio-gas as a Clean Development Mechanism for Marginalized Communities

LOCATION

5 TALUKS,
CHICKBALLAPUR DISTRICT,
KARNATAKA

TECHNOLOGY

BIOGAS

PROJECT FACILITATOR

ADATS

BENEFICIARIES

RURAL HOUSEHOLDS IN THESE SEMI ARID DISTRICTS WITH PLACE FOR A SEPTIC TANK AND SOME LIVESTOCK 35% OF THE END USERS ARE SC/ST WOMEN, 18% MIDDLE CASTES AND 47% UPPER CASTE FAMILIES

DECEMBER 2005: FIRST BIO-GAS CLEAN DEVELOPMENT MECHANISM (CDM), OF 5,500 DOMESTIC BIOGAS UNITS.

AUGUST 2009: 18,000 BIOGAS UNITS CDM REGISTERED

OPERATIONS

END-USERS WILL BE 100% BENEFICIARIES OF REVENUE RECEIVED THROUGH THE CDM

Agriculture and Training Development Society (ADATS)

www.adats.com

No: 10, 2nd Cross
Shanthivana
(in front of the twin tower
Lakeview Habitat, Hebbal)
Sahakar Nagar Post
Bangalore - 560092

Tel: +91 (80) 2343 8993

Geography and Context

✎ This area in Karnataka is semi-arid and drought prone with 560 mm of erratic and spatial rainfall.

✎ There are a number of small and poor peasant families who are struggling to rid themselves of peasant exploitation and take control of their own lives by undertaking grassroots planned development activities.

Why bio-gas?

✎ The use of bio-gas as a cooking fuel brings an improvement in the overall quality of life in many ways for end-user families as a whole, and women in particular. The project has reduced drudgery of women and children. From the climate-change perspective too, this has potential adaptive characteristics. Women have easy access to energy at the turn of a knob, while earlier they faced severe hardship to collect fuel wood on a weekly basis, and get kerosene through the public distribution system once a month which was never enough.

No Shit!

✎ Replacing traditional cooking stoves with bio-gas has eliminated indoor air pollution and has improved the health of women and children

✎ Converting dung to slurry, a large number of bacteria is destroyed, thus decreasing pathogen loads

✎ Biogas slurry manure is far superior to farm yard manure in respect of NPK contents. It has reduced the use of chemical fertilizers and increased crop production

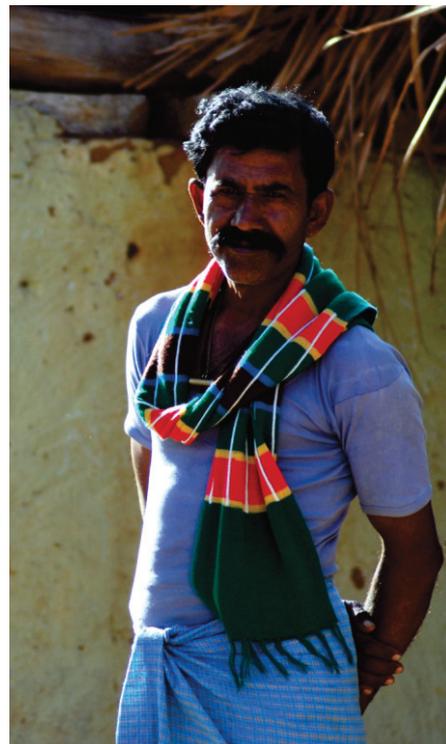
✎ The project activity has reduced pressure on natural forests and common property resources, thus arresting degradation of forests and deforestation and leading to habitat conservation.

Only, if: Conditions, but.

✎ There are a few conditions to having a biogas in a household. The most important is that there needs to be some space around the house for the septic tank, inlet and outlet



CDM: The Clean Development Mechanism (CDM), defined in Article 12 of the Protocol, allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol to implement an emission-reduction project in developing countries. Such projects can earn saleable certified emission reduction (CER) credits, each equivalent to one tonne of CO₂, which can be counted towards meeting Kyoto targets.





to be constructed. Secondly, the household needs to own at least two cattle to provide the bio-gas with consistent dung. Those, who fulfill these conditions, are the beneficiaries of the bio-gas plant.

Gassing away

✓ Each bio-gas plant of capacity 2 m³ requires 700 table molded bricks, 25 sq feet of crushed stones, 10 bags of cement and a tractor load of sand and half litre of water proofing. This contributes to building 2 cubic metre of a biogas enclosure. After the construction, technical persons visit the site and check it. After this, they require about half to three-quarter tractor load of cow dung. After placing this in the tank and leaving it to ferment for about 10 -15 days in the digestive tank, the gas is ready to be produced. When the gas is produced, a gas pipe is attached to the valve and the gas can be utilized.

Cooking clean into money

✓ ADATS has initiated one of the first bio-gas CDMs in December 2005 with the introduction of 5,500 domestic biogas units. The first 11,761 Certified

Emission Reductions (CERs) have been verified and issued into the Carbon Market. The second monitoring is under way to issue another 57,642 CERs into the registry. This project is also certified under Gold Standard.

✓ Another 18,000 biogas units got registered as a CDM project in August 2009, and an Emissions Reductions Purchase Agreement was signed to receive € 4.9 million, in advance, through the forward sale of 384,144 CERs, which will be generated in the first 9 years. The construction of these 18,000 units has started and the project is getting registered under Gold Standard.

- ✓ The end-users will be the 100% beneficiaries.
- ✓ The annual average of estimated reductions of carbon dioxide emissions is 19,553 in the first project of 5,500 units and in the second project of 18,000 units is 42,855 metric tonnes of carbon dioxide.
- ✓ This initiative is also the first pro poor CDM in India. This has encouraged resonance in other stakeholders to capitalize on the carbon markets CDM mechanism to bring development in a carbon responsible way and benefit the poor.



**'Before the bio-gas we used to collect firewood from the forest. We had to face dangers, like robbers'.
- Laxmi Devi, Kothapalli Village, Chickballapur District**



**Blowing the flame was tiring, we would get a headache and our eyes would get affected. But, now we can cook on time and children reach school on time. We can go about our work with no difficulty
- Parvathamma, Yedagulupalli Village, Chickballapur District**

4

A CLEAN COOKING STORY

Chulika - a stove that uses less firewood

LOCATION

KOPPAL AND RAICHUR DISTRICTS
OF NORTH KARNATAKA

PROJECT FACILITATOR

SAMUHA

TECHNOLOGY

EFFICIENT COOK-STOVES
(REDUCES FIREWOOD USAGE BY
50% AND INDOOR POLLUTION
BY 80%)

BENEFICIARIES

HOUSEHOLDS FROM THE
BACKWARD VILLAGES IN THESE
SEMI ARID DISTRICTS

IMPLEMENTED AS A TRIAL IN
100 HOUSEHOLDS. AIM IS TO
REACH 43,000 HOUSEHOLDS
WITH EACH HOUSEHOLD SAVING
2 TONNES OF CARBON PER YEAR

OPERATIONS

AS PART OF THE CLEAN
DEVELOPMENT MECHANISM CDM,
REVENUE SHARING WILL BE 70%
TO THE COMMUNITY AND SAMUHA
WILL RECEIVE 30% FOR ITS
DEVELOPMENT ACTIVITIES

Samuha

www.samuha.org

48/1, 1st Cross,
T Ramaiah Garden, SOS
Children's PO,
Bannerghatta Road,
Bengaluru-560076.

Tel: 080 - 42136206

Geographical Location and Context

✎ Raichur and Koppal, previously an integrated district, together form the 2 most backward districts in Karnataka. These areas are semi-arid and have very little rainfall and little forest cover.

✎ The Energy Resources Institute of India (TERI) did a study on one of the villages here and found that in the community carbon footprint of about 600 odd tonnes, 88% was from domestic cooking.

Cooking up a solution

✎ Samuha, working in these areas realized that the 'Chulika' (an efficient cook stove) which is produced by the company, Isquared, was seen as a solution to both reducing the fire-wood consumption as well as bringing a host of social and health benefits to vulnerable communities

✎ But a deterring factor was the cost of the Chulika because rural communities cannot afford to spend Rs. 1600 on a stove. The Clean Development Mechanism was then seen as an alternative by which the communities could benefit by getting the Chulika for free as well as reducing emissions.

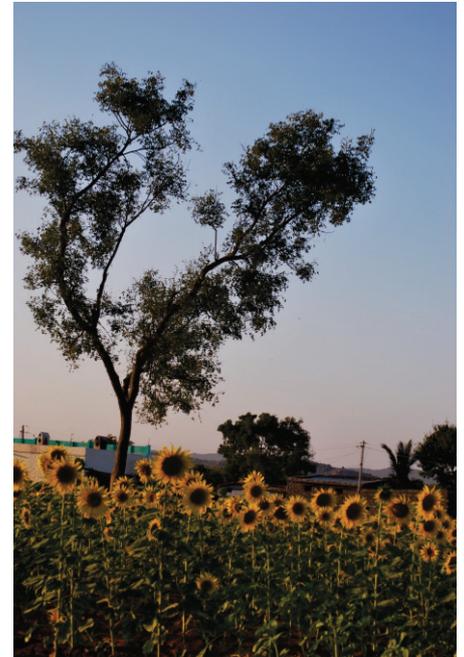
Chulika: A cleaner way to cook

✎ The Chulika has been certified by the Central Power Research Institute that it has a 30.8% thermal efficiency against traditional cook-stoves which are around 10% efficient.

✎ It reduces drudgery to women by reducing the time and need to travel long distances to collect fuelwood which the Chulika consumes 50% less

✎ It improves women and children's overall health situation by reducing indoor pollution by 80%

✎ It reduces cooking time: the materials used to make the Chulika transmit heat more efficiently than the traditional stoves





✓ Less water is used in the washing of vessels as there is much less soot formation on vessels thereby also reducing the work of women in washing the vessels.

✓ The remnants of the burnt firewood become into a coal like formation which can be recycled by giving it to the local ironing man, who uses the coal in his iron and in return he irons clothes for free.

Money for clean cooking?

As part of the Clean Development Mechanism (CDM), the agreement is that the rural communities will get 70% of the revenue (35% to the end-user, 35% to the community fund) and Samuha will get 30% for its development activities. About 43,000 households will be covered in the two projects. Each household is expected to save 2 tonnes of carbon therefore 86 tonnes of emissions per year altogether with two stoves in each household.

✓ This is not to say that the poor should bear the responsibility of reducing their emissions (which is mostly survival emissions), but it presents a model where the notion of 'development' is being defined through a low carbon path.



, 'The old stove used to consume one cartload of firewood a month and the new one uses half a cartload'.

- Annapurna, Nagallapur, Koppal District, Karnataka



Most households in the villages have replaced traditional stoves with two Chulika stoves because of its demonstrated efficiency.

5 MY LIFE, MY ENERGY

A Cluster Approach through Decentralised energy systems for energy access for livelihood of adivasi communities

Geographical location and context

✎ Pathakota is one among many such villages which is so remote and has no access to electricity (off grid). Ironically, the Government of Andhra Pradesh claims 100% electrification. No Government Officer has visited the area in the last 6 years!

✎ This pocket has Primitive Tribal Groups like Konda Reddys, Koya Doras the Valmikis

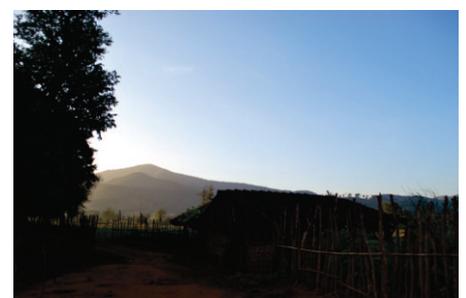
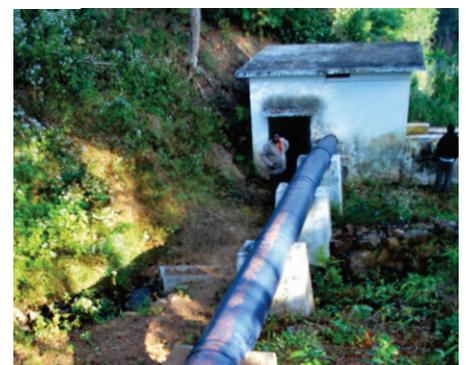
✎ Access to conventional electricity has eluded these communities even though their energy requirement is only for basic subsistence - domestic lighting, cooking and for aiding agriculture, livestock care at night, which was met by kerosene.

Approach to energy access - 'Cluster'

✎ A 'Cluster' means a group of villages powered by a mix/combination of renewable technologies for aiding energy access in an efficient and sustainable manner. A cluster can be " geographical' or a 'technology based cluster'. A Cluster is generally conceived around having the micro hydro as the focal point around which solar lights and fuel efficient smokeless stoves are designed.

Winds of change- where technology meets community!

✎ Laya conducted a feasibility study to understand local energy needs and priorities. Technologies like Micro hydro, solar and efficient woodstoves were identified as most suitable (as entry point technologies) . Subsequently, a group of households/hamlets (cluster) were



LOCATION

PATHAKOTA AND DARIGEDDA
PANCHAYAT, EAST GODAVARI
DISTRICT, ANDHRA PRADESH

TECHNOLOGY

MICRO-HYDRO, SOLAR, SMOKE-
LESS STOVES, LOW CARBON
INTENSIVE SYSTEM OF RICE
INTENSIFICATION

YEARS OF OPERATION SINCE
2009

BENEFICIARIES

600 HOUSEHOLDS OVER 26
VILLAGES OF THE ADIVASI
COMMUNITY OF KONDAREDDIS,
KOYADORAS, VALMIKI

PROJECT FACILITATOR

LAYA

Laya

www.laya.org.in

501, Kurupam Castle,
East Point Colony,
Visakhapatnam,
Andhra Pradesh - 530017

Tel: 0891 2548017,
0891 2735332



developed as an 'energy hub' encompassing the three technologies, solar lanterns, energy efficient woodstoves and a microhydro.

✓The Community contributed labour for constructing their microhydro power station (6Kw supplying 85 households). They contributed money for the solar lanterns and made their own energy efficient smokeless stoves with training assistance. The technology is owned, controlled and managed by the community. The solar lanterns are repaired by trained technicians from the community and the power house is maintained by barefoot engineers. Community based institutions have been set up to ensure sustainability - like the Users Group, Microhydro Management Committees, Farmers Groups, etc.

Going beyond 'light' - integrating low energy farming

✓The cluster is being strengthened by integrating low energy intensive agriculture practices like System of Rice Intensification, Kitchen Gardens, Hydrants, lift irrigation and encouraging sustainable agriculture.



When the grid electricity will come or go nobody can say, the micro hydro electricity can be used daily and during times of celebration (festivals and weddings), it is used in the day time as well.
 - Laxmayya, Male, aged 40+ Pathakota, East Godavari District, Andhra Pradesh



The smokeless stove has reduced our firewood usage by half, hence we spend less time collecting firewood and have two burners to cook on simultaneously with a single flame'
 - Lingamma, Female, aged 35+, Pathakota, East Godavari District

Laya works for the welfare of adivasis in the East Godavari District and Paderu Districts in Andhra Pradesh. They have been working since 1989.



6 LESS CARBON, MORE FOOD

Low Carbon Processes in Agriculture can contribute to the livelihood of small farmers through a CDM

PROJECT FACILITATORS

ACCION FRATERNA ECOLOGY CENTRE, SACRED (SUVISESHA ASHRAM CENTRE FOR RURAL EDUCATION AND DEVELOPMENT), BIDADI, BANGALORE DISTRICT, PWDS (PALMYRAH WORKERS DEVELOPMENT SOCIETY), BEST (BHARATH ENVIRONMENT SEVA TEAM), TAMIL NADU, AND SEDS (SOCIAL EDUCATION AND DEVELOPMENT SOCIETY), ANANTAPUR, FAIR CLIMATE NETWORK

TECHNOLOGY

LOW CARBON FARMING METHODS

IMPLEMENTATION

PILOT PROJECT IN 2011-12 WILL INCLUDE ABOUT 2000 FARMERS IN ABOUT 4000 HECTARES OF LAND

BENEFICIARIES

SMALL AND MARGINAL FARMERS

OPERATIONS

REDUCTION IN INPUT COSTS THROUGH LOW EXTERNAL INPUT SUSTAINABLE AGRICULTURE AND GRADUAL INCREASE IN PRODUCE AS WELL AS THROUGH THE CLEAN DEVELOPMENT MECHANISM WILL INCREASE FARMERS REVENUE

Fair Climate Network (FCN) www.fairclimate.com

19/1 Alexandria Street, Richmond Town, Bangalore - 560025

Context

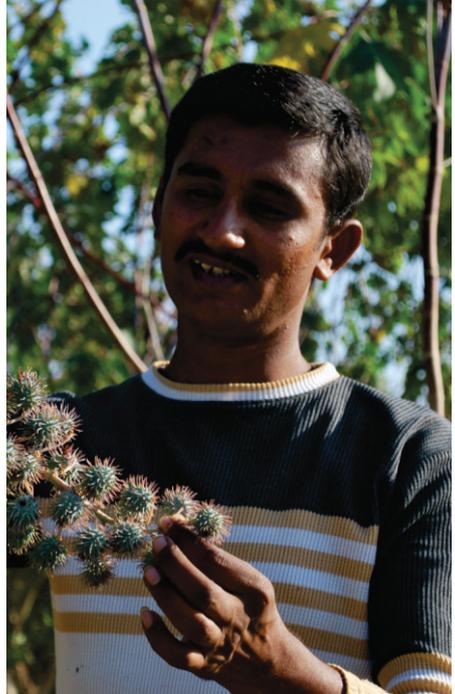
✎ Agriculture is a predominant occupation of rural and adivasi India. The recent agricultural pattern in India has shifted towards a High External Input Destructive Agriculture (HEIDA) which is detrimental to small land farmers who cannot sustain the high costs of inputs to their land.
✎ HEIDA also has adverse consequences to land fertility in areas where the farmers have small land holdings dependent on fluctuating rainfall. Farmers suffer by losing their crop and their livelihood.

Low Carbon Farming

✎ The farming sector offers opportunities for carbon sequestration and emission reductions. Emissions from farming contribute to 14% of Global Green House Gases (GHG). In India, farming contributes to 28% of the national GHG emissions. Low Carbon Farming practices offer the farmers opportunity to capitalize on the carbon market, as they shift to sustainable agricultural methods, involving lower input costs and resulting in reduction and sequestration (improved soil carbon content) of carbon emissions.

Less carbon, More food

✎ The process involves developing Voluntary/Verified Emission Reduction (VER) projects that support sustainable farming by encouraging farmers to adopt a basket of practices that reduce, minimize and remove the use of synthetic fertilizers (methane avoidance and N₂O deduction) while at the same time improve soil carbon content (sequestration). This is done through reduced tillage, precision fertilization, anaerobic composting, using organic fertilizers, mulching, intercropping, multi-cropping, and a horde of techniques specially designed for a particular region, populations and climatic zones.
✎ Carbon sequestration activities include planting fuel, fodder and fruit trees, and protecting those that are already there on the farms. Fast growing vegetation that do not encourage nesting by vermin can be





planted on field bunds and boundaries, or on plots that are not currently utilized to maximum potential. This vegetation can be used for mulching.

✓ Planting multiple crops on the same field supports diversity. Proper crop mixes, based on science and demonstrated result, promotes resilience by bringing about a balance in the farm ecology and reducing the risk of crop failures due to pest attack. Multiple cropping also reduces the financial risk exposure for farmers against erratic and spatial rainfall.

Networking: The Fair Climate Network (FCN) and Low Carbon Farming (LCF) Coalition

✓ FCN comprises 86 persons: development Workers, Climate Change activists, environmentalists, scientists and other professionals from India and other countries. They represent 28 Grassroots NGOs who work with the rural poor and 20 support organizations. 6 Network members participate in their individual capacity.

✓ The purpose of FCN is to facilitate and capacitate grassroots bodies to develop pro-poor CDM/VER Projects in India and tap carbon resources for the

sustainable development of the poorest of the poor.

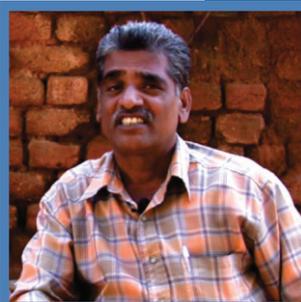
✓ FCN supports its members to develop energy CDM Projects that generate CERs and claim carbon revenues for the sustainable development of the poor.

The network is keenly involved in developing a framework for sustainable agriculture efforts.

✓ FCN provides the leadership and technical resources to develop LCF coalitions.

Taking the lead

✓ The Accion Fraterna Ecology Center is the lead organization of the 1st coalition to take up the Low Carbon Farming project under VER. It is being done jointly with 4 other NGOs: PWDS (Palmyrah Workers Development Society), BEST (Bharath Environment Seva Team), Tamil Nadu, SACRED (Suvisesha Ashram Centre for Rural Education and Development), Bangalore District and SEDS (Social Education and Development Society), Anantapur. As this is being written 2 more coalitions have been formed comprising 10 NGOs, covering a total of 24,000 acres owned by 13500 farmers. This figure is expected to increase exponentially after 5 years.



'Organic agriculture requires farmers to work hard. If we work hard at our soil, the yield will be good. It is also a zero investment form of agriculture where we use resources that are commonly available'.

- N. Nagarajaya, Organic Farmer, Bidadi District, Karnataka



"Earlier, the use of chemicals in agriculture was increasing, and with it the costs but the yield was reducing. With organic farming our costs have reduced and year by year our income is increasing."

- N R Surendra, Organic Farmer, Bidadi District, Karnataka



7

TREE TODAY, LIFE TOMORROW

An Afforestation/Reforestation Programme under the Clean Development Mechanism for Peasant Farmers

Geography and Context

✎ The forests of Chickballapur are typical of the plain tracts of Karnataka. The stocking of the forests is poor. The trees are stunted and branchy, with diffused crown. The soil is poor and shallow and rains are scanty. There are large expanses of thorn forests. The forests have been heavily exploited in the past for extracting firewood and for manufacturing charcoal. Large expanses of thorny, scrubby and deciduous forests were also cleared to plant mostly eucalyptus hybrid under various schemes.

✎ Chickballapur District is a very dry region with the nominal forest area is only 6.18%. Many of the forests are also much degraded. Seasonal conditions have been the major factor causing fluctuation in the area under cultivation. The periodic drought and recurring scarcity have made any kind of land-based activity including agriculture very difficult. In 11 years from 1996 to 2007, farmers planted a total of 74,254 saplings, but the survival rate was very poor at 26%.

Nurturing nature

Through experience, ADATS realized that the saplings planted on dry lands could not survive unless there was a systematic program to support them with technical inputs, watering arrangements, etc. They concluded that afforestation / reforestation was the way forward.

The community A/R initiative - the first registered A/R CDM project in India

✎ The purpose of the proposed A/R CDM project activity –Bagepalli CDM Reforestation Programme is to implement a reforestation activity on the degraded agricultural land of 5 taluks of Chickballapur District of Karnataka.

✎ These lands are currently private uncultivable lands, fallow lands or marginal crop lands, which are highly degraded, belonging to poor farmers and agricultural labourers.

✎ The reforestation activity on such degraded lands holds great promise. It is



LOCATION

5 TALUKS OF CHICKBALLAPUR DISTRICT, KARNATAKA

PROJECT FACILITATOR

AGRICULTURE DEVELOPMENT AND TRAINING SOCIETY (ADATS)

TECHNOLOGY AFFORESTATION/ REFORESTATION (SUPPORT THROUGH TECHNICAL INPUTS AND WATERING ARRANGEMENTS)

BENEFICIARIES

MEMBERS OF THE COOLIE SANGHA IN THESE SEMI ARID DISTRICTS

IMPLEMENTATION

AN A/R CDM TO PLANT TREES ON 18,000 HECTARES OF RAIN FED DRY LANDS IS IN AN ADVANCED STAGE OF VALIDATION. AIM TO MOBILISE € 27 MILLION, THROUGH THE FORWARD SALE OF CERS

OPERATIONS

REVENUES WILL BE RECEIVED THROUGH THE FORWARD SALE OF CARBON CREDITS

Agriculture and Training Development Society (ADATS)

www.adats.com

No: 10, 2nd Cross Shanthivana (in front of the twin tower Lakeview Habitat, Hebbal) Sahakar Nagar Post Bangalore - 560 092

Tel: +91 (80) 2343 8993



expected to generate income to the marginal farmers, not only from the produce but mainly from the sale of carbon credits. Individual family will receive the exact full share of the proceeds by the sale of carbon credits.

Beyond the margins

✓ The A/R CDM project activity is proposed on marginal farmer's lands that have an average land holding of less than a hectare (0.72 ha). These farmers do not have the financial wherewithal to invest in planting activities and wait for several years for the financial benefits to accrue. Without the pre-project investment from carbon credits, it is not an economically feasible proposition.

✓ This project is being implemented in 8,933 hectares of dry land belonging to 8,107 coolie (labourer) families.

✓ The species for planting were chosen by the participating local families who selected local species which are suited for the agro-climatic zone. These will be planted depending on their soil and water conditions and personal preferences. No Invasive Alien Species(IAS) or Genetically Modified Organisms (GMO) are being used.

Tree today, Life tomorrow

✓ It will benefit the local micro-climate as well as the community and bio-diversity.

✓ Apart from producing fruits, and some small amounts of firewood and fodder, the indirect benefits is by conserving moisture in the soil, preventing soil erosion, improving soil fertility by adding organic manure, reducing soil cutting due to run-off water from the hillocks, and maintaining the regular flow of water in the streams.

✓ The project is designed to create long-term secure income for marginal farmers as well as creating a lasting tree cover in the region.

✓ It will decrease vulnerability to current climate change and climatic variability

✓ It will engage in capacity building through training and technical assistance.

✓ It will reforest 8933.34 hectare with local mixed species trees on degraded lands

✓ It will monitor and assess the project's environmental and socio-economic impacts.

✓ It will sell Certified Emission Reductions (CERs) by ensuring GHG removals by sinks for a 20 year period from 2008.



**'Of the 134 saplings I planted previously not a single one has died'
- Chikabbaya, Sindsapalli Village, Bagepalli District, Karnataka**



Before these plantations we had to work as coolies on other peoples land, but now the fruits from these trees provide us with a stable income every year - Akkayamma, Member of Coolie Sangha



8 TALKING TRASH!

A Cooperative of Rag-pickers who are sorting their way into reduced emissions and a dignified livelihood

Geographical Area and Context

✎ In an urban setting, one of the lowest in the strata of society are the rag-pickers. They rummage through the dustbins and garbage under the most unhygienic conditions to look for recyclable material that they can sell. They are treated without dignity and as out-castes.

A step to Recognition

✎ The Kagad Kach Patra Kashtakari Panchayat (KKPKP) is the association of rag pickers/waste collectors and itinerant waste buyers in Pune which was established during a convention of waste pickers in 1993. Working with the KKPKP, SWaCH, SWaCH Coop is India's first wholly owned cooperative of self employed rag pickers /waste collectors and other urban poor came into existence and was registered in 2007.

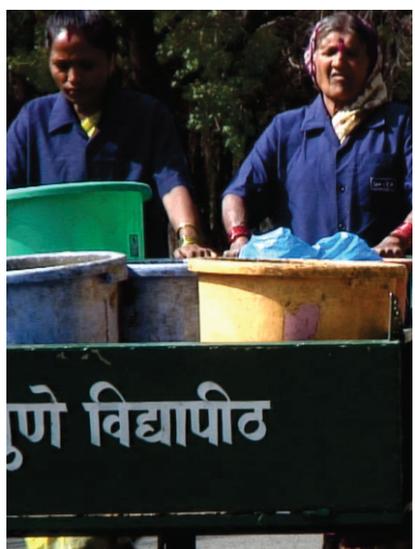
✎ Using the base of the existing cooperative, their fundamental role was to integrate the rag-pickers into the Solid Waste Management system by collecting garbage from the doorstep as opposed to the earlier practice of collecting recyclable waste from the garbage bins.

✎ The Municipal Corporations encouraged this integration and identity cards were issued to the rag-pickers.

Trash talks

✎ The rag-pickers have approached the citizens directly with a host of services for which a nominal amount is charged. The garbage is segregated into wet and dry waste directly at the doorstep. The dry waste is then further sent to be recycled. This waste can be sold by the rag-pickers, who earn from this and also the amount charged as user fee for collecting at the doorstep.

✎ In this way, the rag-pickers earn a livelihood and along with it the waste that



LOCATION

PUNE CITY, PIMPRI AND CHINCHWAD

TECHNOLOGY/PROCESS

AUTHORISED DOOR TO DOOR WASTE COLLECTION AND OTHER ALLIED WASTE MANAGEMENT SERVICES

BENEFICIARIES

RAGPICKERS IN PUNE CITY, PIMPRI AND CHINCHWAD

PROJECT FACILITATOR

SWACH (SOLID WASTE COLLECTION AND HANDLING), PUNE, MAHARASHTRA

IMPLEMENTATION

IN 5 YEARS ABOUT 1700 WOMEN RAG-PICKERS AND ABOUT 2,79,000 HOUSEHOLDS COVERED

OPERATIONS

THE RAGPICKERS RECEIVE A MONTHLY SALARY AND REVENUE FROM THE SALE OF SORTED SCRAP

Solid Waste Collection and Handling (SWaCH)

www.swachcoop.com

Pune, Maharashtra

Ph: +91 9765999500
swachcoop@gmail.com

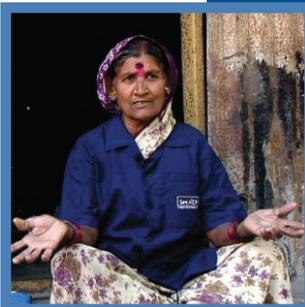


would have normally gone to the landfill site is reduced significantly because it is segregated at the point of collection. Only wet waste is then sent to the landfill site.

- ✓ The rag-pickers now integrated into a functioning system are recognized and demonstrate self-confidence.
- ✓ This has been in process now for 5 years and about 1700 women rag-pickers have been integrated into this process and about 2,79,000 households have been covered in Pune which is about 35% of Pune. SWaCH plans to expand to all of Pune within one year with support from the Municipal Corporations.

Sorting the emission crisis?

- ✓ There is much less wet-waste as it is segregated at the doorstep
- ✓ There is more dry waste that is going for recycling
- ✓ The reduced amount of garbage in the landfill has also reduced the amount of emission
- ✓ Scrap collectors salvage 144 tonnes of recyclable scrap prior to its transportation, thereby saving the Pune and Pimpri Chinchwad Municipal Corporations a sum of Rs.1,58,22,750 (almost Rs. 16 million) per annum in transportation costs alone which includes the emissions from the fuel of the transport.



Previously my child used to be tied to my back and I would sift through the garbage bins. People used to shout at us, shun us. But now we earn a dignified living.

- Pagabai Gaekwad, Garbage Collector and Sorter, Pune University



I get a monthly salary and also extra money from the scrap that I sell, that is why I prefer it here.

- Rekha Shinde, Garbage Collector at Pune University

Conclusive Overview and the Way Forward

The Energy Pathway: the macro perspective

The challenge for India is to rethink its paradigm of development, make radical decisions in favour of renewable and decentralised energy options charting out a course of action that safeguards economic sufficiency, environment soundness, good governance and inter-generational equity at the grassroots.

“Business-as-usual trends do not favor the poor's development, nor do they sufficiently exploit co-benefit opportunities between climate mitigation and equitable development”.

Prayas Energy Group, Pune, India, 2009

More coal fired plants will not ensure energy access

Increase in installed capacity, by way of adding thermal power plants, has not translated into increase in electrified villages and households. Therefore adding coal fired plants has not necessarily meant improvement in the energy access for the people who do not have access to electricity - living at the periphery of the society. A recent study reveals that in addition to the 113 existing MW of gas and coal based projects, another 700 MW are in the pipeline at various levels of clearances comprising more than six times the currently installed thermal capacity. 84% of the sources of energy will depend on coal. And to undertake these projects, water resources will have to be compromised and land belonging to farmers expropriated under the Land Acquisition Act. Many projects are in already critically polluted areas where the marginalised reside¹. Hence, large fossil fuel projects tend to infringe on the human rights of underprivileged communities rather than provide energy access. Clearly this energy pathway of the Government of India needs to be challenged.

Centralised systems are not necessarily cost effective

According to World Resource Institute (WRI) India's transmission and distribution losses are the



highest in the world: 26%-30%, in comparison to the world average of 5-10%. The centralised grid infrastructure in remote areas is difficult and hardly cost effective. Hence, the government finds it more difficult and less economically attractive to connect with few paying customers than to connect only few larger villages with many potential customers. Tribal communities located in small pockets thus suffer from access discrimination even though they are willing to pay the price of electricity.

Furthermore, huge coal and gas fired power plants are constructed with large social and environmental costs - paid by the poor. Even large dams, presumably renewable sources of energy, built for generating electricity not only displace large number of people, but contributes significantly to emissions and to say the least, disrupts local biodiversity. Unfortunately neither the Central Water Commission, nor the Central Electricity Authority, both premier institutes of the Government of India, have assessed the Climate Change impact and implications of India's large dams. Latest scientific estimates show that large dams in India are responsible for about a fifth of the country's total Climate Change impacts. One estimate indicates that the contribution of methane emission from large dams is 18.7% of the total CO₂ emission from India. The Indian policy-makers have largely overlooked the importance of dam-generated methane.

Current policy systems favour the rich

It is ironical that 58% of India's emissions are

¹Thermal Power Plants on the Anvil: Implications and Need for Rationalisation': Study by Prayas Energy Group, Pune, India, 2009

generated from electricity and 56% of rural households do not have access to electricity!

Since the poor tend to be excluded from grid connection, they have to pay high costs for alternatives (kerosene and diesel). Kerosene is used as the main source of 'light' and cooking. The current policy system favours the rich and big urban consumers, who benefit from hidden as well as overt subsidies to fossil-fuel based energy sources such as LPG and petroleum products and to centralized electricity generation systems. It is estimated that 40% of the subsidies for LPG and kerosene go to the richest 7% of the population. Moreover, the subsidy on LPG is 27.5 times the subsidy on kerosene.

The urban and rural divide is stark in terms of use of electricity. Calculations based on the National Sample Survey (NSS) data show that about 81.5% of urban households are electrified, whereas in rural areas this rate is only 46.2%.

Energy policies are primarily 'electricity' and not 'energy services' focused

The main approach of the Indian energy policies has been to 'increase energy access' in rural areas by 'increasing electric connectivity'. The government aims to ensure that the villages/houses are simply connected to the grid, but fails to solve the real challenges of rural energy services like cooking, water pumping for drinking and irrigation, cottage industries, milling, other livelihood and income generation activities. For example, biomass in the Indian context consists mainly of agricultural residues, like rice, coffee



husk, bagasse etc which is difficult to handle and transport. The government energy policies do not take into account ways by which such valuable resource could be used for making briquettes which can replace traditional fuel wood thereby enabling efficient and clean cooking in households as well as cottage industries. In other words, the energy programmes have a narrow focus restricted to providing electricity for 'increasing access', but do not provide solutions to the basic energy needs for poverty alleviation.



Scope for promoting decentralised renewable energy systems is enormous

Considering the fact that even after 60 years of independence we have not been able to reach about half the households with basic electricity, the canvass for encouraging, facilitating and investing in small decentralised renewable energy systems is an opportunity that we cannot afford to miss. Particularly in the context of fast increasing emission levels of India, those who have little access to energy should be a priority concern of the Government.

Also climatic factors present a huge opportunity for India to excel in local renewable technologies. For instance approximately 300 sunny days annually favour the development and use of solar. Moreover, investing in decentralised energy options is likely to be more effective in the long run from various perspectives as revealed in the various case studies in the document.

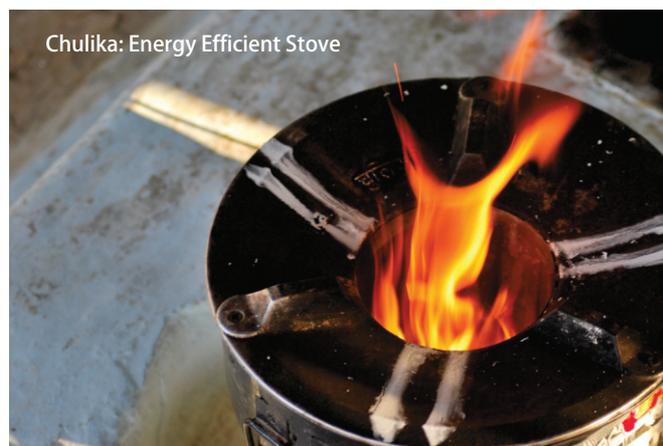
Summary of Insights from Case Studies

Each of the case studies demonstrate the operational feasibility of grassroots options, which play a mitigative role even while they ensure development of communities. Several of these projects have entered the carbon market, which allows a gateway for effective use of a global market instrument in favour of the poor. This is not to say that the poor should bear the responsibility of reducing their emissions (which are mostly survival emissions), but to present a models where the notion of 'development' is being defined through a low carbon pathway.

The **Hydro** projects undertaken, due to their smallness of scale, are recommended in remote areas, where perennial sources of water are available, although the technology aspects need to be tried and tested for their sustainability. These projects are outside the grid outreach and offer us insights into an approach, where water is abundant. Compare these initiatives to the micro hydros promoted by some of the State governments where the electricity produced goes to the grid, which is centrally controlled and managed, leaving the community with an asset which is of little use to them, because they are left without access to electricity!

The **Biogas project** was one of the first of its kind to enter the carbon market and lead the way for the promotion of low carbon development projects which benefit the poor. Biogas projects are especially useful in places, where dung is easily available and where the practice of stall feeding prevails. However, there are various other models which have been tried to produce gas based on a mix of household and crop waste. There is a huge potential to promote research and development and create opportunities to upscale such efforts.

The **Chulika cook-stove** project has been certified by the Central Power Research Institute as being 30.8% thermal efficient as against traditional cook-stoves, which are around 10% efficient, and consume 50% more fuel wood. The Chulika became affordable because of the resources generated through the CDM such that 43,000



households will be covered ensuring a savings of 86,000 tonnes of emissions per year. Hence the importance of CDMs for pro poor projects and the need to create conditions for access of CDMs to marginalized communities for sustainable development.

The lesson that we learn from the **Solar** project initiative where women in Jharkhand, were enabled to promote solar lanterns by way of an enterprise is that the promotion of such a project has empowered the rural women of self-help group members' in new entrepreneurial skills. Today various models of solar lanterns are available in the market and as the demand for solar lanterns increases so does the price reduce. In off grid areas solar lanterns are indeed considered as god sent by remote communities, who are willing to contribute substantively to own such a product. What is needed is proactive action by the government to subsidise such initiatives for effective promotion.

In the **Cluster Approach** project the effort has been to outreach a geographical cluster of a group of villages with a combination of renewable technologies to ensure energy access in an efficient and sustainable manner strengthened by encouraging sustainable agriculture practices. The vision of this project is to ultimately create demonstrative clusters with multiple renewable technologies combined with sustainable adaptive mechanisms in the long run. Such projects enable communities to meet their energy requirements through need based choices in a comprehensive manner facilitating long term planning processes to meet their livelihood needs.



This **Afforestation/Reforestation** project demonstrates how agro forestry, comprising locally viable and useful species can be of direct benefit to local communities even while the trees play a role of sequestration. Compare this with 'Energy Plantations' mainly mono-culture plantations of quick growing fuel wood to meet 'energy' needs of corporate at the expense of the needs of local communities and original indigenous forest species. With increasing pressure on depleting forests, alternative sustainable approaches are needed to keep pace with the growing demand for fuel wood. Hence planted forests, established through afforestation or reforestation, have a particularly important role to play in providing a renewable and environmentally friendly energy resource if managed responsibly.

The **Low Carbon Farming** project offers farmers the opportunity to capitalize on the carbon market, as they shift to agricultural methods that are more sustainable, involving lower input costs that result in reduction and sequestration (improved soil carbon content) of carbon emissions in the process. The case study



demonstrates this in real terms also pointing to a significant reduction in agriculture related emissions. This is significant considering that in India farming contributes 28% to the national GHG emissions.

The **Waste Management** project demonstrates the value of rag pickers 'as carbon assets' as they are negating our carbon footprint by collecting and segregating garbage at source, thereby reducing the amount of garbage that goes to the landfills. In fact, rag pickers represent a huge opportunity to reduce greenhouse gas emissions. Considering that in India we do not have a good waste management policy, almost all the waste ends up in landfills, with negligible recycling. Methane emissions from waste in landfills contribute 3% of the total GHG inventory in India. Hence, this project highlights the need to encourage such initiatives, which are doing a service to society especially in the context of their contribution to contain GHGs. It is important to acknowledge the positive role of the rag pickers and integrate them in the solid waste management chain.

Call to the Government of India - A Charter for Change

It is our appeal, to the Government of India to take note of these examples in developing coherent energy and climate policies that are inclusive of chronically impoverished segments of our society and community which would enable better and equitable access to energy while continuing transition towards a low carbon development path. We do believe that the time has come to ensure sustainable development with farsighted leadership for the wellbeing of an inclusive future.

Energy access should be integrated with livelihood enhancement and poverty alleviation leading to overall growth and development. Energy access to the poor goes beyond electricity and goes well beyond the current definition used by the Indian government, which talks of one light per household. The strategy should also address all energy needs for livelihoods and production: heating and lighting requirements of the poor as well as requirements relating to

Conclusive Overview and the Way Forward

livelihoods, micro-enterprises, transport and sustainable farming practices. In this context the Government of India is called upon to transfer subsidy advantages to the Renewable Energy Power Generation Projects from fossil fuel projects for rapid energy transition. The technology options should be based on economic viability and adaptability to community contexts.

Planning has consistently been driven from the top which has led to service delivery failures. Stress should be given to bottom up energy planning which caters to the needs of people. The bottom up strategy is equitable, inclusive and supports the needs of people.



More specifically, a shift in paradigm in government policies therefore must entail:

- ★ **A moratorium on financing large thermal power projects that add little value to electricity access for the poor;**
- ★ **Facilitating and Up-scaling community owned and managed energy systems using locally available sources of energy like micro-hydros, solar, bio-gas, fuel efficient stoves, etc., across all regions of the country rather than large centralised systems which aggravate displacement;**
- ★ **Facilitating agro forestry in afforestation, as it secures food and livelihood requirements of the communities rather than mono culture plantations by private companies;**
- ★ **Encouraging sustainable agricultural practices such as low carbon farming rather than energy intensive agriculture involving a high degree of CO2 emissions from chemical fertilisers and pesticides;**
- ★ **Supporting and promoting skills of youth at the grassroots as energy service providers to enable the development of a green economy;**
- ★ **Creating conditions to upscale small and people friendly carbon based models to support the sustainable development needs of grassroots communities;**
- ★ **Ensuring that the 'sustainable development objective' of industries who take up CDM projects is monitored effectively; and**
- ★ **Placing communities at the center of climate change mitigation and adaptation policies, especially women such that their experiences, knowledge and vision are factored in national climate change plans.**



ACKNOWLEDGEMENT

We would like to express our gratitude to all those who made this study possible.

We thank IRDWSI, ADATS, SACRED, Laya, Accion Fraternal Ecology Centre, Samuha, SWaCH, LGSS for their support in local data collection, logistics, organising community meetings and interviews.

Our deepest gratitude to all the community representatives for sharing their experience with us.

And finally, our gratitude to ICCO and EED for supporting this study and publication.

If you would like to **learn, share, volunteer, donate or get in touch**, then please write to us at

inecc.mumbai@gmail.com / layarc@gmail.com

Indian Network on Ethics and Climate Change, c/o Laya, 501, Kurupam Castle, East Point Colony, Visakhapatnam, Andhra Pradesh, India - 530017
Tel: +91 891 2548071, +91 891 2735332

