Best Practices

of communities affected by disasters
In Bangladesh, India and Nepal

Collected and Documented by

Cordaid

Cordaid, Netherlands

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Concern Universal - Bangladesh

"Capacity Strengthening on CMDRR & Climate Change Adaptation" project
is being implemented in partnership with 67 NGOs
in Bangladesh, India (West Bengal, Assam & Meghalaya) and Nepal
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Researchers
Sabrin Sultana
Kanika Chakraborty
Michael Chew
Masud Rana
Abdul Hamid

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For more information, please contact:
Abdul Hamid
Head - Organisational Development and Education
Concern Universal-Bangladesh
House - 8 (4th & 5th floor), Road - 28, Block -K, Banani, Dhaka - 1213, Bangladesh.
Cell: + 88 - 01712-058629, Tel: + 88 - 02 - 8855296, Ext - 117, Fax: + 88 - 02 - 9883267
www.concern-universal.org.bd

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Preface

Concern Universal - Bangladesh (CUB) is an international NGO based in the UK, working in Bangladesh since 1993. Under the "Capacity Strengthening on Community Managed Disaster Risk Reduction and Climate Change Adaptation" project, CUB is building the capacity of 67 NGOs in Bangladesh, India and Nepal with the financial support of Cordaid (Netherlands).

All disasters are local and unpredictable, and no one is ever fully prepared. Local communities are on the frontlines of both the immediate impact of a disaster and the initial emergency response. Therefore, we must focus our energy on improving local communities' resilience to natural hazards. Communities are the essential cornerstone in our capacity building effort for saving their lives and livelihoods.

So often marginalized people are thought of as passive victims of circumstance, whether in economic deprivation, or in the crisis of natural disasters. However it is these communities who have not only survived these adverse conditions for generations, but have learnt and acquired resilience doing so. The project builds on this local resilience, supporting communities to self-organise and be active agents for positive change. Education is vital, as is the sharing of experience within and among communities. We need to listen and learn from the grassroots - so that we can build upon examples of risk reduction that have been tried and tested in the crucible of local experience.

The project has been identifying and documenting the best practices from the communities with that purpose in mind. They represent a whole range of activities, from coming directly from the community to those facilitated through NGOs. Behind each is a story of hope in the face of adversity. We hope these stories will educate and inspire further practical efforts at the community level while contributing to the overall global "movement" for disaster risk reduction and community based adaptation.

We are obliged and thankful to our partner NGOs, especially those who have provided us with information and given us opportunities to identify and document these best practices from their communities. Above all we are grateful to the communities behind the case studies who have been so generous with their time. The process of documenting the best practices will continue till the end of the project period (December 2011). Beyond this CUB will be compiling a Best Practices Handbook with accompanying video documentation. If you have found these stories inspiring, please let us know, and we can convey the messages back to the communities.

Stephane Bonduelle
Country Director
Concern Universal - Bangladesh

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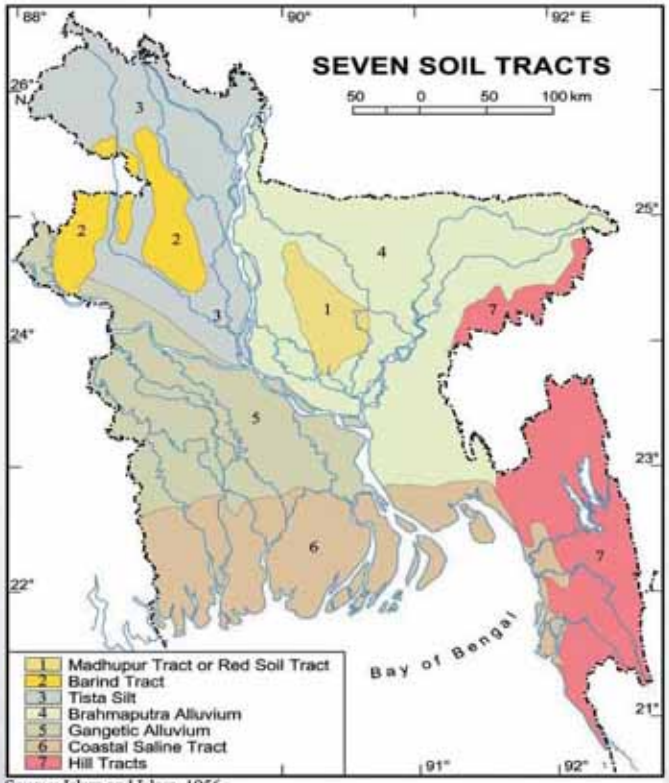
1. Sharecropping in the Barind Tract

(Mango plantation in the paddy field)

The part of Rajshahi and Rangpur divisions of Bangladesh is called the Barind Tract. (Varendra Tract in English, and Varendra Bhumi in Bengali). The hard red soil of these areas is very significant in comparison to that of the other parts of the country. A typical dry climate with comparatively high temperature prevails in Barind area except for the wet season beginning from mid June to October. Rainfall in the area varies from about 1500 mm to 2000 mm. Temperature ranges from 8 degree Celsius to 44 degree Celsius. The total cultivable area being 1.44 million acres, out of which 34% is loamy, 10% Sandy, 49% is clayed and 7% others. Out of the total cultivable land, 84% are single cropped, 13% are double cropped and the rest are triple cropped.



Source: Islam and Islam, 1956

TRINOMOOL, one of the partner NGOs of Concern Universal, works in the Nachole sub-district under Chapai Nawabgonj district in the Barind Track.

This area was well-resourced and the community and economy were amongst the best in the country before 1947.

As years passed by, this tract of land had fallen behind in all phases of development and economic activities were sluggish. Furthermore, latest developments in industrialization could not make any headway in this Region. As a result the standard of living of the people of this region dropped to be low compared to the rest of the country.

Now-a-days, the living standard of the people of this area also heavily impacted due to a population explosion, reduction in agricultural land, deforestation as well as from the changing climate. The common people don't know the science and impact of climate change, but, they are already doing adaptation, unconsciously from their experience and skills. It is basically agricultural adaptation for their immediate needs.

The people of this area have experienced for a long time the reduction in rainfall and the increasing temperature. As a result their agricultural production has reduced, and they are forced to source alternative options for their livelihood. From their experience they are practicing crops diversification - specifically planting Mango trees in their paddy field. This sharecropping was started 7-8 years previously and is now getting good results as their alternative livelihood option.

Mango cultivation in the paddy field

The people's reasoning is that if their paddy, wheat, or vegetable production falls, wheat then at least they can survive from the production of Mango.

Now people are increasingly interested in the mango garden and are adapting their situation due to climate change.

Different government organizations including the Fruit Research Institute, Department of Forestry and Bangladesh Agriculture Development Corporation (BADC) coupled with large other private sector nurseries are producing hybrid varieties of fruit saplings and supplying those to the farmers who aim to expand their gardens.

2. Hydro-powered Grinding Machine

The world faces an enormous challenge in mitigating and adapting to a changing climate, and it is only through ingenuity and behavioral change that these challenges can be overcome. Inventions such as the hydro-powered grinding machine are an important first step in helping us to face the issue of climate change. Just as important is ensuring that these ideas are widely disseminated and replicated.

The Hydro-powered grinding machine in Simatmari Village of Makwanpur District, Nepal. HIMAWANTI, a partner NGO of Concern Universal working with that community

This hydro-powered grinding machine (pictured) was found in Simatmari Village of Makwanpur District, Nepal. The machine is owned by ex-carpenter Chandra Bahadur, who has found the machine to be so profitable that he no longer needs to work in his previous trade. The machine is able to grind around 120kg of grain per day - as much as 10-15 people working for 10 hours each! With a profit of 5 rupees for every 4kg of ground grain, Chandra is able to earn 150 rupees per day, thanks to his wonderful machine. Chandra took out a loan to purchase the machine 5 years ago, and will shortly repay the entire loan! He is very happy that he made the decision to buy this wonderful machine.

The hydro-powered grinding machine works by using the power of the Simat River to create enough energy to easily and quickly grind grain, wheat or rice. The glacier fed river produces enough energy to power the machine almost all year round. This is very simple technology that is perfect for use in South Asia, where rivers are powerful and abundant and many countries are facing energy crises. The technology not only saves countless hours of back-breaking labor, but is also completely carbon neutral.

Chandra Bahadur working his hydro-power grinding machine

Harnessing the power of water to power our technologies is one of the best ways for humankind to mitigate the effects of climate change.

3. Establishment of a Grain Bank for DRR

In 25 May 2009, Cyclone Aila wreaked mass destruction in the coastal South 24 Pargana district (the Sundarban area) of West Bengal, India. As the cyclone brought down heavy rains, the heightened wind speed uprooted trees and blocked roads, flooding villages, and throwing thousands of people out of their homes. In West Bengal, at least 5.1 million people were displaced, with more than one million people stranded in the Sundarban islands alone, most of them without any food or water.

The tidal surges and floods triggered by Aila have washed away roads, damaged bridges and submerged fields

The tidal surges and floods triggered by Aila have washed away roads, damaged bridges and submerged fields. Some areas are just totally inaccessible as they are underwater and there are simply not enough boats to get relief out to these people who are sleeping out in the open with no shelter. Many villages in the South 24 Pargana district are cut off completely and have not seen any relief from aid agencies or local authorities. Hundreds of people were missing in the 15 affected districts, mostly on the coasts, where survivors desperately need food and drinking water.

Spotted dears in Sunderbans delta

The Sundarbans, the world's largest delta, and a region which houses 265 of the endangered Bengal Tigers, was inundated with 6.1 m (20 ft) of water. Dozens of the tigers are feared to have drowned in Aila's storm surge along with deers and crocodiles. More than a fourth of the 3,500km of mud embankments built by the British at least 150 years ago collapsed like a pack of cards when struck by 20-foot- tall tidal waves. The Cyclone Aila has devastated the entire solar panel set-up in the Sunderbans Island, leaving the island completely bereft of electricity. The islands of Sunderbans at present do not have any access to grid connectivity and solely depend on solar, biomass and renewable energy.

Aila has inundated the entire Sundarbans region and displaced thousands of residents in the islands. They have lost everything in the natural calamity. They are now living under the open sky with their families and children. The agricultural lands and all water bodies are now filled with saline water. People who get their livelihoods through vegetation, fisheries and cattle farming have landed in deep trouble. Everything has been washed away by the cyclone and the rural economy has virtually collapsed.

To enhance the community's ability to cope with natural hazards, Ramkrishna Loka Seva Kendra (RLSK), one of capacity building project partner of Concern Universal - Bangladesh, is setting up community managed Grain Bank in Gosaba Block, South 24 Pargana, West Bengal, India.

In order to create the Grain Bank, 10 kilograms of partially saline-resistant seeds were distributed to each of the 51 vulnerable farmers selected through a consultative process. It was expected that the quantity of seeds would multiply 40 times and lead to grain output of 400 kilograms per farmer in case of good harvest. The farmers had to return 15 kilograms out of the grain output to the Self Help Groups (SHGs) as contribution to the Grain Bank. This process ensured the food security of the farmers by enabling them to produce their grain free of cost. Moreover, transportation cost could be substantially reduced through this method.

Community prepared bamboo made Grain Bank

Grain collection and distribution meeting

Overall, the process of setting up Grain Banks in this manner is fulfilling the following objectives:

- Ensuring complete food security for 73 families (directly) as part of the livelihood component,
- Mitigating the risk of starvation during a disaster by storing grain and seed with 55 different SHGs as part of the DRR component,
- Ensuring the sustainability of the process by training the SHGs to manage the grain bank and enabling them to carry these practices into the future,
- Inclusion and involvement of women in all activities related to disaster risk reduction, as all the concerned SHGs are run by them
- Changing the agricultural practices of the farmers to a more progressive and sustainable form by introducing the use of certified seed.

4. Booming Bangladesh: Fish in paddy fields in full bloom

Tilapia fish cultivation in the Boro paddy field

Tilapia fish

Rangpur-Dinajpur Rural Service (RDRS), is a renowned non government organisation (NGO), and one of Concern Universal partner NGOs that has worked in the greater Dinajpur and Rangpur region (now under Rangpur division) in Bangladesh for a long time with poor and marginalized farmers. For the climate change adaptation, RDRS with the poor and marginalized farmers, continuously inventing/ engaging some agricultural adaptation for the upliftment of poor communities. **Fish cultivation in the paddy fields is one of them.**

The Rangpur and Rajshahi divisions of Bangladesh are poverty stricken. Tilapia fish in their paddy fields bring economic self-reliance and improve the livelihood of common people. RDRS in collaboration with 12 partner organisations has been implementing the project in Kurigram, Lalmonirhat, Nilphamari, Gaibandha, Dinajpur, Thakurgaon, Panchagarh, Rajshahi, Naogaon and Chapai Nawabgonj districts involving 10,000 farmers in 2011.

The poor and low income groups, small and marginal farmers, and women and socially-excluded groups could increase their annual household incomes and fish consumptions by culturing fish in their paddy fields.

The small and marginal farmers are selling the GIFT Tilapia fingerlings in full swing as its business reaches peak following a huge demand amid currently favourable climatic conditions and adequate water.

Under the programme, Rangpur-Dinajpur Rural Service (RDRS) has taken a massive plan of farming 3.5 crore GIFT Tilapia fingerlings in paddy fields to produce 700 tonnes additional fish worth Taka 12 crore in the 2011 season in the country's 10 northern districts.

The reputable NGO has been implementing the programme after the poor and marginal farmers achieved tremendous successes by producing 293 tonnes of additional fish and 1.2 crore fingerlings in paddy fields to improve their livelihoods in 2010.

The NGO with its 11 partner organisations distributed the broods for producing quality fingerlings in Boro paddy fields this year (2011) to help the poor earning profits, tackling poverty and meeting their nutrition demand by GIFT Tilapia farming and selling fingerlings.

This season, a total of 3.5 crore Tilapia fingerlings are being produced involving 8,827 paddy field farmers, who have successfully breaded Tilapia broods in their fields since the last Boro season this year.

To make the programme successful, 2.3 lakh GIFT Tilapia broods of fish have been reared in cages in the community levels and those were distributed to the enrolled farmers for breeding in 790 hectares of paddy fields.

The selected farmers had developed small ditches in the Boro paddy fields and released the Tilapia broods from late March to mid-April, and breeding continued till April- May last year when the farmers started selling their fingerlings and the business rose now to its peak.

The poor farmers having only rice fields of 5-10 decimal can stock 10-15 GIFT Tilapia brood and produce healthy fingerlings in the poverty- prone region. This is how they maintained their livelihoods in adverse times - making the most out of their tiny rice fields.

5. Drought Tolerant Paddy

As climate change continues to alter climatic conditions all over the world, both the size and intensity of drought prone areas of Bangladesh are increasing. As droughts worsen and rainfall becomes more erratic farmers are unable to properly plan and manage their seed cultivation and the productivity of the paddy diminishes due to late, unusual or insufficient rainfall.

In order to help farmers cope with these changing drought conditions, the International Rice Research Institute (IRRI) invented a type of drought tolerant paddy (line number 4371-70-1-1), which has been particularly successful in drought prone area of India where it is known as "Shahabagi". With the financial support of the Bill and Melinda Gates Foundation, RDRS-Bangladesh tested this drought tolerant paddy in Bangladesh in their STRASA-IRRI project, finding that Bangladesh farmers were very pleased with the results. It is hoped that the Bangladesh Government will soon approve this type of paddy in the near future, so it can be more widely distributed to farmers throughout Bangladesh.

Methodology: Paddy seeds should be planted six inches apart from one another, with 3-4 seedlings cultivated in one bunch. As the paddy has a short life-span of around 25 days, mature paddy plants should be cultivated in mid-June. With a constant amount of fertilizer in the paddy field after the soil test, the paddy will be extremely productive. If it is hard to do undertake a soil test then it is best to use 75kg of TSP type and 34kg MOP type fertilizer on the land during preparation time. A further 10-12 Days after cultivation an additional 65kg of Uriea fertilizer per hectare of land should be used and 30-35 days after cultivation another 65kg of Uriea per hectares should be used. The land should be weed free; this can best be achieved through natural methods or, if necessary, by applying herbicides within 3-5 days of cultivation. 800gm Petilacor per hectare or 20gm pyrajosulphufiron Ethayel can be used.

Birds can be an effective way to decrease insect damage if they are allowed to sit on bamboo sticks in the field, but insecticides should be used if insects become a major problem. Generally in Bangladesh droughts occurs during the months of Assin and Kartik (September-November), however the drought tolerant paddy will not be damaged if there is no chance to arrange irrigation during this time. The paddy should be harvested once 80% becomes mature/ripe. The paddy will mature 115-120 days after cultivation, and if it is properly cultivated can produce 4-5 tonnes of crops per hectare.

These types of innovations are crucial to ensuring that local farmers are able to adapt to changing drought conditions, which will intensify as a result of climate change.

Note: 1. IR 4371-70-1-1 paddy is currently being tested in the Bangladesh context, to ensure it is suitable for local conditions.

2. This type of paddy is designed to tolerate dryness but can't tolerate severe cold.

3. This type of paddy can't be cultivated during Boro season

6. Flood Tolerant Paddy - A Success Story

Climate scientists predict that South Asia will experience more variable rainfall and an increased risk of disasters as a result of climate change. Farming communities are expected to be especially vulnerable to these impacts - they tend to be the most reliant on rain-fed agriculture and occupy the most marginal lands that are often most at risk to flood and landslide hazards. Small changes to rainfall patterns can have devastating results throughout the growing cycle. To demonstrate the magnitude of the problem, agricultural production losses due to flooding in Bangladesh 2007 were estimated at 1.3 million tons. Agriculture provides 20% of Bangladesh's GDP and 60% of the population rely on it directly or indirectly for their livelihoods.

In light of this situation, it is crucial for local populations to begin to adapt to the changing climate. The work of UDDOYOG Foundation, in the Gaibandha District presents a great example of how farming communities can begin to adapt their practices to protect themselves from the negative impacts of climate change. Gaibandha district is one of the most underprivileged places in Northern Bangladesh. Since 2004, UDDOYOG Foundation has been implementing a project named "Livelihood Empowerment and Agro- Forestry" in the Gaibandha District with the financial support of the Switzerland-based donor "Inter Cooperation". The project is focusing on livelihoods, agriculture, empowerment and increasing the technical skills and knowledge of beneficiaries in regards to community forestry. A specific focus of the project has been finding a way to deal with the frequent damage to the paddy fields because of frequent flash flooding during AMAN season (August - November).

Flood Tolerant Paddy

All seven Upazillas of Gaibandha district are affected by the floods. Kettar Para village is particularly affected by flash flooding from the Goreya Pathor Ghaghot River every year, with farmers often losing most of their AMAN crops. Most of the lands of Goreya Pathor are affected three or four times by the flash floods, with most of the lands under water for 15 to 20 days, causing the decay of all cultivated paddy plants. To solve this problem the farmers of this village have been working with UDDOYOG and the Rice Research Institute to cultivate flood tolerant paddy during the AMAN Season.

In 2007 the Rice research Institute organized a small exhibition plot (121m2) to promote various types of flood tolerant paddy in this area. The five flood tolerant paddy varieties in the exhibition plot from the Rice Research Institute inspired local farmers to explore the option to cultivate these types of paddy. In 2008, four interested farmer's cultivated SORNA sub -1, BR-11 Sub-1 types of flood tolerant paddy in this exhibition plot area. The results were clear - all the paddy of Kettar Par village was destroyed by flash flooding except for the flood tolerant paddy of these four farmers.

At the end of the AMAN season UDDOYOG Foundation with the combined help of The Rice Research Instituted and Inter Cooperation organized a "Krisok Mat Dibos (Farmer Field Day)" to publicize the success of the flood tolerant seeds among local farmers. As a result of this event, many local farmers demonstrated their interest in cultivating flood tolerant paddy in their villages during the next AMAN season. Krisok Mat Dibos

Krisok Mat Dibos

In 2009, flood resistant seeds and plants were distributed among 15 farmers; with farmers obtaining the expected results of increased cultivation during the AMAN season. In continuation of the last three years of success with this approach, 2010 saw 68 farmers cultivate flood tolerant paddy in the Kettar Para and Goreya Pathor areas (20 farmers BINA-7, 38 farmers B R-11 and 10 farmers cultivated Samba Sasury Paddy).

These crops produced the following amount of paddy from 1 decimal (40.46 m^2) in 2010:

- SORNA sub -1 - 18-20 kg
- BR-11 Sub-1 - 25-30kg
- SAMBA Sub -1 15-18 kg

In 2010, the 68 farmers produced between 18,000 and 20,000kg of paddy in their land. The benefits of the flood tolerant paddy seeds are obvious to these farmers, especially as the process requires only a very small amount of fertilizer.

Flood Tolerant Paddy

The Farmers are very happy to have access to the flood tolerant paddy seeds, after 12/15 days of flooding, they don't need to cultivate the land because they know that the paddy will grow naturally and they will get expected amount of rice. There is no better method for ensuring a bountiful crop during AMAN season than to cultivate flood resistant paddy varieties in this flood prone area of the Gaibandha district.

However, not everyone is aware of the success of flood tolerant paddy, not only in the village of Keddar para and Goreya but also in the surrounding areas. It is critical that these best practices are shared throughout the neighboring areas.

The IPCC estimates that, by 2050, rice production in Bangladesh could decline by 8% and wheat by 32%, as a result of climate change impacts.

It is thus crucial that innovations such as flood tolerant paddy seeds are made. Just as crucial is ensuring that communities are made aware of these innovations and work to share them with their neighbours and neighboring villages.

7. Protecting seed beds from Cold and Fog

Protecting Seed beds with plastic cover

In order to mitigate against major crop losses from natural disasters, it is important to use practical strategies that are suited to local conditions. This is definitely the case in the Thakurgaon area, where Local NGO Service Emergency for Rural People (SERP) has been working with the area's farmers to protect their seed beds against cold and fog.

Thakurgaon is located in the northern part of Bangladesh, in close proximity to the Himalaya's. This location means that the people of the Thakurgaon area are very vulnerable to the impacts of cold snaps and fog, which can badly damage paddy seed beds during the Boro season (Planting in December-January and harvesting in April-May). The Boro season is the most productive rice growing season in Bangladesh, and losses of production due to cold and fog affected seed beds during this season can have a devastating effect on local farmers. The cost of buying and replanting new seeds is too much for most farmers to afford and their desperation to prevent these losses has resulted in the adoption of a new technique for protecting seed beds from damaging losses.

In order to protect the seed beds from cold and fog, the paddy seeds are kept in water for two days before moving them onto a bamboo matt for drying. Following this procedure the seed bed is covered in straw, banana tree leaves and plastic for two to three days. Finally farmers will make the seed bed muddy with compost fertilizer and water before planting the seeds and covering it in plastic, which serves as an insulator against the cold.

During cultivation time the plastic cover is frequently opened during the day to allow sunlight to reach the seed beds. 15 days before cultivation, Uriea fertilizer should be used for optimal results. The seeds should be kept in the bed for 25-29 days (for Hybrid seeds) and 40-45 days (for BR-29 seeds) prior to cultivation in a separate field. 10-12 kg of seed and 250-300gm plastic are required for 1 Bigha (equivalent to 1330 m2) of land, with the plastic costing approximately 50-60 taka. The plastic covering can be used for 2-3 years, and is a very inexpensive way to protect such valuable crops.

Protecting Seed beds with plastic cover

The farmers of Thakurgaon have seen the benefits of this method and have been applying it with great results. They are very happy to be protected against the catastrophic loss of agricultural products due to their new techniques for protecting their crops against cold snaps and fog.

8. Environmentally friendly Cooking Stove

(Bondhu Chula)

Often, when people think about climate change mitigation, they think of changes to businesses practices that will be costly and inefficient. This, however, is the wrong mindset, as many climate change mitigation activities can actually drastically decrease costs for businesses and communities. As an example, the 'Bohndu Chula' (Environmentally friendly cooking stove), is not only reducing carbon emissions, it also reduces the costs associated with fuel consumption, increases time for other activities and reduces the impact of toxic smoke inhalation.

The Bondhu Chula is a highly efficient cooking stove for use in rural households of Bangladesh. The Bondhu Chula reduces fuel consumption for cooking by around 50 percent. In Bangladesh, about 95 percent of Bangladeshi people (145 million) use traditional fuels like cow dung, agricultural wastage and wood - totaling 60 million tonnes of fuel worth 100 billion Taka ($1.46 billion) per year. Thus improved efficiency in cooking practices can save an enormous amount of money and resources. This is especially important in the context of biomass becoming increasingly scarce and costly, putting pressure on the farmers to use more chemical fertilizer instead of bio-fertilizer.

As well as the costs associated with the use of scarce resources, poorly ventilated clay stoves that produce smoke, and pollution pose a serious health threat to women and children. According to the World Health Organization (WHO), 46,000 women and children in Bangladesh die each year, while millions more suffer from respiratory, tuberculosis and cardiovascular diseases and lung cancer due to the "killer in the kitchen." The Bhondu Chula stove works to seal the cooking area, thus drastically reducing the damage to people's health from smoke inhalation.

Bandhu Chula at household level

To popularize the Bondhu Chula, the government and many NGOs have launched a countrywide program. The state-run Bangladesh Council of Scientific and Industrial Research (BCSIR) invented this stove with a view to preventing wastage of fuels and keeping kitchens free from hazardous and excessive smoke emissions. Later, this design was upgraded by GTZ, a German based international NGO, who have made it more effective and user-friendly. The materials required for the Bondhu Chula (clay, mud, bricks, cement, bamboo, iron rods, nets, chimneys etc.) are inexpensive and easily available within the communities. Fire materials burn on nets to increase separation from the pot (which increases combustion efficiency) and smoke is removed from the room through a chimney. The design helps to absorb all the heat for cooking purpose produce from the stove. These improvements mean the cooking require less time and 50% less fuel, drastically reducing emissions. A typical household stove will cost around 500-1000 taka, with commercial sized stoves costing 4000-7000 taka. The savings from fuel will pay back the stove quickly -a household will save 350-400 taka/month (payback period 2-3 months), and a restaurant will save 100-200 taka a day (payback period 1-2 months).

As mentioned, these stoves have multiple positive impacts including the reduction of:

- Carbon emissions
- Health problems related to smoke inhalation from inefficient stoves
- Time required for cooking - giving more time for other activities
- Time required for gathering fuel
- The use of natural resources such as firewood, clay, bamboo and others
- Costs associated with buying fuel

9. Eco-toilet and Organic Composting

(A hope for better living)

Ms. Ata Banu, a 38 year old housewife, has lived with her three children along with her husband at Bazinapukur village under Ghatvog union of Porsha Upazilla in Naogaon district for 23 years. The village is located in the west at a distance of 45 km from Naogaon district town. Her husband, Md. Abdul Mannan (49) is a farm labourer and earns about BDT 2,500- 3,000 in a month as he cannot take much work due to his illness and old age. In fact, she is a mother of five children and two her daughters have been married at early age due their poverty and the third daughter, who is about 10 years old lives with them. Her elder son also works as farm labourer and earns about BDT 2,500 per month. They can only work for about 7-8 months in a year during cultivation and harvesting periods, and remain unemployed for the rest of the time, mainly in dry seasons. During this period of unemployment, her family must borrow money at higher interest and struggle to pay back from their low income. They have a small land area, around 10 decimals, attached in their homestead, where they cultivate some paddy during rainy seasons. But they cannot produce any food grains or vegetable during dry seasons, from Jan-May, due to lack of water and required moisture of lands. Finding no alternatives, Ata Banu has to work on a part-time basis at nearby houses from where she earns about BDT 1,000 per month. Thus Ata Banu has to manage her family while shouldering the curse of extreme poverty.

Eco Toilet

This changed when a SPACE Field Facilitator had come to her in early 2010 and shared about the Eco-toilet supports funded by Bangladesh NGO Foundation. He also shared the socio-economic, health and environmental benefits of the Eco- toilet and urine and vermin-composting technique. Learning all these things from the Field Facilitator, she became interested and shared the idea with her husband, who also became convinced for installing those for better sanitation and income generation.

Managing the cost-sharing money about BDT 3,500 with so many troubles, she installed an EcoSan toilet inside of her household boundary and very close to her sleeping room. Having user-training and other capacity building support, such as PDRA and awareness raising, training, with the cooperation of Concern Universal Bangladesh, she started using the human urine technique making a homestead garden near her house, where she planted sweet pumpkin, Ladies-fingers, spinach and other vegetables. After two times using urine from the eco-toilet and organic fertilizers from household waste, she observed dramatic changes of the plants what she had never seen before due to uneven dryness and drought in the area.

People from neighborhood were curious and came to see her vegetable garden. When they heard those vegetables were produced from human urine and organic fertilizers, were astonished looking at their nutrient values and quality. However, Ms. Ata Banu and her family had some initial hesitation to consume the vegetables as those were produced from human urine. However, they did try some and found exception and original tastes! For sharing her experience, she gave some vegetables to her neighbors who also found similar tastes and experience. Thus the villagers became interested and bought vegetables from her gardens. This year, she sold vegetables to the neighboring families and in the local market. From this, she earned BDT 5,360 and she did not need to buy any vegetables from market. Her husband and children are happy now to get her home grown products and are planning to scale up vegetable gardens around their homestead and borrowing lands from the neighbors.

Ata Banu in her vegetable garden

Using the money, she has repaid loans and managed the cost of her family and schooling of her younger son and daughter. She thinks she can finish her part-time maid servant job in other's households and instead be fully involved in homestead gardening.

Now, she encourages her neighbors and villagers to follow her example in reducing use of chemical fertilizers and food cost, while being self-reliant in food security and keeping a healthy environment. These actions also can help reduce the effects of climate change in the Barind Tract Areas. Taking learning from Ata Banu, 16 families from Bazinapukur and Borogram villages under Ghatnagar union have already started homestead vegetable gardens using urines and vermin-compost.

Vegetable garden

Vegetable garden

10. A village woman improves agriculture through vermin-compost

Sampa Mondal is one of very successful farmers in her village. She lives in Mallikpur village under the 24 North Pargana district, West Bengal; India. Four years ago she took training on making home nutrition gardens from PRISM, one of CU's capacity building partner NGO in West Bengal. She has a very beautiful organic vegetable garden in her home. In 2008, she also took training on making vermin compost. After taking this training she made one small vermin-pit adjacent to her house.

Initially she was opposed by her husband who is a chemical farmer but she was determined in her mission. PRISM also supported her by providing earth worms (Eisenia foetida - tiger worm or red wiggler) free of cost. At the end of 2008, she produced 80kg vermin-compost from her pit - this was made from 75kg of cow dung and 125kg of home vegetable waste, straw, and banana trees, etc. Out of 80kg compost she sold 40 kg to the local farmers at the rate of Rs. 4.00/kg and rest 40kg was used by her husband in their farm land.

Cement made vermin-pit of Sampa Mondal

Being successful, she next tried to produce vermin-compost on large scale. She applied for a grant from the Gram Panchayet, with PRISM helping her to make the proposal. She got the grant, and bought two large cement chambers from the Panchayet in 2009. Since then she has been producing vermin-compost on regular basis. So far she had sold her compost not only to the local farmers but also to the local Agriculture Development Office. Her work has inspired many local women.

In January 2010 she was appointed as a Panchayet-level trainer on vermin-compost and so far has given training to more than 150 women on making vermin-compost at their houses. Now more than 100 women of neighboring villages are producing vermin-compost at their homes under the guidance of Sampa Mondol. She has become a full time trainer and is now giving training to all the poor women on this vermin-compost production technique. The Local Agriculture Development Officer has visited her house and is always encouraging her.

11, Disaster Education in Schools

(Makwanpur District, Nepal)

Background

The Makwanpur district of Nepal is vulnerable to many natural hazards, including earthquakes, flooding and erosion due to landslides. However, the community has had a low-level of knowledge about how to best address these hazards to reduce their vulnerability. No DRR projects had been yet run in the area before the project. In this context a project was run called 'Disaster Risk Reduction through Schools program' (DRRSP), funded by DFID and implemented through ActionAid. DRRSP set out to increase the resilience of the community to natural hazards.

This report sets out to document selected activities of DRRSP which may be relevant to replicate elsewhere, focusing on two schools in the Hetuda area - Banshagopal Higher secondary school with a population of 1000 students, and Churiamya Higher secondary school with 800 students.

Educational program

Banshagopal Higher Secondary school, Chaugada , Hetuda

The key strength of the project lies in the educational aspect. Climate change and disaster content was integrated into the teachings at both schools, which allowed the students to be exposed to these crucial ideas from an early age (as the Nepal curriculum does not include this). This has advantages over community-level training as in this case people have already formed their knowledge around disasters and are less open to learning this new knowledge.

The main disasters in the school's areas were flood, river and land erosion and earthquakes. To address earthquakes, two earthquake resistant buildings were constructed - previously there were none. These featured a combination of reinforcement in the structure (for instance steel reinforcements), and attention to the design (for instance no doorways under beams). At first the community was skeptical because of cost and because it was different to their usual methods of construction. However

they shifted their attitudes as they learnt more about the need for DRR. The total cost was 1 cr 30 lakh, and the project was able to rally the community together to contribute 60-70% of the costs through a combination of donations at mela and religious programs. If people could not contribute money, they contributed their labour. In this way the project was able to leverage much larger outcomes from a smaller external funding input.

Specific earthquake-safe building training was offered to masons at both school sites. The added benefit of this training was that as well as the resulting earthquake strengthening of the school buildings, the trained masons also assisted some of parents with strengthening their own houses and thus propagated both the knowledge and the infrastructure improvements.

Structural adjustment

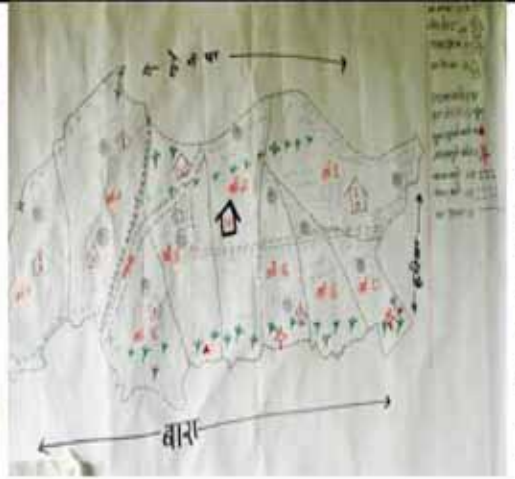
Training

Churiamya Higher Secondary School , Hetuda

Student-self organizing was central to the educational component of the project. The student club at the school actually had it's own dedicated room and a democratically elected committee. They produced wall-magazines and mobilized the students around DDR. Every Friday there are school based outreach activities in the community (eg popular theatre). Similarly in Banshagopal school students were encouraged to share their learning's with their parents who would slowly get to know about DRR.

Following the CMDRR approach, the school community undertook hazard mapping at the beginning of the program. This identified 11 kilovolt power lines that would put students at risk during disaster - these were then moved as part of the action plan. The mapping also identified earthquake risk areas - thus the school chose to retrofit existing buildings that were at risk from earthquake to make them safe. One example of this was by moving the doors from underneath the structural support beams, the building was strengthened greatly. Inside, wooden benches that were brittle were reinforced with steel to provide protection for students, who

CMDRR process



were trained to take shelter under them in earthquake. Community fundraising helped to augment the grant monies received for the renovations. The school is able to collect around 5000 from its general assembly yearly.

Social structures for Community Managed DRR

A core feature of the program was the formation of various community groups - such as the community clubs and the Disaster Risk Reduction (DRR) Committee. The community clubs consist of student and teachers clubs that centre on the sharing of disaster stories and the best ways to cope with them. This peer-to-peer sharing built up the confidence of the participants who could see that they could learn themselves without relying on solely external training. The DRR Committee had the role of overseeing the building and education projects, and providing guidance and fundraising support. It drew on technical support from engineers when required. It was funded by each member giving 5 Rs each month. It also had an important role to share knowledge with other schools. In one example, the DRR committee met others who had started a grain bank - however the committee knew the risks of the grain bank going mouldy in flood times so were able to suggest the better strategy of storing funds instead.

New Techniques of Disaster Management

As was mentioned, the community had previous had low-level of knowledge about facing disaster. As an example, traditional techniques of treating injured persons would be to put them in a bamboo basket and then to hospital - but now they know how to apply first aid first, then take to hospital, greatly increasing survival. Other basics like swimming training were crucial - most did not know previously. Equipment also helped, life-jackets, and early warning systems (mike, speaker tape system).

Through education programs people learnt the connection between tree-cutting and river erosion and so this practice was stopped. They learned to use local materials, the skills that they already had (or could acquire through training). Planning tools such as the PDRA, social mapping, and action plan were introduced. Neither the community nor the NGO had come across these tools before, and they allowed them to focus their ideas and energy.

New Attitudes

Of course, changing skills or providing equipment is not enough - often it is beliefs which can present the largest obstacle to effective engagement. In this case previously most of the community believed that disaster come from God, and so they could not do anything. Now after the CMDRR training, they can see that while hazards may be out of their control, disasters are human-made, and hence they could begin to see that they could take action to mitigate them. Their empowerment expanded. Initially they expected help to come externally - at the first meeting they just wanted help from the NGO, and saw themselves as helpless recipients. However after the training, and learning to see that they could do something, they slowly started to take more responsibility, and community volunteering increased.

Traditionally marginalised groups such as women have increased their involvement. As they are at home more often, they noticed more about their immediate environment and were more receptive to the project than men overall. After the program many were pleased that the surroundings had become cleaner - an outcome of the project's focus on caring for the community was expressed through people removing litter.

Looking to the future

There are still challenges ahead with the project. Learning is slow and step by step. For example, when they first built their dams they were destroyed in floods as were just made from local soil. Later, tree planting stablised the dams, and they are now seeking funds for solid concrete dams which will last. A key challenge is to support the DRR committee to continue to meet and mobilize the community after the funded project period has ended.

According the DRR committee members, the most inspiring part of being involved is seeing in their own community the adaptations happen that they support people to plan for, such as local dams and so forth. It emphasises the project's philosophy of teaching the community how to catch fish, rather than buying it for them.

12. Floating animal platform

Pukuria is a village of Gior Upzila, Manikgonj area of Bangladesh, with about 350 families living here, population being near 3000. Most village people get their livelihoods from farming, fishing, carpentry, day labouring, boat making. Unfortunately the village is prone to flooding which threatens people, livelihoods and livestock. Often flood protection measures focus on the people and can neglect livestock, which are a crucial income source. In even a very minor flood, standing in floodwater for a long time may lead to livestock diseases, particularly 'hoof disease' (khura roag). So anything that can raise livestock above water is crucial. There exists indigenous knowledge that assists with the protection of livestock during the floods.

During flood periods, domestic animals can be protected by using floating platforms. These platforms are made by collecting existing floating water plants. These plants are packed tightly together, and bound by jute. Animals are loaded onto the shelter which floats and rises with the floodwaters. The animals can survive on the platforms for 15-30 days, they can also feed on the platform if necessary. Other feed such as straw, water hyacinth, banana leaves, urea-molasses mix, millet/wheat bran, rice husk, oilseed residues, strained water after boiling of rice can also be used.

13. DRR education and cooperative livelihood program

Many DRR or adaptation programs focus on one issue - education or agriculture assistance for instance. The Hoste Hainse school project described below shows innovation through addressing both the short term direct practices that influence the community's capacity to face disasters, as well as the long term use of sustainability education of the younger generation. Furthermore, these two components are linked financially to encourage longer term sustainability.

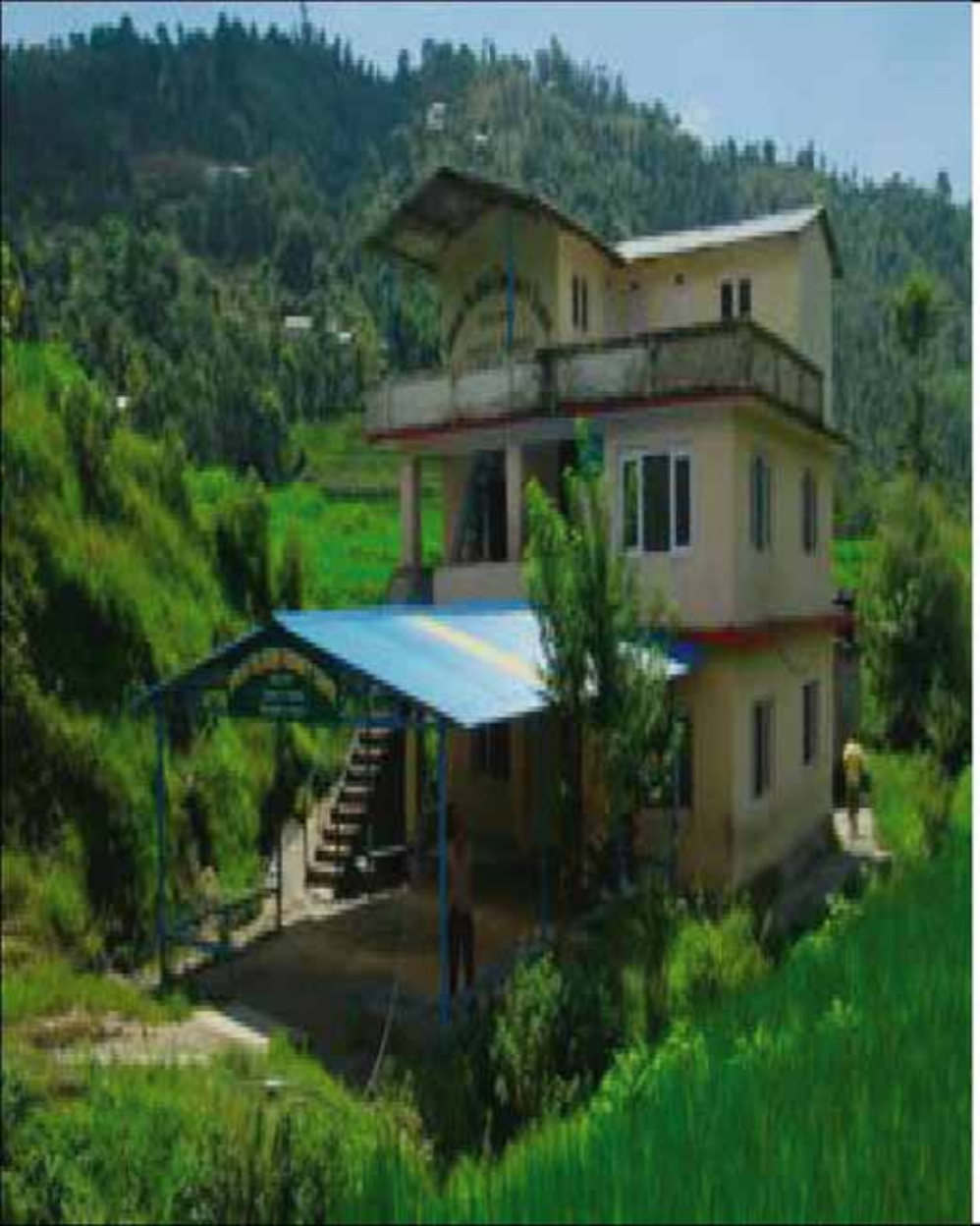
Background

Sankhu Palubari village is located just 20 KM from the center of Kathmandu City, with a total population of approximately 2500. Tamag is the largest ethnic group (36%) however there is a large Newar population which has a strong influence on the culture and people of the area. Around 40% of children in Nepal do not attend school.

Hoste Hainse is an NGO that focuses on education for the underprivileged in an attempt to address this gap. Its mission is to protect the rights of child in general and in particular to empower underprivileged and needy children and act to abolish all sort of child exploitation by providing them educational opportunities. The NGO has started the Sankhu Palubari Community School to serve the community, it has 292 students.

Education Program

The school follows an English Medium School curriculum, with music class and some agricultural education as extra class to encourage more multimodal learning. Classes Nursery (Kindergarten)-8 are taught at the school. As the students pass out from grade 8, this education will be supported up to grade 10 at a separate sister school. DDR has been recently introduced to the school in the form of weekly classes covering climate change, disasters, and adaptation. In addition some community level events have been run, such as reforestation days and community awareness programmes. A Student Club has been formed and efforts are put into build the community spirit of the students - already this has been demonstrated by senior students from the sister school returning to assist younger ones voluntarily.



Cooperative

However the key barrier to effective education is poverty; and poverty is no stranger to the school's community. Many families barely get to make ends meet day to day. To address this (and to find an additional funding mechanism for the school), Hoste Hainse setup a co-operative around five years ago, that function to aggregate families savings so that significant livelihood investments can be made - instead of the families living hand to mouth. In 2011 the cooperative has 23 groups, each comprising of approximately 20 families. All the parents are members of the coop, and each family contributes 100 Rs. per month to the their funding pool, out of which three families per group per year can get substantial loans of up to 10000 Rs for livelihood investments such as tractors or greenhouses. The coop has also provided other alterative livelihood training to its members - in areas such as spinning, soap and candle making.

Organics

As well as these (incremental) substantial loans, the coop has a core emphasis on environmental sustainability through encouraging organic vegetable production. Much of Kathamandu's vegetables are grown with pesticides, herbicides and artificial fertlisers, whose end use all contribute to adverse health and environmental impacts. Moreover their production is energy intensive and generates carbon emissions, contributing directly to climate change. The coop works to provide training on organic production techniques, and provides plants for people to expand their own kitchen gardens to produce surplus for market. Here the co-op is also able to act as a distributor for its members, linking them to the growing organic market in Kathmandu.

The organic teaching is linked to the school through the organic club, where students learn the principles of sustainable agriculture first hand. The coop provides seed and plants of different vegetables to the students with planting guidelines and care which encourages the students as well as to the parents to grow organic vegetables.

Challenges

The organic market has substantial challenges - namely price - organics still cost much more than conventional chemical produced vegetables, with the market currently being foreigners and the upper classes. Another challenge is productive capacity - so far the families have not been able to produce enough to provide consistent income. The coop is only as strong as its members ability to produce and so far it has only been able to contribute less than 3% to the school.

Opportunities

However the organic market is expanding and as the community is able to get more experienced in the alternative livelihood techniques, they will be able to raise their livelihoods - short term and directly through the alternative income, as well as in the long term through supporting the schools education. Through projected income increases of the member families, the cooperative aims to supply 20% of the school's expenses, which will make far more financially sustainable in the long term.

As it costs 12100 Rs. Per student to attend the school, the cooperative hopes to lower this cost to 10000 within few years but also it has various challenges to cover this cost.

Future plans:

The main problem facing the school is it doesn't have its own building. Though the Village Development Committee has provided 10 Ropani (5000m2) of land to the school, it has not been possible to construct the building yet. The main focus is the school building which will ensure the sustainability of the school managing from the local level.

The existing organic farming is only for consuming at household level. We are planning to develop a strategy assessing the growing organic market and looking to increase production to a large scale.

14. Household and Community Based Rain Harvesting Systems

Pukuria is a village of Gior Upzila, Manikgonj area of Bangladesh, with about 350 families living here, population being near 3000. Most village people get their livelihoods from farming, fishing, carpentry, day labouring, boat making. The main crop of this village is rice and wheat. However these village people have a big problem - lack of pure drinking water. They have tube wells but many of these are not working properly, and they are all have arsenic in the water. Every year many people are affected by arsenic poisoning. They have been trying to find out how they can overcome this problem.

Luckily a solution has come through the involvement of the Socio Economic Development Agency (SEDA), one of the nonprofit organizations in Manikgonj. In 2004 SEDA developed new ways to get pure drinking water, using Rain Water Harvesting Systems. There are two different types, one for a group of families, and one for an individual family.

Community Based System

They provided this system to 5 families in this village, who have been using this system from the last 5 years. The users can drink water from this system for one year before it requires simple cleaning. The total cost of the tank is 56000 taka. Every family needs 800 taka to have a share of this system - but SEDA has helped out through a shared-cost arrangement - they provide 400 taka and the family only has to pay the other 400 Taka.

Materials:
Brick, Sand, Rod, Tube well, PVC pipe, Tin, Guttering

The tank size is 8 foot high, 12 feet wide; with a capacity of around 15000 litres. To make one tank 5 people's labour is needed.

24 people can drink water from this tank - the system provides only drinking water.

This system provides cool and pure water, without any arsenic.

Uses:

Every year the tank needs to be washed to make sure there is no germ build-up. First the dry the tank, then apply bleach powder with a cloth, then this bleach is washed off. Then the family can use the tank again.

Household Based System

This is a smaller system that provides for just one family. It can be used in times where the group arrangement is unfeasible. Total cost is 16000 taka but the family needs only to provide 1600 taka family and SEDA matches the rest of the money. SEDA had provided this system to 53 families in this village.

The tank size is 6 feet high, 4.5 feet wide; the capacity of this tank is 3200 liter. To make one tank 5 people's labour needed. The user family can use this water for one year. After one year they need to wash it, using a similar process to the community system. This system can provide water for one family (6 Member), providing both drinking and household and washing water.

15. Bio-Gas demonstration plant

Pukuria is a village of Gior Upzila, Manikgonj area of Bangladesh, with about 350 families living here, population being near 3000. Most village people get their livelihoods from farming, fishing, carpentry, day labouring, boat making. These village people lack a proper supply of gas for cooking, and are instead using mud-made cooking stoves. For this reason they need to buy dry firewood which is very expensive. Sometime they can't cook anything to eat. They have been trying to find out how they can overcome this problem.

One possible solution has come through the involvement of the Government and the Socio Economic Development Agency (SEDA), one of the nonprofit organizations in Manikgonj. In 2003 Government developed as small-scale type of biogas plant, and sent out agriculture officers to promote the idea. One such officer noticed that SEDA have 6 cows, which would suit the using the bio gas plant.

The ideas behind the bio gas plant are quite simple. Organic wastes such as cow dung can produce biogas (a mix of methane and carbon dioxide) when fermented in an airtight container.

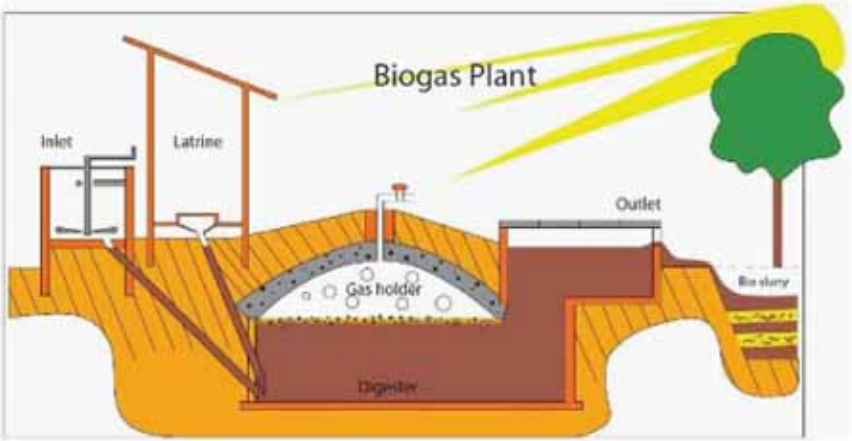
So for this plant the cow dung (around 40-50kg, from 5-6 cows) is mixed with water and fed into the airtight tank, where it produces the biogas over 24 hours. The fermentation is more active at higher temperatures so the tank produces more gas in summer than winter. Chicken manure can be used instead of cow dung as well. The tank needs to be washed about once a week. Two stoves can run by one plant.

In addition, biogas can help reduce global climate change. Normally, manure that is left to decompose releases two main gases that cause global climate change: nitrous dioxide and methane. By converting cow manure into methane biogas via fermentation, which is used for cooking, reduces the effect of global warming.

In general there are many potential benefits to biogas usage: saving fossil fuels, saving time collecting firewood, protecting forests, using crop residues for animal fodder instead of fuel, saving money, saving cooking time, improving hygienic conditions, producing high-quality fertilizer, enabling local mechanization and electricity production, improving the rural standard of living, and reducing air and water pollution.

Material: Cow dung, Water, One tank (Brick, Cement, Sand) Pipe

The total cost, 35,000 taka, is high. The government can provide 80% money as loan and the users have to pay 20% money upfront of the total cost. If the village people use this plant they can save money from firewood. So far SEDA uses the plant as a demonstration as the cost is still too high for the poor villagers. SEDA is looking for donor funds to help reduce these costs and making them more assessable to the community.



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