

Peru Details

CHALLENGE:

How could we use technology to improve efficiency in the distribution and use of water for irrigation in the high-mountain Ccatcca district so that the area's farmer producers can enjoy continuous production of fodder for family livestock and thus help to overcome rural poverty?

Description of the challenge:

Fifteen years ago, twelve small rainwater reservoirs were established. Together, they store 1 million cubic metres of water. Because of this, around 260 farmer families currently use spray irrigation technology, essentially for the production of fodder crops (rye grass and clover), which in turn enables them to commercially produce guinea pigs, an activity that has become their main source of income.

However, the increasingly obvious consequences of climate change are having an impact on the region and are manifest in droughts and frosts. It has been observed that irrigation water generally dries up between the months of August and September. This represents a 2.5-month "trough" with no water for irrigation when fodder availability falls drastically, thus forcing farmer producers to get rid of their livestock capital and see their hopes to improve their family incomes thwarted.

Extending the availability of irrigation water to cover all the low-water months is essential in order to guarantee sustainable economic incomes for these producers.

These 260 farmer producers currently use spray irrigation technology, even though it is commonly known that this system is only approximately 60% efficient. The challenge is therefore to increase this efficiency to 90%, a figure that we estimate will provide these farmer producers with irrigation water throughout the low-water months and drastically reduce the decrease in available fodder. We likewise understand that a new way of managing water distribution by irrigation organisations is necessary.

This, therefore, is the problem we are facing: because of a lack of water for irrigation for an average of 2.5 months a year (September, October and November), the animal fodder available falls drastically. This forces farmer producers to get rid of their livestock capital (in order of economic importance: guinea pigs, sheep and bovine cattle), which has a negative impact on their family incomes.

It is hoped that the following objectives will be met in this challenge:

- 1.** Incorporation of much more efficient irrigation technologies to make irrigation water available throughout the low-water period in the farming communities of the Ccatcca district.
- 2.** Improvement of the irrigation water management systems as regards distribution, assignment and application (irrigation frequencies and times).
- 3.** Introduction of new species of fodders that, for example, require less water without the volume of plant matter currently produced being affected, or increasing the supply of plant material using the same amount of water, etc.
- 4.** Improvement in fodder storage systems to ensure available fodder in the low-water months.

Mission of the challenge:

To make use of technology to increase the availability of irrigation water and guarantee a stable fodder supply throughout the year for the development of family livestock operations.

Beneficiaries:

The typical beneficiary is a farming family with five (5) members involved in agriculture and fishing and a farm of eight (8) plots. Each plot covers an average of 1,200 m². Of these plots, two (2) have spray irrigation and perennial fodders are grown on them (clover and rye grass). The others are assigned to dryland crops or, in other words, the following crops depend on the rainfall cycle (November– April): Andean tubercles (*papa*, *oca*, and *lisa*, etc.) and cereals (barley), basically destined for home consumption.

Livestock activity, meanwhile, is focused on the breeding of guinea pigs (200 units), the family's main source of income. An average 25 guinea pigs are sold each month and this generates an income of 125.00 euros. If necessary, the head of the family migrates temporarily to the city to boost the family's income.

Of the communities concerned, Cuyuni and Ccopi are contiguous territories and form a single irrigation organisation, as they depend on water from the Iscaycocha reservoir. Machacca is another territory with another irrigation organisation that depends on water from the Machacca reservoir. From conversations held on Tuesday 9 April with irrigation water users, we have extracted the following information:

- They largely agree with the considerations set out in the description of the challenge.

- They have access to irrigation water once a week and this water usually dries up at the start of November. In irregular years or when there is a drought, water from micro-reservoirs tends to dry up in September.
- Their main irrigation crops are perennial fodders, the *papa mahuay* (early sowing) and salad vegetables, in order of importance. The two last crops mentioned above are mainly destined for home consumption by the family.
- The lack of water affects family diet as they regularly consume guinea pigs as well as salad vegetables. Heads of families are also forced to migrate to the city to sell their labour. They also state that this situation encourages young people to abandon their communities.
- Part of the problem, they acknowledge, lies in defects in the management of the irrigation system and a lack of maintenance of the installed infrastructure. From a technical perspective, they indicate that greater training in the application of irrigation water is necessary and are aware that this problem should be tackled by improving management and water application skills. We stressed that any intervention (problem-solvers) should bear in mind lasting sustainability of the technical and/or innovation proposal.
- To deal with the problem, they suggest the following: changing the watering method to drip irrigation, building new rustic dams and reservoirs, trying out new varieties of alfalfa, increasing the production of oats and receiving training in the use of water. They also propose reducing the rotation of “tomeros” (people in charge of distributing the water) and providing them with training.
- Over the years, the number of irrigation water users has increased and given demographic trends, it is envisaged that fewer families will be incorporated into the system. An annual increase of three (3) families is estimated or, in other words, a total of thirty (30) families in the next 10 years.
- The commercial production of guinea pigs has enabled them to improve their family incomes and to give their children an education.
- If they had more water, they would sow more crops to increase guinea pig production, as this represents a good alternative to maintain the rise in family incomes.

Development areas

1. Incorporation of much more efficient irrigation technologies.

Design or adaptation of irrigation technologies with which farmer producers can use the water currently in the dams to irrigate throughout the low-water period. Communities of the Ccatcca district are located in a high-mountain region at an altitude of over 3,500 metres the terrain of which has the following basic features: abrupt relief, steep slopes and an average relative humidity of 65%.

2. Improvements in irrigation water management systems.

The introduction of a new technology or process is understood to require changes or adaptations in the current water management system. This management covers the organisational part (distribution and assignment of turns) and the application part (irrigation frequencies and times to suit the crop type). Periods of skills training for users and managers of irrigation organisations should be taken into consideration.

3. Introduction of new species of fodders.

It is also possible to consider the option of introducing and/or adapting new species of fodders that require less water, without affecting the volume of plant matter currently produced, or of increasing the supply of plant matter with the same amount of available water and incorporating new fodder production procedures.

4. Improvements in fodder storage systems.

Also being sought are innovations that provide greater fodder storage security and prevent the loss of its dietary qualities in order to make it available in the low-water months.

Furthermore, if the proposed technological innovation is approved, there is great potential for scalability, as this could be applied to improve efficiency in the use of water in the other twelve (12) reservoirs in the Ccatcca district.

Lastly, the project's sustainability will not only be determined by the solution to the existing problem, but also depends on beneficiaries gradually assuming the operating and maintenance costs of the irrigation systems.

Support documentation:

- CCAIJO Projects Framework Programme 2012 – 2016
- CCAIJO Projects Framework Programme 2017 – 2021
- Diagnosis of the Ccatcca microbasin, May 2009
- Ccatcca Approved Development Plan 2015 – 2018
- Report on the Quispicanchi Listening Phase W4P