



SUPPORTING FOOD SECURITY IN BOLIVIA SOWING BEANS, SOWING HOPE



New higher-yielding bean varieties: a farmer has just brought in a harvest of 'Negro chané', a bean variety introduced by the project.

In order to introduce more valuable, durable and easy-to-grow agricultural plant species in Bolivia, in the 1970s the Swiss Agency for Development and Cooperation (SDC) began promoting the cultivation of beans. Beans adapt well to several of the climates found in Bolivia and thanks to their nutritional value also improve the diet of rural communities. Beans also command high prices and were therefore a good business opportunity for agro-industrial producers. Over a 27-year period to 2014, the SDC helped, in cooperation with Bolivian partners, to increase the area under bean cultivation from next to nothing to almost 60,000 hectares, with multiple positive effects. The introduction of this crop not only increased incomes but also improved living conditions. Beans also provided a more diverse diet – richer in protein, iron and zinc – and improved the health of many rural communities in Bolivia. At present, some 4,000 Bolivian families – 70% of whom live in Santa Cruz, the country's most agricultural region – are growing beans.

Frijol, frijol, frejol, poroto, habichuela, habilla, caraota, alubia, chuwi: the large number of names given to beans shows

how widespread and important this legume is in the various countries of the American continent, where it originat-

ed. Bolivians call beans either 'porotos' or, more commonly, 'frejoles'. They have been grown in Bolivia since ancient times but only became a commercial crop in the late 1980s, which is when the SDC began, in conjunction with various partners, to promote its cultivation. To this end, the SDC formed a working group with two partners that complemented its strengths: Colombia's **International Centre for Tropical Agriculture (CIAT)**, which specialises in the conservation and genetic improvement of bean seeds with methods involving no genetic modification, and the **'El Vallecito' Agricultural Research Institute** of Gabriel René Moreno Autonomous University in Santa Cruz de la Sierra, Bolivia. The El Vallecito

institute specialises in adapting seeds to Bolivian conditions and in training farmers – men and women – in how best to plant, harvest and store beans, to prevent and combat pests and obtain the highest possible yields.

What concrete benefits did the project bring? Small, medium-sized and large growers took part in selecting the most suitable seeds from a range of varieties developed by El Vallecito and CIAT on the farmers' own plots. These seed varieties were then planted on land of various soil types and sizes with advice from agronomists such as Víctor Choque and José Padilla. To encourage farmers to grow beans, the two are always on the road, traversing arid mountain regions, valleys and plains. Some of the roads they travel on are good; others are so far off the beaten track, they look like goat paths. "They call us the bean guys", says Choque, "and we wear the name with pride because we believe in the humble bean: we've seen how bean cultivation has improved people's lives."

MORE RESISTANT VARIETIES

Farmers in the valley regions strive to produce bean seeds certified by the government-mandated National Agriculture and Forestry Innovation Institute (INIAF). The reason for this is simple: they can sell these seeds for about seven times the price of normal beans for the consumer market. The farmers sow beans at the beginning of autumn and reap the harvest only three months later. This short growing season gives beans an advantage over other crops grown in this region, such as maize and tobacco. After the seeds are harvested and carefully selected and packaged in bags, they are sold to agro-industrial businesses in the north of Santa Cruz, a plain that lends itself to intensive farming and where beans are sown and harvested in winter. Along with sesame and chia, beans are an alternative to the main crop grown in Santa Cruz, namely soya.

Because the farmers in the valley regions have limited capital and are rarely able to store seeds for their own use, the year following the harvest they buy the seeds – including seeds from the north of Santa Cruz – they will use to grow their own crops. Over time, this threatens the quality and quantity of bean crops, in particular because the seed certification process (as part of which the authorities test the seeds to guarantee their purity)

is rather imperfect in Bolivia. Growers sometimes use diseased plants or seeds that 'segregate', i.e. that have not been well selected and will trigger genetic mutations leading to changes in colour and bean variety over successive crops. Bean diseases that can be transmitted by bacteria, viruses and insects have therefore spread far and wide. Farmers complain that "there were no pests in the old days and now we have to spend a lot of money on pest control", which harms the environment and cuts into their profits.

This is where the men and women of the El Vallecito institute come in. Working with the support of CIAT and the SDC, they are developing biofortified bean varieties with a higher iron and zinc content which are more resistant to diseases and lack of water. They also evaluate and distribute these certified seeds and teach farmers how to protect them from potentially destructive pests. It is a constant race to stay ahead of changes in the natural environment.

THE HUMBLE BEAN CONQUERS BOLIVIA

Bertino Rocha is a smallholder farmer in Mairana, a municipality in a valley at an altitude of over 1,000 metres. The area enjoys a temperate climate that is ideal for growing beans. As a model farmer and head of his village, Bertino, who is nearly 80 years old, has witnessed and played a role in almost every stage of the project. He recalls: "They brought material from Colombia and asked me to plant beans in a plot of land I had under irrigation. I sowed five kilos of seeds, which yielded 11 hundredweight (46 kilos each). I had to pay El Vallecito twice the amount of bean seeds they'd given me (namely 10 kilos). I sowed again the following year and delivered 200 hundredweight. That's how the programme spread. Eventually, 5,000 hectares were planted throughout the region." El Vallecito is still using this seed exchange system: for every hundredweight of seeds a farmer is given, the farmer is required to give back two hundredweight; these seeds are then distributed to other farmers. The big agricultural companies also operate in the same way as a solution to the problem that smallholder farmers are short of working capital. Unlike El Vallecito, how-



Key to innovation: staff members of the 'El Vallecito' Agricultural Research Institute with Víctor Choque (left) and José Padilla (front row, centre).

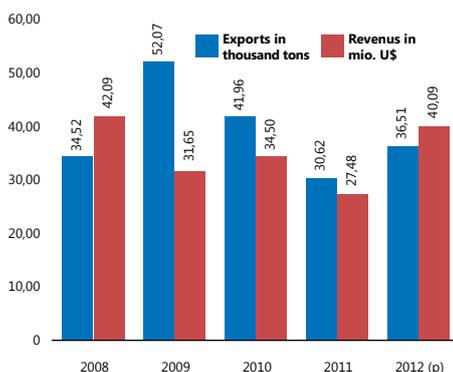


Pioneer bean farmer Bertino Rocha has tried growing dozens of varieties.

ever, the agricultural companies export beans. Of the total annual production of 100,000 tonnes, 70% is exported, mainly to Brazil, Colombia and Spain, earning Bolivia USD 25 million.

Bertino remembers a number of occasions when people from the project knocked on his door to propose that he try growing this or that new variety on his land. Agricultural technicians, agronomy students and other farmers tested dozens of bean varieties on the parcels he lent them: the 'negro sequía', an extremely fast-growing black bean variety developed by El Vallecito to help farmers cope with dry years; the 'fortaleza', a reddish bean; and the 'negro Chané', named after a municipality in the north of Santa Cruz, the biggest bean-producing region.

Export of beans from Bolivia



Source: Bolivian Institute of Foreign Trad, 2013

THE FIRST SEEDS: AS GOOD AS GOLD

Juan Carlos Galviz works in Valle Abajo near Mairana. The son of a farmer, Juan Carlos is as knowledgeable as Bertino. After gaining a degree in agronomy from the Universidad Autónoma Gabriel René Moreno, he returned to the countryside, where he owns 100 hectares with his brother. Juan Carlos is an example of the upward social mobility that has been transforming Bolivia in recent decades. As a graduate of El Vallecito, he was an ideal candidate to introduce bean cultivation in his community. The first seeds he was given were so valuable that the experts from the university could not afford the luxury of allowing them to be used to grow beans for the consumer market. They therefore warned the farmers who pioneered the cultivation of these seeds that if they sold their harvest to third parties they would be sent to prison. Since those early days, much has happened in Valle Abajo. A succession of different bean varieties have been grown; big export companies have appeared on the scene (for every seed they distribute to farmers they get two in return); pests – which were a rare occurrence at first – have multiplied; and Juan Carlos and other smallholder farmers are now able to use modern agricultural technology for nearly all their agricultural tasks. Juan Carlos is boosting his productivity thanks to precision agricultural methods and used machinery he carefully keeps

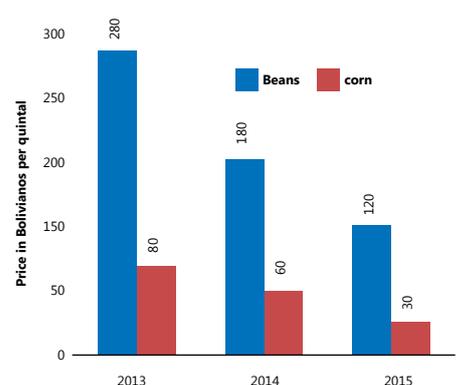
in good repair. He invested in machinery most of the income he earned from growing beans between 2006 and 2013, when he could sell each hundredweight destined for the consumer market for 400 bolivianos, or approximately USD 57. Things have changed since then but the bean farmers are still hopeful: "I will keep farming beans because it's a fast-growing crop and the cash I earn from selling beans allows me to grow maize and tobacco," says Juan Carlos.

With the money he earned growing beans and raising pigs (pig farming was another SDC project he took part in), Bertino Rocha bought half the 20 hectares he now owns. Juan Carlos bought machinery. The farmers in the north of Santa Cruz, for their part, purchased big tractors, sowing machines and harvesters.

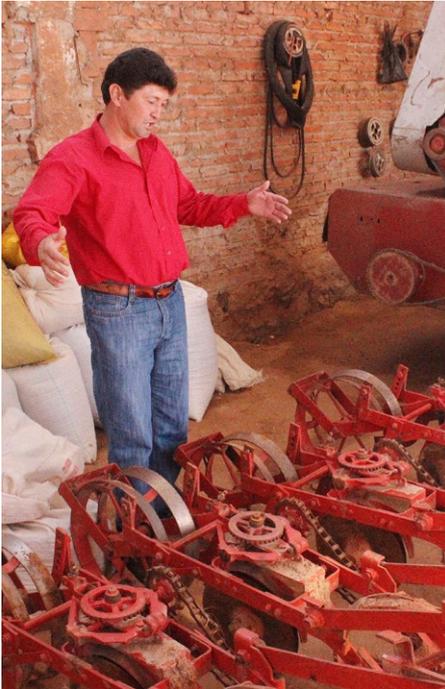
PROTEIN, IRON AND ZINC: BEANS IMPROVE THE DIET OF THE GUARANI PEOPLE

So what has become of the farmers who own very little land? El Vallecito is also working in the Chaco region of Santa Cruz, an arid zone inhabited by indigenous Guarani communities that depend on subsistence farming and livestock rearing. The project introduced bean cultivation in Chaco mainly as a contribution to food security, that is to say to improve nutrition among smallholder farmers who used to subsist almost exclusively on maize. In addition to farming activities proper, men and women were also taught how to cook beans in various

Higher revenues thanks to beans



Source: El Vallecito. One quintal is 46 kilos.



Driving progress: selling beans has allowed Juan Carlos Gálvez to buy agricultural machinery.

ways and how to use bean flour to make cakes, biscuits, snacks and deserts. It was a big success: the Guarani now consume 16 kilos of beans per person per year on average, compared with the national average of half a kilo. This addition to the local diet has significantly increased the protein, iron and zinc intake of the Gua-

rani, and Guarani children in particular: "Since we started eating more beans, our children have perked up and have put on weight", says Gueisa Arias Bravo, a women's representative from the community of Itembewasu. She heads a team of cooks of both sexes who promote the advantages of beans: "In the old days we didn't know how to cook beans and our families wouldn't eat them. We've now learnt how to prepare beans and everyone loves them", says Gueisa Arias while stirring a pot of black beans and pork, which is a staple meat in the region. The Guarani make a feijoada which it is fair to say – with apologies to Brazilians – is the tastiest in the world. They also make bean biscuits and bean bread as well as dozens of other delicious foods made from beans.

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This publication is also available in German, French and Spanish.

Now that the project is finished, the SDC is making all the knowledge it has acquired about bean cultivation available to the National Agriculture and Forestry Innovation Institute (INIAF). This knowledge includes how best to promote bean cultivation in different ecological settings and production conditions, and how to organise bean growers and expand the areas under cultivation. It is hoped that INIAF will continue to work with El Vallecito and that El Vallecito will use its own resources and the support of other financial backers to keep sending its seeds and 'bean guys' to rural areas.



More beans, better health: a Guarani community meeting about bean consumption.