

Watershed management transforms lives

An inclusive and participatory integrated watershed management program has brought prosperity to the small rainfed village of Lucheba, China.



Village roads constructed through collective action

Until a decade ago, the steep slopes of the Lucheba watershed were hot spots of poverty and malnutrition. Agriculture in this rainfed area was a challenge for smallholder farmers, with scarce water supply compounded by degraded natural resources, low crop yields, and lack of access to roads and market.

Fast forward to 2013 – the watershed area is now covered with lush green vegetation. The old and dilapidated houses that once stood in the village square have been transformed into brand new concrete houses with big courtyards and gates, equipped with modern appliances and gadgets.

“We started using harvested rainwater for cultivation, and everything just changed,” said Mr Peng Fay Ou, a farmer with a one hectare landholding in the Lucheba watershed. With seven members in the family, he used to earn 3,000 RMB (US\$ 500) per year. Now his agricultural income has increased three folds, to 10,000 RMB (US\$ 1,650) per year, largely due to growing vegetables thrice in a year using harvested rainwater.

ICRISAT’s interventions through its participatory integrated watershed management program (IWMP) have changed the lives of hundreds of smallholder farmers and their families in the small village of Lucheba.

Unlocking the potential of rainfed areas

For the people of Lucheba, change began a decade ago, when ICRISAT and the provincial government brought to the village the results of its long years of research for development work on integrated management of natural resources for sustainable rainfed agriculture. In partnership with the Guizhou Academy of Agricultural Sciences (GAAS), the national agricultural research system, local communities, and farm families, ICRISAT led a consortium of partners in implementing the Lucheba watershed program supported by the Asian Development Bank (ADB) from 2003 to 2006.

Focused on reducing poverty and land degradation by adopting an inclusive, farmer participatory approach, the watershed management program introduced into



Photo: ICRISAT

under the Lucheba watershed program.

the small village various interventions such as soil and water management, improved cropping systems, crop diversification, integrated nutrient management, and integrated pest management practices, along with other income-generating microenterprises such as poultry and pig rearing.

Throughout the program's duration, the communities were involved and played an active part, from identification of constraints and interventions, implementation, monitoring and evaluation, to impact assessment.

As an entry point activity, the community came together in implementing two drinking water schemes by harvesting water from natural springs, and transporting the water through pipes in the villages.

Throughout the program, the community undertook the construction of 151 rainwater harvesting structures-cum-irrigation water storage tanks, planting of 133,600 trees on 100 ha of wasteland, construction of an approach road, and crop diversification with high-value vegetable crops in the watershed.

More than 260 biogas plants were set up in the village households to reduce pressure on fuel wood and to protect the forests. The whole village now has biogas-powered street lighting.

Farmers with support from the project, their own contribution and partial support from the government, constructed a 4.8 km village approach road from the main road to facilitate the transportation of the vegetables produced to the markets. Later, a 6 km-long field road was constructed with support from the government.

Clear and sustained impacts

In 2013, seven years after the completion of the ADB-supported watershed program implemented in 2003-2006, ICRISAT revisited the small village of Lucheba in a study titled "Impact Assessment of Lucheba Watershed, China" targeted to gain a fair understanding of the extent of impact of the watershed program at the village level involving the whole community.

An investment of US\$ 472,191 in the Lucheba watershed development program has gained a net present value of US\$ 14.7 million, and 31.14 benefit-cost ratio at 20% internal rate of return (IRR).

Now managed by farmers and other community members, the Lucheba watershed program has clearly demonstrated the long-term sustainability of an inclusive development intervention in terms of crop productivity, women empowerment and poverty eradication.

While a large number of studies have pinned watershed development program as among the most appropriate strategies for the development of rainfed agriculture ecosystem, few have been as successful and sustainable as the Lucheba watershed program.

Engaging people, inclusive growth

Mrs Song Pangying is now a micro-entrepreneur. While her husband works away on their one hectare land, Mrs Song runs a small grocery shop in another village. The family's investments have extended to poultry raising.

Mrs Song's daughter-in-law, Mrs Caiyang Ju is 22 years old, cooks for the family and takes care of the home in the absence of her mother-in-law. She plans to expand to vegetable cultivation to earn more income for the family for a better life.

"We wanted to move to cities in search of better opportunities. Back then, money was very hard to come by. But now due to the watershed program we are able to identify new ways to earn more," says Mrs Wang Xianhui, women group leader in Lucheba. "Our village environment is cleaner than in the cities."

Economic transformation in Lucheba

- Increased average household land area with irrigation by 94%; reduced rainfed area by 34%.
- Area with high-value crops, like vegetables, of average household increased from improved water conservation measures
- Yield levels of crops increased by 6-19% in rice and maize, and 32-673% for various vegetables.
- Farm-based employment and income shows that diversification in favor of high-value vegetable crops has increased labor earning by 82%.
- Farm income from crops, largely vegetables, increased by 192%.
- Total household income rose by 32%.
- Crop diversification significantly improved household food availability/security, shifting dietary patterns in favor of fish, meat, milk and eggs, while retaining cereal consumption.
- The Lucheba watershed development program cost of US\$ 472,191 has gained a net present value of US\$ 14.7 million, and benefit-cost ratio of 31.14 at 20% internal rate of return (IRR) on investment.



A woman farmer enjoying the sight of her lush field of vegetables.

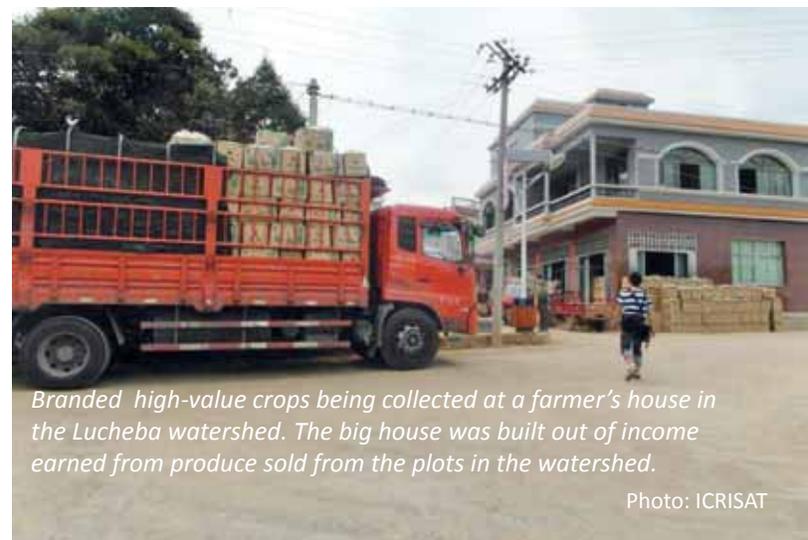
Photo: ICRISAT

"In all 1,347 people residing in the 43 km² area with 340 households in 6 village farmers' groups have benefited immensely in terms of improved quality of life, better environment, and increased incomes," said Mr Yang, village chief of Lucheba.

"Our farmers are now well trained with new technologies, and are able to cope better in any adverse situation, like low market prices. The change in the village happened when our farmers started growing vegetables instead of rice – farmers now harvest rainwater, and are highly aware of water-use efficiency," Mr Yang added.

The impact assessment study confirms that the Lucheba watershed model holds promise as an appropriate approach for improving the natural resource base and enhancing livelihood options, and that it can be replicated in other dryland ecosystems in China. The outcomes of the case study also suggest that scientists and policy makers of technical and institutional arrangements for watershed development programs should have an in-depth understanding of the socio-economic and ecological linkages and stakeholders' perceptions for long term shared watershed management.

The Lucheba watershed program has indeed shown that building solutions and making decisions together bring lasting benefits for all. ■



Branded high-value crops being collected at a farmer's house in the Lucheba watershed. The big house was built out of income earned from produce sold from the plots in the watershed.

Photo: ICRISAT