

# Eco-village Development as Climate Solution

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## **Executive Summary**

More than half of the South Asian population of 1.7 billion people live in rural areas and many of the poverty problems of the region are in the villages. Sustainable development in the villages has the potential to enhance the living conditions and to reduce rural-distress & poverty-induced migration to cities. To develop villages in sustainable ways, a number of issues need to be addressed and adequate solutions supported. This includes effects and impacts of climate change on agriculture and water resources, energy access, sanitation and safe drinking water, access to information, improved health, and others. When the solutions are mitigating and adapting climate change impacts, reducing poverty using green, sustainable and local solutions they are effectively leading to "Eco-Village Development" (EVD) that will enhance rural livelihood.

The key to successful application of these local solutions include mobilization of resources and finance, supporting policies, capacity building, training, quality control and involvement of civil society. Supportive policies for these local solutions include directing subsidies to energy access instead of to fossil fuels; financing for up-front cost that are often higher for the local EVD-solutions, even when they are cost-effective; support for technical development and quality control; policy coordination; and involvement of civil society.

International cooperation is also important for large-scale success with local solutions, including climate funding for EVD and other local solutions to be included in a short term "Leapfrog Fund" and in a long-term climate agreement. Additionally the UNFCCC climate-technology mechanism could contribute with exchange of knowledge, experience, and technologies, as well as adaptations to the specific conditions.

## **Existing Challenges & Alternatives**

In the South Asia countries, poor people struggle for access to energy, sanitation & drinking water, good nutrition and health, out of which several live in villages or have migrated to cities still maintaining linkages to their villages. There are issues identified with centralised solutions development model in the past decades requiring an alternative approach to fast-track poverty alleviation with co-benefits for climate.

Issues with Centralised Solutions: In many cases the centralised solutions are not efficiently supporting the local development. Often rural grid electrification does not provide stable electricity supply everywhere, limiting the possibility for commercial uses, healthcare or stable lighting for homes and streets. Moreover, the geographical terrain pose additional hurdle to develop grid electrification in parts of rural South Asia. Often cooking with LPG is not affordable and then villagers have to return to unsustainable use of burning cow-dung cakes or wood in inefficient cooking stoves. The centralised energy solutions, such as coal power, also come with increased emissions.





Decentralised Eco-village solutions: A long range of proven decentralised solutions exist that has contributed in development of village with better use of local resources and with very low emissions. These solutions can overcome the problems of unstable supply and affordability that come with the centralised solutions. In specific cases these local, sustainable solutions have shown their value for millions of people in South Asia, such as improved cookstoves, solar (PV) home systems, family biogas plants, improved water mill and micro hydro for electricity.



Lack of Policy Support to Eco-solutions: In spite of these large-scale successes the prevailing development strategies in the South Asian countries are still focussing on the centralised solutions. In the past 15 years of Millennium Development Goals (MDG) campaign to eradicate poverty; this has been a huge missed opportunity for South Asia to reduce poverty in sustainable ways and with lesser greenhouse gas (GHG) emissions.



Access to finance: Rural areas generally lack facility of financing institutes. Financial inclusiveness is difficult for pro-poor, remote and rural areas. For the pro-poor communities, the criteria for accessing loan should be different to that of people living in cities where the financing institutes are nearby. For rural areas, the concept of micro-financing with innovative financing model has to be introduced in the communities in order to increase the access to sustainable solutions to develop their villages. Reform in financing modality can improve the access to sustainable solutions in many rural parts of South Asia.



Climate change and resource depletion: Most of the rural communities in South Asian region belong to farming communities. They are vulnerable to the effects of climate change and resource depletion such as erratic rainfall, depletion of water resources and reduced productivity of farmland. Agro-practices which include cultivation of food and cash crops are dependent on monsoon rain therefore erratic rainfall pattern inhibits growth and commercial production of cereal crops. Farmers therefore are at high risk of losing their income source impacting their livelihood. Due to reduced productivity from the farmlands, the farmer families are shifting their livelihood and many are migrating to cities. Since most of the South Asian countries economy is dependent on agriculture, this trend will hamper growth of the region. The problems can be addressed with intrusion of knowledge on modern and climate friendly, organic agro-practices, integration of micro-irrigation system with appropriate renewable technologies that can improved access to water for irrigation purpose.



For these reasons, we want to increase the focus on local, Eco-Village Development (EVD) solutions, in particular for villages where centralised solutions are unavailable, unreliable, and/or unaffordable. Local EVD solutions must be in focus in the national and regional policies of South Asia as well as on the international agenda.



## *Key to Success of Eco-Local Development*

Successful dissemination of thousands or even millions of sustainable energy installations shows that the barriers can be overcome. The key to overcoming barriers and to successful application of local solutions to enhance development with poverty reduction include:

- **Resources** including finance, tax incentives, subsidies, technical staff for local solutions - subsidies from fossil fuels must be shifted to energy access through local solutions.
- **Policy & communication support** to local solutions by governments and by the international society
- **Exchange of knowledge**, insights from experiences, and technologies must be promoted along with training, to women particularly who are the actually engaged at the ground level as users that need practical, implementable local solutions. There should also be provisions for availability of spare parts and maintenance.
- **Quality** of products must be sufficiently high.
- **Civil society organisations** must be **involved** to bring in their experiences and use their capacities to disseminate solutions. Civil society can also help to ensure transparency and improve outreach to, for instance, women and poor people.

## *Supportive Policy Frameworks*

Development to reduce poverty based on local EVD solutions will require concerted actions at policy level. Some of the policy issues to be addressed to allow development with EVD solutions are:

- **Subsidy and policy reform:** Subsidies to fossil-fuels and for grid extension are far higher than public financial and technical support for local, sustainable solutions. A subsidy & policy regime reform is important to encourage uptake of EVD solutions.
- **Financing the up-front costs of installation, training and spare parts:** Even though some local solutions are cost-effective compared with centralised solutions, many poor people cannot afford the up-front cost of installation, spare parts, and training, which is in some cases higher than that of the central alternative, in particular when the latter is subsidised. Financing mechanisms and, in some cases subsidies, typically are needed for large-scale success of local solutions.
- **Financial Support for South-South partnership to transfer appropriate technologies**
- **Financial support for technology development & quality control:** Even though the local sustainable solutions have successfully existed for a few decades, these solutions are still developing fast. With adequate financing such technological developments open up new local solutions that were not feasible as drivers for development earlier. There is also a need for continued quality control, also of more mature solutions.
- **Cross-sector policy coordination:** There is a need for coherence amongst various laws and policies as well as for coordination amongst various ministries and departments relevant for rural areas administration and development;
- **Engaging all parts of the civil society:** There is a need for open & transparent policy frameworks encouraging civil society engagement for wider dissemination of solutions as well as solution to ground challenges.
- **Mainstreaming gender:** Gender issues and equity need to be incorporated in all development sectors and the policy frameworks to be developed for sustainable development of rural villages.

## ***Importance of International Cooperation***

While national and sub-national development programmes must address policy issues to successfully promote development with local solutions, international cooperation is also important for large-scale success.

Climate funding can provide some of the resources for EVD and other local solutions with low greenhouse gas emissions. This should be a priority in the Paris agreement and other outcome of COP21, while it should also be prioritised in existing international assistance (official development assistance, ODA). In the short term a ‘Leapfrog Fund’ should be established from global mitigation finance to support South Asia in moving towards a low-carbon economy, with focus on EVD solutions.

The UNFCCC climate-technology mechanism could contribute additionally to the facilitation of the exchange of knowledge, experience, and technologies. This must include solutions from the North as well from the South. It should also support possible improvements, adaptations, and optimisations of technologies and solutions to the specific national or, eventually, local conditions.



### **Improved Cookstoves**

Improved cooking stoves (ICS) can reduce wood use by about 50%, and in places where use of biomass as fuel is a major contributor to greenhouse-gas emissions, increased cooking efficiency is key to reducing CO<sub>2</sub> emissions. Improved stoves also emit a considerably lower volume of particulates than traditional cooking fires. Around mountain areas with glaciers, their use reduces deposits of black soot from cooking smoke on the ice, another distinct contributor to climate change.

**In Nepal**, Center for Rural Technology, Nepal (CRT/N) has contributed in the promotion of about 281,668 ICS (approx 30% of the total number of ICS disseminated in Nepal). With support from government and other national and international development organisations, CRT/N has contributed in strengthening the capacity of Local Partner Organizations (LPOs), Stove Promoters and Users for nation wide dissemination of different model of ICS. Additional 60,300 and 4,500 ICS including portable ICS, has been disseminated under supervision of CRT/N through the Improved Cooking Stove Carbon Financing Program supported by SNV and Women Economic Empowerment Nepal (WEE-Nepal) supported by ENERGIA. These initiatives have been contributing in Nepal’s national agenda of “clean cooking solution for all by 2017.



**In Sri Lanka**, the stove programme stands out as a large-scale success in reducing biomass use with improved cookstoves. Today the stove dissemination is fully commercialised and about 400,000 stoves are produced annually by 185 rural potter families and sold via a network of private traders and sellers dispersed throughout the country. This reduces greenhouse gas emission around 1 mill. tons of CO<sub>2</sub>-equivalents/year, equal to a about 8% of Sri Lankan CO<sub>2</sub>-emissions from fossil fuel use. External support and consistent efforts of key NGOs and institutions over many years has lead to this remarkable result.



### **Solar Electricity**

Solar electricity can replace kerosene used for light. It also can replace diesel to power, e.g., pumps, and agricultural machines. In countries where central power supply is based on fossil fuel, especially in the case of coal, solar electricity will also reduce CO<sub>2</sub> emissions substantially compared with grid connection.

**In Bangladesh** Grameen Shakti (GS) has achieved a milestone by improving the rural livelihood through access to green energy. More than 1.5 million solar home systems have been installed through its micro-credit system. Around 10 million people are getting benefit from the systems, and over 350,000 tonnes of CO<sub>2</sub> are saved each year because of this.



### **Improved Water Mill (IWM) and Small Scale Hydropower**

**Nepal** has a tradition of water mills, and based on this tradition appropriate technology in the form of improved water mills (IWM) were developed which increased the efficiency and output compared with the traditional water mills. IWM projects have given opportunity of employment generation within the country for IWM kit manufacturing company, service centers based in the districts and the beneficiary communities. IWM can grind grain faster than traditional water mills and can also be used for various purposes like partial polishing of rice husk, expel oil from oil seeds, and generation of electricity (1-3 kW).

Availability of IWM services in the locality helps to increase in resilience of the community and also reducing the drudgery, especially of the women and girl children. IWM has displaced diesel driven agro-processing system over the years, contributing in reducing GHG emission. IWMs can reduce emission by 3 - 4.5 ton CO<sub>2</sub>e/unit/year by replacing diesel-driven machinery. Till July 2014, 10,633 units of IWM has been installed in Nepal. Approximately 80% of total IWM have been installed by Center for Rural Technology, Nepal.

Nepal has utilized its water resource to develop pico-, micro-, and mini-hydro plants. As of July 2012, 2,963 units of pico-, micro and mini hydro plants have been installed in Nepal generating a combined 47.6 MW power. Since 2012, through NRREP program of AEPC additional 6.2 MW power has further been generated. The productive use of energy generated from small hydro has given the opportunities of employment and additional income to the rural people through use of power for lighting and other productive applications.

### **Combined the solutions: Eco-Village Developments**



**In India** several organisations are combining local solutions into sustainable "eco-village developments", among others based on the successes with millions of family-size biogas plants now used in India.

One example is a renewable energy-based eco-village development project, which is a joint effort of WAFD (Women's Action For Development) and INSEDA (Integrated Sustainable Energy and Ecological Development Association) to demonstrate how several of such local solutions can enhance development.

Among the solutions are biogas plants, bamboo building materials, solar drying, composting, organic gardening and rain-water collection. In these projects focus are on the how the development process, assisted by the capacity-building of 'end users', makes these interventions sustainable and enduring even after the withdrawal of the national organisations at the conclusion of the project period. This capacity building helps receptive communities to develop their villages into eco-villages and to evolve their own responses to climate change and development-challenges.

*This paper is based on the first findings within the Project "Evidence based advocacy for low-carbon, pro-poor sustainable "Eco-Village Development "(EVD) in South Asia".*

*Read more about the Project and the Project partners in South Asia at*

[www.inforse.org/asia](http://www.inforse.org/asia), [www.dib.dk/sydasiens/](http://www.dib.dk/sydasiens/) [www.cansouthasia.net](http://www.cansouthasia.net) .

*Proceedings of the INFORSE Side Event of the UNFCCC COP21 in Paris, where this policy brief was launched on December 3, 2015: [www.inforse.org/europe/conf15\\_COP21.htm](http://www.inforse.org/europe/conf15_COP21.htm)*



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*Contact Person: Gunnar Boye Olesen (INFORSE), T: +45 86227000, E [ove@inforse.org](mailto:ove@inforse.org)*