Irrigation efficiency

Results show that farmer A using sprinkler and drip over-irrigate his fields which creates considerable irrigation losses through run-off. In addition, paddy cultivation had considerable water losses through deep infiltration. Farmer C using furrow irrigation did not have high irrigation use since he temporarily relied on a nearby surface irrigation canal until it ran dry soon after he started to cultivate. Hence, reducing the irrigation losses from overuse will reduce the irrigation cost. Water used could be reduced by about 50 % in the future by applying water according to irrigation requirements.

	Farmer A	Farmer B	Farmer C
Water overused	1,381 m^3	5,767 m^3	6.4 m^3
Overused pumping costs	USD 50/ LAK 410,000	USD 210/ LAK 1,710,000	USD 0.2/ LAK 1,900

Conclusion

This study illustrates the great potential of groundwater use for irrigation in the dry season at Ekxang village, situated on the Vientiane Plain. Indeed, in the best-case, the system had generated almost 7 million LAK (850 USD) of profit from a 2 rai (0.4 Ha) plot of land. Such results could also be possible for other farmers by selecting crops with high profitability, low fertiliser requirements and by improving agricultural practices such as weed management. As well, reducing irrigation water use under sprinkler and drip irrigation will guarantee lower irrigation costs and therefore higher profits to the farmers. The first year of the trial reveals the limitations in the system capacity to support growing rice during the dry season. Rice cultivation requires a copious amount of water due to both the crop water requirement and huge infiltration/percolation losses in the dry season. Maintenance requirements were very low during the first year and the system needs to be carefully maintained by the groundwater user group in the coming years.

Future activities

This results to date are very positive and are expected to foster wider adoption of farmers to grow cash-crops in the dry season. The profitability of the system could be further improved by reducing the water use and increasing the crop productivity through better agricultural practices .

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Groundwater irrigation trial at Ekxang village, Phonhong district

Results for the first cultivation period:

28-12-2015 to 01-05-2016

IWMI International Water Management Institute

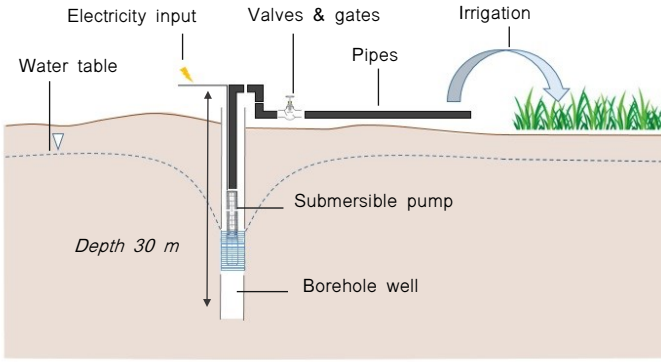
IGES Institute for Global Environmental Strategies

Australian Government Australian Centre for International Agricultural Research

CGIAR RESEARCH PROGRAM ON Water, Land and Ecosystems

Context

In 2015, project team members from Department of Irrigation (DOI), International Water Management Institute (IWMI) and the Institute for Global Environmental Strategies (IGES) developed the first community managed groundwater irrigation system in Ekxang village, Phonhong District, Vientiane Province. An operational irrigation system was built in the village close to the school. The site comprise two 30 m deep wells drawing water from an unconfined, sand and gravel aquifer. The site was designed to irrigate an area of about 30 rai (4.8 Ha) but currently irrigate less than 10 rai (1.6 Ha). This groundwater irrigation system is designed to enable dry season crop production by ensuring secure and reliable access to water. The system is managed by a groundwater user group from the village which is tasked with operating and maintaining the irrigation system.



Topics covered

- Present the results of the first dry season of cultivation
- Provide recommendations for enhancing the agronomic and financial performance of the system for forthcoming dry seasons

Results

Three farmers (A, B, C) cultivated during the dry season from January till early May 2016 over an area of approximately 1.3 ha (8 rai).

Crops grown

The table below presents the area cultivated by each farmer and the crops they decided to grow.

Farmer A	Farmer B	Farmer C
0.37 ha/2.3 rai	0.76 ha/4.75 rai	0.2 ha/1.3 rai
Watermelon	Rice	Sweet corn
Salad		Pumpkin
Coriander		Sweet potato
Pumpkin		
Snake gourd		

Irrigation water use

The table below presents the irrigation water use per farmer for the entire cultivation period and the water fee associated with pumping. Farmer B used more than 7000 cubic meter for paddy cultivation. Farmer A used less water but still 2340 cubic meter. Farmer C used a very small amount of water because he mostly used the surface irrigation canal.

	Farmer A	Farmer B	Farmer C
Irrigation method	Sprinkler and drip	Paddy	Furrow
Water use	2,340 m^3	7,020 m^3	128 m^3

Crop productivity

Crop productivity refers to the weight of crop harvested (in kg or T) on a per unit area cultivated basis. The results can be separated into two classes with crops having:

- High productivity (higher or similar yield compared to the Vientiane province average yield)
- Low productivity (lower yield compared to the Vientiane province average yield)

Reasons of yield fluctuation are detailed in the table below.

	Crops	Production yields	Reasons
High productivity	Morning glory, coriander, spinach, salad, snake gourd, pumpkin	5 – 10 T/ha 800 – 1600 kg/rai	Low fertility requirement Sufficient water provided to the plant
Low productivity	Sweet corn, sweet potato	1 – 4 T/ha 160 – 640 kg/rai	Low sowing density
	Watermelon	4.4 T/ha 700 kg/rai	Weed infestation
	Rice	1 T/ha 160 kg/rai	Insufficient water delivery

Agricultural cost and benefits

At the end of the dry-season farmers benefits (net profit) could be determined from the income received from sale, less the irrigation cost (i.e. pumping costs) and less the agricultural costs.

The table below presents the different costs, income related to crop production, and the profits farmers generated. Irrigation cost was subsidised by the project for the first season but is still taken into account in the calculation of profits.

	Farmer A	Farmer B	Farmer C
Pumping costs	110/ LAK 900,000	USD 317/ LAK 2,580,000	USD 5.2/ LAK 42,000
Agricultural costs	USD 86/ LAK 700,000	USD 90/ LAK 730,000	USD 66/ LAK 540,000
Income	USD 1,043/ LAK 8,500,000	USD 172/ LAK 1,400,000	USD 191/ LAK 1,560,000
Profits	USD 847/ LAK 6,900,000	USD -234/ LAK -1,910,000	USD 120/ LAK 978,000