

Evidence Based Advocacy for Low-Carbon, Pro-Poor Sustainable Eco-Village Development



Success Stories from EVD project

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Background

The concept of “Eco-Village” for country like Nepal is very relevant when we envisage impacts of climate change on small mountainous country. Nepal is not obliged to reduce the emission of GHGs since Nepal contributes only about 0.027 percent in total global emissions of GHGs. Yet the impact of global emission resulting in climate change is affecting geographically and ecologically fragile landscapes such as Nepal where livelihoods are extremely sensitive to climate variances. Given that about 82 percent Nepalese are residing in rural parts or vulnerable zones of the country, the climate change impacts are likely to be more severe for Nepal. Moreover, majority of poor population and communities inhabits the rural Nepal. About 25 percent of the population is still below the poverty line. Major chunk of this population resides in rural sector of the country. These poorest groups of rural Nepal are most vulnerable to the effects of climate change. Difficulties to ensure food security, lack of access to energy and deprivation of information and knowledge makes these poor groups of people more susceptible to climate related impacts. All these problems have resulted in employment-based migration from rural Nepal to urban cities or foreign countries. Livelihood opportunities in rural Nepal are gradually diminishing. The development activities in rural Nepal are hardly gaining the desired pace.

In this context, for maximum utilization of local resources, labor and by deploying local knowledge and capacity and identifying effective environment friendly alternative for livelihood enhancement and to implement such concept in actual life, “Eco-Village Development” Concept has been developed. Under this, there is an integrated approach like utilizing easily available renewable energy, soil and climate friendly agriculture, forest, and environment conservation, sanitation and waste management along with local capacity building for productive outcomes. This concept bring the deprived community specially women and poor group to the mainstreaming and develop them socially and economically for empowerment and give priority to equal gender participation.

Centre for Rural Technology, Nepal (CRT/N) in collaboration and cooperation with District Development Committee (DDC), Kavre, Ghatta Dhani Sanngh; Kavre, and as local partner organization, Agricultural Development Office; Kavre, concerned line agencies and respective Village Development Committees and other organizations has been implementing “EVD” program in three villages namely Chyamrangbesi, Dhungharkha and Chalal Ganesthan of Kavre district. This publication tries to comprise the success story and positive impact on the livelihood of people from project after implementing EVD project in these 3 villages.

Solutions for Eco-Village Development

1. Improved Cookstove for Household use (CRT/N-Ben-2)
2. Two pot hole mud stove with chimney
3. Household Solar lighting system
4. Repair and maintenance of Bio-gas plant and management of bio-slurry
5. Improved Water Mill
6. Water turbine for grinding, expelling and processing
7. Rainwater Harvesting and use
8. Hydraulic Ram Pump for lifting water
9. Plastic Tunnel for off-season vegetable farming and organic farming
10. Micro Irrigation techniques (Drip Irrigation and Sprinkler Irrigation)
11. Cow shed management and preparation and use of organic pesticide
12. Fruit and ornamental plant plantation
13. Use of waste water and fish pond
14. Waste management (liquid and decomposable solid waste)

Hard working Farmer Bir Bahadur Tamang and his son Sumit

Bir Bahadur Tamang, is a resident of Sikrigyang-9, Chalal Ganesthan VDC, Kavrepalanchowk District. At the age of 60, his family depends on subsistence farming for living, which barely helps them make the ends meet. Mr. Tamang reports that the production from farming has been decreasing compared to the last few years, which has made it more difficult to feed the family. He reports a lack of water resources as major reason behind decrease in crop yield. This has been one of the major underlying factors for his youngest son to migrate abroad for employment, in hope to improve family income.

With an on-set of the Eco-Village Development project, Bir Bahadur got opportunities to gain knowledge on various solutions that could contribute to enhancing his livelihood. With raised awareness regarding renewable energy, climate change adaptation and mitigation measures, Bir Bahadur was able to efficiently use local resources in climate-friendly way to improve his livelihood. He also encouraged his son, Sumit Tamang, to take part in a capacity building training on tunnel-based farming process for cultivating off-season tomatoes and on safe food production through a gradual transition from chemical-based to organic farming.



Mr. Bir Bahadur Tamang (right) and Mr. Sumit Tamang (left) with their plastic tunnel

After taking the capacity building training, Sumit built plastic tunnel houses using locally available materials and simultaneously started a nursery to produce tomato seedlings. Prior to this, nursery was completely a new idea to finalthe villagers. Farmers would generally buy seedlings from the market. After a nursery was set up, Sumit and his father shared some of their seedlings with their neighbours in order to encourage fellow villagers to be involved in commercial farming practices. While the family invested on the locally available resources like bamboos and rope to build tunnel



Local production of tomato seedlings

houses, the project provided fund to purchase the plastic (12x6 meters). With rejuvenated desire to make money via climate resilient agro-practices, Sumit planted 100 seedlings of tomato species inside the plastic tunnel to protect it from excessive rain during the monsoon. Sumit reported that starting from August 2016, he has been able to harvest tomatoes worth NRs. 50/kg. He expressed his elation at being able to sell his agro-produce at good rate. He reported that he earned NRs. 15,000 from the first harvest produced from the first batch of seedlings he had grown in the tunnel house. He also mentioned that he distributed some (worth about NRs. 5000) of his first harvest among his friends and relatives. Sumit and his

father have been thoroughly encouraged by the returns they got from their hard work. As a result, they have started growing the second batch of seedlings and are constructing one more plastic tunnel house to expand their production of off-season tomatoes.



Plastic Tunnel under construction (left) and tomato production from the tunnel (right)

They also planted some off-season vegetables like cucumber in their kitchen garden to see if it grows outside the plastic tunnel or not. The production was just enough for their own consumption. They are planning to grow more next year, and are hoping to earn money from it as well. They are also growing a high value ornamental plant called "*Bodhichitta*" in their kitchen garden. He purchased 5 seeds at NRs. 500 per piece. This plant generally produces fruit after three years of planting and its fruit is considered sacred among the Buddhist community.



Using used water in kitchen garden using sprinkler irrigation system (left) and decomposing household waste to prepare compost in pit (right)

The Tamang family has also been producing organic fertilizer using a composting pit method that they learned about at the capacity building programme organized within the EVD project. They have been using the fertilizer generated from this method on their kitchen garden and plastic tunnel house. Similarly, the family has also dug small pit in their backyard in order to collect water used for washing hands and utensils. This was done with an intention of re-using the water to irrigate kitchen garden and plastic tunnel house. This has helped in making their surrounding clean and favourable for his bee farm. Last year, he earned about NRs. 60,000 by selling honey and he is expecting more than that this year. Since people come to his house to buy honey at NRs. 600 per kg, he does not need to go to market to sell honey.

Taking Benefit from Rain Water Harvesting- Rupa Tamang

Rupa Tamang is an active member and a Joint Secretary of “Shree Ganesh Paurakhi Krisak Samuha” of Chahal Ganesthan VDC, Ward No. 9 Sikrighyang. This organization is a local partner organization of CRT/N for implementing EVD project in Sikrighyang village. Under this project, consumers were allowed to choose from several of EVD solutions such as plastic pond and tank to collect waste water and rain water; seasonal/off-seasonal vegetable farming, fruit/ vegetable farming; micro-irrigation techniques such as drip irrigation and sprinkler irrigation; plastic tunnel for planting off-seasonal vegetables etc.



Rupa in front of her rain water harvesting system

Among different solutions offered within the EVD Project, Rupa Tamang, chose plastic tank to collect and store rainwater. It is evident that amount of rainfall in the monsoon has decreased over the past few year. This is causing water resource to dry up in many parts of the country. Moreover, devastating earthquake of 2015 disrupted water supply system in many of the affected villages including Rupa's village. As a result, there was an acute shortage of water in the village.



Rain water harvesting set up in the roof of Rupa's house

Plastic tank has enabled Rupa to collect rainwater to fulfil her water requirements at the time of water scarcity. She now has a pipe installed in her temporary shelter that supplies water collected in the plastic tank. Not only that she learned to construct plastic pond from the EVD project, hence she constructed plastic pond and she has been collecting unused water from community water supply in the pond. This stored water is use in the vegetable farming by sprinkler. She is very happy as she now don't have to buy vegetable, instead she is selling it and earning money as well.

Taking Advantage of Waste Water Generated From House- Sovit Man Tamang

Sovit Man Tamang is a farmer from Chahal Ganesthan Ward No. 9. He was worried about the production and income a year ago but now after implementation of this EVD project, the scenario has changed. Until a year ago, he believed that there was no opportunity in the village, but now he sees many opportunities. After adopting EVD solution related to agriculture, within 6 months, he has earned about NRs. 10,000 by selling fruits and vegetables. Until last year, he used to buy and consume these products worth as much. He is also involved in cattle rearing, plantation of high value crops and fruits, production of bio-fertilizers and organic products. He hopes to be able to reap



Happy Sovit Man after receiving plastic tank

economic benefits from these practices as well in the future.

Because of the 2015 earthquake, entire community was destroyed and everyone in the village was worried about the situation. After the intervention of the EVD project, CRT/N and villagers worked together to identify the problem and organize several capacity building activities to address the problem by utilizing locally available resources and livelihood options.

Water scarcity was one of the major problems identified in the village. Therefore, Sovit Man decided to get a plastic tank to collect rainwater and to use it in his farm and other activities. The EVD program provided NRs. 5,000 to his family as a support to purchase plastic drum. He has been collecting rain water and water coming from community water supply in the village.



Sovit Man's wife in front of plastic pond to collect waste water (left) and solid waste turned into organic fertilizer (right)



Vegetables grown by using stored waste water and rain water

He has also constructed a plastic pond, where he collects wastewater from his house. He uses micro irrigation techniques such as sprinkler irrigation to channel this collected water to his vegetable farm and fruit plantation. He reported that with the application of these technologies in his farm, he has raised the yield and also his income by NRs. 30,000 by selling vegetables.

Metallic Stove (CRT/N-Ben-2) Appreciated by Ganga Dahal



Ganga after receiving metallic improved cookstove and a set of pot from VDC representative

Almost all houses in the village were damaged, following the earthquake. Building regular fixed-type traditional stove (made of earth) was not possible due to a lack of safe and permanent place to live in and, the uncertainty that lingered in the form of aftershocks. The portable ICS became the most appropriate cooking technology when the entire village was living in temporary shelters. But villagers were sceptical about its ability to fulfil their needs the same way as traditional cookstove did. As soon as they received the improved stove, they tried by lighting it and got better result than was expected. The stove largely reduced fuel



Villagers trying ICS for the first time

wood collection. Other benefit of ICS, as she says is, it is easy to move the stove around as per her need and is easy to use. Although she also owns LPG stove, its use has been kept minimum and her expenses per month on LPG has also reduced. In her hotel, she uses LPG only for emergencies and at the times when they have many guests. Otherwise, ICS is her primary cooking device.

Ganga Dahal is a permanent resident of Chyamrangbesi VDC Ward no. 2, and lives in a family of five consisting of her husband, two children and a mother-in-law. Her husband works as a teacher. The family runs a small hotel in the village. The earthquake of 2015 has badly affected her house and the entire village. During this time, realizing the urgent need of the community, EVD project team from CRT/N in collaboration with "Machhapuchre Football Club" from Sydney, Australia distributed metallic improved cookstove (CRT/N-Ben-2) and 2 sets of pots to each family in the village.



Ganga and other villagers participating during ICS distribution program at village

consumption and smoke emission. Hence, Ganga and others in the village have been using this stove since then. However, they still go back to using traditional cookstove for other purposes such as making animal feed, and for times when they have to cook food in bigger utensils.

Reduced fuel consumption due to ICS was also an added advantage of post earthquake as the cost of firewood around that time was skyrocketing as a result of increased demand. ICS saves about half of the fuel consumption as compared to the traditional cookstove. Ganga shared that she could save around Rs 3,750 per month. It also contributed to forest conservation, saved her time in cooking and fuel



Ganga making food in metallic cookstove



Because of the ease in use, her daughter also uses and helps her while cooking. She wishes women from other rural areas may also get this kind of facility.

Sanukanchhi sees fish farming as alternative income generating opportunity



Sanukanchhi in front of her fish pond

Fifty years old Sanukanchhi is a permanent resident of Chyamrangbesi. In addition to taking care of household chores, she is also actively involved in agricultural activities. Her family consists of her husband and three children. The major source of family income is agriculture. However, over the past few years, due to changing climate leading to declining crop yield and return over investment, she and other members of the village have shifted from traditional agricultural practice to improved agricultural and other income generating opportunities.

CRT/N's EVD team had rounds of discussion with villagers to collaboratively identify several livelihood options that the community could practice within the village through the efficient use of locally available resources. These options are climate-friendly and provided opportunities for villagers to earn income. Among those options, through tap into the abundant water available in the village, fish farming was identified as one of the best options. Along with Sanukanchhi, nine other members of the village chose this option. At the same time, World Food Program was initiating "Food for work" project with an objective to pursue socio-economic development of the village. Villagers cashed on this support to build 10 ponds for fish farming. EVD project provided all required training for fish farming. In order to promote and expand on the climate-friendly livelihood options as per their need and preferences, the EVD project provided a support of NRs. 5,000 to all 45 households. While many of



Sanukanchhi cleaning fish pond

the households used this amount to install solar photovoltaic systems or to construct plastic tunnel for farming, Sanukanchhi and other three families invested their money on fish farming.

All 10 households that constructed fishponds in the village are getting good return on their investment. Sanukanchhi has done a very good job of managing the pond; as a result, her pond is often used as a demonstration pond. Several government and non-government organizations from district have already visited her village to see her fishpond.

The pond was constructed about a year ago. It is 5.5 m wide and 2 m high (water level is up to 1.2 m). It costs her about NRs. 30,000 to construct the pond as per the prescribed norms, including equipment cost, material cost and skilled and unskilled labour cost. Initially, about 500 Common carp and Grass carp species of fish worth NRs. 700 were released in the pond.



Officers from government and non-government organization observing Sanukanchhi's fishpond



Growing fish in Sanukanchhi's fish pond



These fish species were new in the village. When fish are ready for harvesting, her family consumes some and sell the rest at local markets. Previously, they would spend about NRs. 25,000 annually on fish and other meat items. After constructing fishpond, she does not only save money but also has additional income from selling fish. She earns about Rs. 10,000 every year by selling approximately 20 kgs of fish, at the rate of NRs 500 per kg.

For fish food and other requirements, she spends about NRs. 1,000 per month. This is the first attempt at fish farming in the village. Therefore, they often invite fish experts for necessary counselling.



Happy Sanukanchhi and her husband Ganga lal with their vegetable farming and fish pond

The initiative that Sanukanchhi took to adapt to the change in climate and to the new environment by using local resources has set an example for everyone. The support from her family members has also been appreciable from the beginning.

Solar Light has helped to improve study for Roshan Dahal

Roshan Dahal, is a son of a permanent resident of Chyamrangbesi Ward No. 2 Bhim Prasad Dahal. Fourteen years old Roshan is a student in grade nine in Shree Chakreshor Higher Secondary School. His parents are farmers, and always remain busy in their farm. So most of the time, Roshan and his sister look after their household chores.



Roshan under the solar light

Roshan's everyday routine is to do his homework, then prepare lunch and eat and go to school with his sister. The

kitchen setting is kind of dark as there is no window to let the sunlight in. This setting used to be particularly problematic when they used traditional cookstove characterized by high emission and low fuel efficiency.



Roshan preparing tea in biogas

Few years ago, his father installed biogas in their house, which has made his life much easier as he does not have to cook in smoke anymore. However, it is still dark and uncomfortable to work in the kitchen, particularly during the time of load shedding. A lack of power in the night time

also impeded their daily activities and education. He used to request his father to bring home an alternative lighting source but due to poor economic condition, his father was unable to do so.

CRT/N's EVD project helped Roshan and his family to own a household solar lighting system by providing necessary information and some monetary support. His family has installed 20 watt solar system worth NRs. 9,000 in their home, out of which, Roshan's family paid NRs. 4,000 out of their pocket and received a financial support from the project worth NRs. 5,000.



Solar Light



Roshan and his sister studying under solar light

Roshan even mentioned that their grade in school has improved since last year because of their hard work and the conducive environment that solar light has created for them to study during the night time. His father expressed his happiness and informed that they have invested on the right thing. He also added that due to solar, now they can charge their mobile any time, can look after and feed cattle easily; in overall, household work has become a lot easier after their adoption of this technology. They thanked CRT/N for providing right information and right technology at the right time.

Jeet Bahadur's experience with Improved Water Mill

Jeet Bahadur Shrestha is an 89 years old resident from Ladku village of Kavre district. Despite of his old age, he is as actively involved in farming as done by other members of his family. Farming and the operation of water mill have been his family's occupation for generations. He says, 'Until 15 years ago, since we did not have any modern technologies available in the village, we would rely on traditional water mill to grind grains such as corn, millet, buckwheat, wheat, barley etc.' Traditional water mills consist of shaft and blade both made from wood, and uses kinetic force generated by water dropped from about 2.5



Jeet Bahadur Shrestha in front of his water mill



Grinding grains for customer

with an IWM. While the traditional water mill used wooden chute to support water flow, the IWM uses polyethene pipe with a nozzle attached to it at the outlet. Instead of wooden shaft and blade, the IWM uses the ones made of iron. This transformation has brought a significant improvement in Shrestha's water mill-related work efficiency. The improved technology can now grind about 30 kgs per hour of grain as opposed to 7 kgs by the old

meters high. These seemingly awkward technologies were time and resource intensive. Villagers had to wait for hours to grind a couple of kilograms of grains. Operation of traditional water mill required abundant water flow, which is why these technologies had to be installed far away from the village.

Since the implementation of Improved Water Mill (IWM) Programme about 13 years ago, with technical support from Centre for Rural Technology, Nepal, Jeet Bahadur has replaced his traditional mill



Madhav Raj Timilsena visiting Jeet Bahadur's mill for grinding

technology. This estimate suggests that the same amount of work that took all day with the traditional water mill, now takes just 2-3 hours with the IWM. This has greatly saved Jeet Bahadur and his consumers' time, and has improved his income. He has been using the saved time on other income-generating activities.

When asked if he knows when they started using traditional water mill, he says 'We have been using it for as long as I can remember. However, in the recent times, beside IWM, diesel-run and electric mills are also in use. Yet, majority of consumers generally prefer IWM because (according to consumers) grains ground using Improved water mill do not warm in the process which saves them from going bad, and the taste and nutrition in the flour remain intact. Diesel-run and electric mills warm the flour in the process causing the flour to go bad quicker than the flour produced using IWM. When asked about the evidence of these claims, a resident of Bojaghari, Dhungharka -2, Madhav Raj Timilsina says, 'We feed on flour produced from water mill which is why even at the age of 80, we can carry loads, (laughter) ... otherwise, our sons would have celebrated my 10-15th death anniversaries by now!'

In addition to differences in taste and quality, consumers claim that, service charge for grinding also varies a lot depending on the technologies used. According to them, for every 70 kgs of grains ground in IWM, consumers pay in grains worth NRs. 125. Conversely, for the same amount of grains, they pay about Rs. 250 for grinding service provided by diesel-run and electric mills.



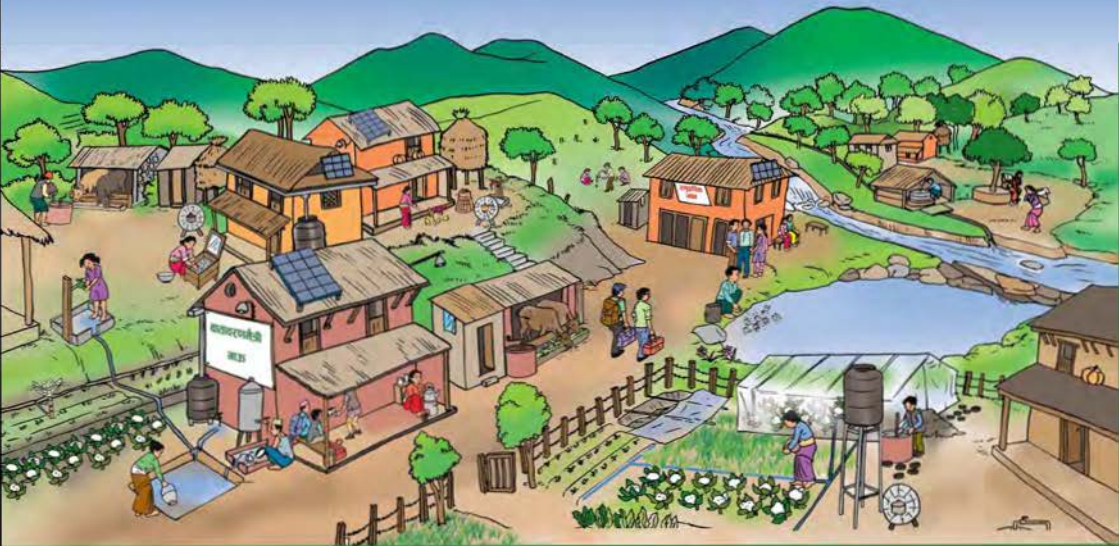
Madhav Raj Timilsena grinding his grain (left) and returning back after his work done (right)

There are about five other mills in and around Jeets Bahadur's village. Since there are just so much consumers in the village, his mill operates for only 15-20 days a month. When the mill is operational, IWM grinds about one quintal of grains, which earns him about Rs. 250 worth of grains and cash. In addition, since the operation of IWM does not require a lot of labor, this has become a suitable occupation and source of income for old Jeet Bahadur.

In collaboration and coordination with:
District Development Committee, Kavre
Ghatta Owner Association, Kavre

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MODEL ECO VILLAGE



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