

Pumps and Ponds:

Responding to Drought Attributed to Climate Change in Svay Rieng, Cambodia

SNV Progress Brief

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Sometimes the most effective humanitarian innovations are the simplest ones.

To help farmers in Cambodia cope with intensifying dry seasons caused by climate change, we're helping them diversify from rice to vegetables. All it takes is a tarpaulin-lined pond, a hand-powered pump, and a bit of know-how and support.

Farmers in a pilot project are already sharing their good practices with others, and it's time to take the initiative to the next level.



Summary

SNV has been exploring ways to boost disaster preparedness through mainstreaming climate smart agricultural practices for smallholder farmers, with a particular focus on Svay Chrum district, part of Svay Rieng province in the southeast of Cambodia.

Following a feasibility study, a climate change adaptation pilot project was implemented from July 2012 in cooperation with local partner the Cambodian Farmer's Association Federation of Agricultural Producers (CFAP). There are two main elements:

- Promoting vegetable crop production through water storage and supply system enhancement (by use of a Rovai pump together with tarpaulin-lined ponds); and
- Rice production enhancement through wind pump water supply systems.

Both pilot projects aim to alleviate farmers' vulnerability to prolonged drought, and at the same time to produce more through additional crop cycles. Via simple technology to replace diesel-fuelled pumps, which are costly to farmers and the environment, the result is improved profitability. Moreover, food security and nutrition are also improved through the additional benefits of adding extra vegetables to dietary intake.

So far SNV has subsidized the cost of initiating adaptation practices among the target groups, and seeks ways to upscale and sustain the successes so far.

Promoting vegetable crop production through water storage and supply system enhancement

Improved tarpaulin-lined ponds and Rovai pumps were introduced and used by seven farmers. Each improved pond is capable of irrigating 400 square metres of land, doubling production possibilities from two to four cycles per year.

Compared to the baseline, the farmers' relative net annual income increased by \$144. Female farmers liked the Rovai pumps in particular since they alleviated the hard physical work of carrying water to irrigate the fields by hand.

We calculated that if farmers were investing their own money on these improved techniques, their breakeven period would be around three years or less, especially if they built just the tarpaulin-lined pond and waited to purchase the pump system.

This calculation assumes only sales of vegetables without considering the additional benefits of improved nutrition. In the next phase, we plan to introduce a fish-farming component to partly to reduce the return on investment period and further improve household nutrition.

The model design uses a 130 cubic metre pond lined with a tarpaulin sheet to reduce water percolation into the soil. Each pond is about two metres deep and measures about 10m x 5m at the base and 12m x 7m at the surface. A manually-operated Rovai pump connected to the pond allows farmers to pump the water to their crops directly.

Improving Profitability

On average, to cultivate vegetables a farmer spends about \$25 a year on each 400 square metre plot. This goes mainly on fertilizers and other inputs including seeds, plastic mulch and trellis string. Very few farmers use chemical pesticides

With the improved pond system, production can provide an average gross income of \$95 offering a net profit of about \$70 per cycle. This is roughly a 300% return on investment, compared to a baseline of about 165%.

Given that farmers can use the improved pond for four cycles per year, the total net profit comes to about \$285 per year.

It costs about \$585 to build an improved tarpaulin-lined pond and install a Rovai pump.

Rice Production Enhancement Through Wind Pump Water Supply Systems

Due to unreliable wind flow in the target locations, neither of two windpumps we set up could produce enough power to irrigate farmers' fields. Farmers also found it harder to fix problems with the windpumps due to their height. These challenges led us to shift our efforts towards Rovai pumps coupled with tarpaulin-lined ponds, which were found to be a more feasible solution.



Location of Svay Chrum district in Svay Rieng province, Cambodia (via Google Maps)

Sharing New Techniques

During the pilot, farmers became aware of the increased profit they could gain and began sharing the cost of renovating ponds, including the labour and materials needed.

Farmers also benefitted from the opportunity the ponds gave them to diversify into raising fish and ducks. Moreover, the ready supply of water augments disaster preparedness, giving farmers a solution to put out dry season fires.

This kind of interest from the target communities encourages us to sustain and upscale the pilot project results.

The technical capability to deal with equipment breakage is still of concern. While most farmers attended the maintenance and repair training provided by Ideas at Work, they did need close follow-up.

Opportunities

Improved cultivation practices can be introduced to farmers and further intensify production, including proper trellising, proper mulching, and/or better irrigation systems e.g. drip irrigation.

Awareness-raising on climate change will help farmers understand the need to change and adapt their production practices.

Though rice is the staple crop for securing food intake, vegetable cultivation is usually a subsidiary income-generation activity, providing cash to support daily living costs.

The relative profitability will encourage farmers to focus on surface water harvesting rather than ground water.

Further production intensification is possible through improved cultivation techniques and water-saving systems (e.g. drip irrigation) once the project scales up.

Farmers can also be informed about the possibilities that the pond-and-pump systems offer. Compared to rice, vegetable crops have a higher market value, afford more varied nutrition and yet are quicker to grow and require less water.

Further awareness-raising on the causes of climate change and adaptation opportunities can be delivered together with technical training.

Gender aspects

Before the pilot project, women spent an average of 70 hours a year on pumping and carrying water to irrigate 50 square metres of land whilst men spent about 123 hours per annum. To cover 410 square meters, this is 21 hours per cycle for women and 37 hours for men.

With the improved storage system, women spent 17 hours on Rovai pump pedalling and watering per cycle whilst men spent 31 hours.



Photo: Tarpaulin-lined pond in Svay Chrum district

About the Rovai Pump

'Rovai' is Khmer for 'turning something by hand'. The pump was designed by a Cambodian social enterprise, Ideas at Work (IaW), in conjunction with project partner Resource Development International (RDI). The standard 'RP6' model is simple to install, operate and maintain.

The pumps are made from stock steel protected with a three-part paint system, and fitted with stainless steel nuts and bolts to make the Rovai a very durable low-cost pump at around US\$75-100 each.

All materials used in the pumps can be found in Cambodian markets, making spare part problems a thing of the past.

According to IaW, more than 4,000 Rovai installations are benefiting 250,000 Cambodian people with easier and cleaner water.

Photo: IaW



For more information

To learn more about SNV and our work in Cambodia, visit our website at:
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About SNV worldwide

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