

## Are there ways to reduce risks in family agriculture in Bolivia?



Yapuchiri Francisco Condori Alanoca, farmer of the Cutusuma community, La Paz.

### Agro-climatic local observers give their answers

The Aymara people call them “Yapuchiris”, the Quechua people speak of the “Yachay Puquchij”, for the Bolivian people who communicate in Spanish all of them are “Agro-climatic Local Observers”. The name may sound modern, but the profession is as old as agriculture in the Andes. In recent years, hundreds of locals have been gaining knowledge, self-esteem, credibility and reputation. These “observers” are rural people who closely observe their natural surroundings and can interpret the climatic phenomena. They are leaders in their communities who have learned to manage the risks of agriculture under increasingly precarious conditions because of climate change. Improving the production of plots in their communities and preserving crops in the face of climate adversities are the main tasks of local observers. The revitalization of this ancestral profession and the implementation of a sophisticated agricultural early warning system (EWS) by the Ministry of Rural Development and Land – MDRyT (by its Spanish acronym) have been supported by the Swiss Cooperation in Bolivia since its inception through the Disaster Risk Reduction Project, active between 2005 and 2018.

“We, the Yapuchiris, are farmers by calling”, says Francisco Condori, a peasant from the Cutusuma community, located in the northern highlands of Bolivia, a few steps from Lake Titicaca. Over the years, Francisco has become a leader in a movement that recovers ancestral knowledge and combines it with modern scientific *Know-how*. He is one of the pioneers within the Federation of Union of Productive Associations of the Highlands – FUNAPA (by its Spanish acronym), an organization that - in the provinces of Ingavi, Los Andes, Omasuyos and Aroma - has 45 members who are Yapuchiris (34 men and 11 women).



Yapuchiri Ascencio Machaca Siñani.

For rural development experts, local observers are the new extension workers in the agricultural sector. The model that we want to follow is not an external assistance-oriented model anymore; rather it should strengthen the role of local observers for them to become facilitators among their peers in the community. They do not confine themselves to observing and recording climate events with the purpose of making forecasts: modern Yapuchiris are powerful agents of change for - among others - valuing and spreading new crops, improved seeds, organic fertilizers, or making know and controlling pests in their communities.

*"We don't carry papers and concepts like engineers. What we teach to other community members, we have researched and tested in our plots",* says Francisco, a born communicator. His advice has weight. *"I haven't failed any year; people have seen that. They asked me what my recipe was. They come looking for me to see how I seed or how I prepare the land. At the beginning, they thought I used chemicals to yield such large crops. I taught them to grow without chemicals and how to observe the climate".* Francisco carries the agricultural green flag along with other Yapuchiris to the communities in the Highlands and uses bio-inputs to fumigate the leaves affected by pests or to treat the seeds. Production in his own plots is varied. He says that today, potatoes yield the most in the market. In his plots he also grows oca [oxalis tuberosa], beans,

corn or quinoa: *"I need a variety of crops for consumption at home and to reduce the risk of losing a crop by frost, drought or floods."*

*"External evaluations demonstrate that the project, which is essentially based on the Yapuchiris as agents of change and on organized peasant communities, has given significant results"* says Oscar Paz Rada, a Bolivian civil engineer, specialized in water resources and environment, Director of the project run by HELVETAS Swiss Intercooperation, the organization that executed the project in its final two stages by mandate of the Swiss Cooperation in Bolivia. Among others, Paz Rada mentions an important increase of agricultural production for some crops such as potato, quinoa or onion in certain areas of the highlands. It is estimated that more than 2,000 producers from the countryside and their families have been able to improve their income and overall economy thanks to the application of new agro-ecological systems. 32 centres of bio-inputs have been consolidated in the area of the project. Today, no less than 34 communities have risk maps to anticipate and combat disasters.

#### **A new profession**

At the beginning of 2019, Bolivia had around 440 agro-climatic local observers, of which 15% are women. All of them have taken training courses. Through regional events, they are familiarised with new experimental techniques and can exchange their knowledge with engineers and scien-

tists. A major step was achieved recently with the recognition of the work of the local observers by the competent authorities of the Bolivian State. Although they still work *ad honorem*, Yapuchiri is now a profession for which there is basic training. The Suka Kollus Program (PROSUCO, by its Spanish acronym) planted the seed for the movement of the agro-climatic local observers in the early 2000s. In the northern highlands, the project, supported by the Swiss Cooperation in Bolivia, was dedicated to reviving an ancient tradition to combat the risk of flooding and frost: cultivation in high plots, which have the form of raised beds [see *Waru Waru* agricultural technique]. The project sparked growing interest in a more systematic observation of the climate and its effects on agriculture in communities distant from the influence of modern technologies.

The strength of the Yapuchiris today is an agreement on the complementarity of ancestral and modern knowledge in agriculture. Francisco uses several sources of information with equal ability. On the one hand, he uses data from his automatic agricultural meteorological station installed by a university a few steps away from his home or he reviews information on climate and temperature that he receives on his smartphone via commercial apps. However, on the other hand the basis for his analysis is always his own observation in the field. His proximity to the local producer is essential: *"Climate, soil, crops and even the people's*



Yapuchiri Donato Quispe Tacachira.

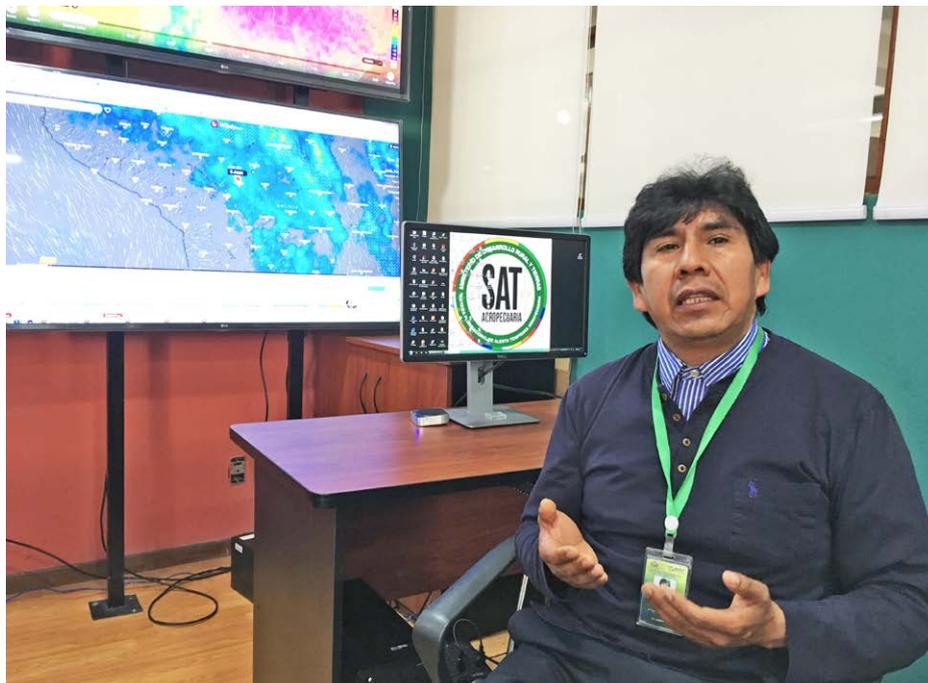
character differ from province to province. For this reason, the Yapuchiris have to be observers who live in their community. We have a great social responsibility. People take our advice on appropriate timing and good locations for sowing or harvest or frost warnings”, says Francisco.

### Powerful bio-indicators

The Yapuchiris are famous for their agricultural climatic forecasts based on bio indicators. “We know how to observe the behaviour of plants and animals, the formation of clouds or the direction of the winds. We also know the constellations of stars”, says Francisco and gives an example of a bio-indicator that never fails in his community: “Qiri Qiri is a very small wild bird that lives on the shores of Lake Titicaca. Between August and October, one must check the height at which the Qiri Qiri builds its nest on the totora plants. If the nest is located at a height very close to the water level, this means that rain will be scarce. If the nest is higher, it is likely that the lake will grow to that level and we consider that it will be a rainy year.”

### Early warning for agriculture

A challenge for the future is the integration of knowledge and local observations with conventional technological information that comes from different meteorological and agricultural weather stations, among them the National Service of Meteorology and Hydrology – SENAMHI (by its Spanish acronym), as well as commercial satellite



Franklin Condori, economist, head of the Unit of Rural Contingency - Agricultural Risk Management.

systems. Many Yapuchiris are already part of the Network of Local Observers sponsored by the Ministry of Rural Development and Land for them to be part of the agricultural SAT. The implementation of the technical core, on which the system is managed, has been supported by the Swiss Cooperation in Bolivia through the Disaster Risk Reduction Project.

The Operations Centre in the city of La Paz is governed by large screens. From

one of the floors of the Ministry of Rural Development and Land all the agricultural climate information of Bolivia is monitored. This is the realm of Franklin Condori, a loquacious 53-year-old economist born in La Paz. As head of the Unit of Rural Contingency - Agricultural Risk Management, he has been commissioned - along with a small group of Bolivian collaborators and prominent international consultants – to implement the new computerized system for weather monitoring and to organize the dissemination of weather information and forecasts to the municipalities. By law, 339 municipalities in 9 departments of Bolivia must prepare themselves to face disaster situations and to warn about risks in rural areas.

Why are the local observers important for the Agricultural SAT system? Condori does not hesitate to emphasize the value of their contributions: “They are key, not only to consolidate the information on warnings, but also to understand possible risk scenarios. In this way, they help us, for example, in defining the recommended periods for sowing. In general, their contributions strengthen the inter-scientific information and forecast system.”, Condori has a long experience in the field of reducing the risk of disasters in Bolivia: “I am convinced that the ancestral knowledge is useful not only for alerts, but also in establishing preventive measures in the management of small ecosystems”.



Yapuchiri Virginia Quispe Chuyma.



Yapuchiri Alejandra Mamani from Tihuanacu, La Paz.



Yapuchiri Francisco Mamani Chávez.



Yapuchiri Rosa Mamani from Tihuanacu, La Paz.

According to Oscar Paz Rada, Coordinator of the Disaster Risk Reduction Project, Bolivia and its 11 million inhabitants are very vulnerable to the effects of natural phenomena and the threats of climate change. Bolivia - along with the other Andean countries - is located in an area of intense climate activity, periodically affected by the El Niño / La Niña phenomenon. There are natural threats in the territory every year, such as frost, hail, drought, flooding and landslides. Even though Bolivia has consistently suffered from the consequences of natural disasters throughout its history, in the last decade the frequency, magnitude and intensity of them have increased due to climate change, among other factors. Consequently, natural disasters and climate change are the main foci of attention because they virtually affect all development activities.

The Swiss Cooperation in Bolivia, through the Disaster Risk Reduction Project has assisted Bolivia in strengthening its national capacities for risk governance, building a culture of resilience and strengthening emergency response, including first responders, with an investment of USD 18 million from 2005 until the end of 2018. According to Rodrigo Villavicencio, National Programme Officer of the Swiss Cooperation in Bolivia, the project had different approaches:

- To support the National Agricultural Early Warning System through the development of computerized models, include social participation and recovery of ancestral knowledge.
- To strengthen the risk prevention capacities at the three levels of state, for example, by adapting and applying a tool of Swiss origin that - through a threat and cost/benefit analysis of prevention measures - facilitates and improves investment decision-making.

This approach considers disaster risk and climate change to avoid possible damage to the population and infrastructure. In addition, emphasis was given to the development of institutions to work on the subject, among others the Risk Management Units, established in municipalities, departmental governments and ministries.

- To develop other tools, which may allow building new works or improving existing works in a more resilient way, avoiding risks related to climate change such as floods, damage to infrastructure and others.
- To include disaster risk reduction and adaptation to climate change in the study plan of degree programs such as civil engineering, agronomy, architecture or communication of universities in Cochabamba and La Paz. The objective is to improve risk prevention and resilience of infrastructure and of development projects in the future.
- To strengthen "Rapid Response" with the purpose of consolidating the capacity of State organizations at municipal, departmental and national level in actions against climate change-related natural disasters.
- To recover and validate the ancestral knowledge in agriculture which - combined with current, local and global knowledge - allow improving practices and procedures in agricultural production thus avoiding losses and improving the condition of families in rural areas.

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