Managing agrobiodiversity in successful smallholder landscapes in Ecuador

Producer organisation: Union of Peasant and Indigenous Organizations of Cotacachi (UNORCAC)

Agrobiodiversity Case Study 1: Ecuador

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Forest and Farm Facility

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Cover photo: Muyu Raymi seed fair in 2022 showing maize varieties from the Cuicocha Pana community © UNORCAC

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Acronyms

UNORCAC	Union of Peasant and Indigenous Organizations of Cotacachi
GIAHS	Globally Important Agricultural Heritage Systems
NGO	Non-governmental organisation

Summary

The Union of Peasant and Indigenous Organizations of Cotacachi (UNORCAC) has played a fundamental role in the conservation of agrobiodiversity in the forest and agricultural landscapes of the Indigenous and peasant communities of the Cotacachi canton in Ecuador. Cotacachi is considered an area rich in agrobiodiversity due to the productive agroecological systems managed by Indigenous communities in the various climatic regions of the Interandean Zone. This zone ranges from 2,200m to 3,400m above sea level in the Andes mountains. It is inhabited by the ancestral and historical settlements of Indigenous peoples and their communities. It has also been inhabited more recently by farmers (*haciendas*) since colonial times.

Most of the canton's agricultural population (60.7%) live on the eastern slopes of a volcano known as Mama Cotacachi in the parishes of El Sagrario, San Francisco, Quiroga and Imantag. The Interandean Zone is comprised of four agroecological subzones and the Cotacachi Cayapas Ecological Reserve. These agroecological sub-zones are distinguished by elevation: croplands (2,300m to 3,000m) and *páramo* (above 3,000m). The croplands are divided into the short-rotation crops zone (2,300m to 2,500m), the maize zone (2,500m to 2,700m), and the cereal zone (2,700m to 3,000m). These sub-zones are differentiated in terms of rainfall, soil, vegetation and crops. The agricultural systems managed by the Indigenous communities stand out for their high biodiversity and for the agroecological approaches and traditional knowledge used. The people strive for soil and water conservation. They visibly shape a colourful mosaic landscape in contrast to the *haciendas* which are characterised by largescale monoculture crops based on biochemical and technological land-use packages that degrade the soil and water.

Agriculture for Indigenous and peasant communities is a matter survival and resilience. Their strategy is rooted in notions of territory renewed by solidarity and shared practices in the face of unfavourable social and economic conditions. Food production is family run and incorporates a series of elements and practices based on ancestral knowledge. That traditional knowledge has enabled them to maintain high levels of agrobiodiversity conservation and biocultural heritage to the present day. The term 'chakra' is used to describe this agricultural or food production system that contributes to economic, social, cultural and environmental development. The chakra is the integrative element in the development of these communities and their territories.

The role of UNORCAC and its Women's Central Committee – an organisation established to address the specific problems faced by women Andean farmers in the Cotacachi area – has been focused on the management of projects that continue to strengthen these diverse agricultural systems. UNORCAC and the Women's Central Committee support food security and livelihoods through the maintenance of agroecological plots and native varieties that have both cultural relevance and are at risk of genetic erosion. UNORCAC and the Women's Central Committee have also promoted the cultivation of different vegetable varieties to improve the diets of families.

For UNORCAC and the Women's Central Committee, it is very important that the producers have their own space for the transfer of knowledge and to exchange seeds and seedlings – both of which are critical to maintaining agrobiodiversity. UNORCAC and the Women's Central Committee have created different spaces, including:

- The Muyu Raymi seed fair (meaning 'seed festival') for the exchange of germplasm between producers, knowledge about ancestral medicine, and culinary knowledge

- The Bioknowledge Centre, a demonstration and educational site for visitors from educational units, universities and other groups that focuses on the transmission of knowledge through the demonstration of ancestral health practices (cleansing rituals and humanised childbirth), and the restitution of seeds to farmers in the communities through its community seed bank
- Gastronomic festivals, and
- Training workshops and experience-exchange tours.

These are important spaces which build on the human capital of the communities themselves, working with previously trained and qualified community members who then replicate training workshops for the producers.

After working with communities to achieve subsistence food security, UNORCAC has also helped them to develop market opportunities. Surplus produce is used to generate income through marketing at rural fairs, supplying school food programmes, selling and delivering baskets of fresh produce directly to homes (a strategy used especially during the COVID-19 pandemic lockdowns), selling produce to tourists, and supplying restaurants.

UNORCAC has also helped to develop value-added enterprises such as its food-supplier company Sumak Mikuy (meaning ‘excellent food’). Sumak Mikuy adds value to underutilised crops such as the cape gooseberry, the spicy rocoto pepper (*aji rocoto*) and wild fruits such as *mortiño*. It produces dried fruit, has a defined national market, and exports abroad. Its main suppliers are producers organised around the cultivation of cape gooseberry and pepper, or mortiños in the *páramo*.

Another microenterprise initiative developed by UNORCAC’s Women’s Central Committee is the Sara Mama enterprise and brand. Sara Mama produces the soft drink Chicha de Jora, which is based on germinated maize and is representative of the four Andean world celebrations and other family and religious celebrations. These strategies broaden the sales options from the use and conservation of native and local varieties and have in no way displaced other varieties.

In response to community demand for territorial development, UNORCAC has also incubated a community agrotourism enterprise. Runa Tupari Native Travel promotes agricultural practices that go hand in hand with the promotion of local food, medicine and Indigenous rituals/clothing. The company offers homestay tourism and has both national and international clientele. Tourism means additional income for the families – and provides a powerful incentive to maintain traditional agrobiodiverse agricultural practices.

The role of women in the use and management of agrobiodiversity is very important. They are the custodians of knowledge, and its transmission from mothers to their children and grandchildren that ensures knowledge is conserved. For a diversity of crops and seeds to be maintained, it is necessary to use them for food, medicine, rituals or other uses. Women preserve their communities’ biocultural heritage through their knowledge of culinary practices, agricultural cycles, lunar cycles and the agricultural festive calendar. Women’s participation is particularly important in managing agroecological systems, commercialising products, participating in seed fairs and gastronomic fairs, conserving seeds, and in the practice of medicine, rituals and ceremonies of the agricultural calendar (March, June, September and December). Women are also the main suppliers of maize to Sara Mama. Through organisational networks at the canton level, women in the subtropical zone also exchange products with other women producers from the lowlands. Women are critical to territorial

management of agricultural systems and are included on the board of directors of the Central Women's Committee.

In addition, UNORCAC and the Women's Central Committee have tried to shape supportive public policies at the local level, with ordinances on the conservation of the agrobiodiverse heritage in the canton of Cotacachi, and on water, land, seeds and Indigenous justice. The state has shown little interest in supporting peasant family farming, which is why the local organisations have sought funding from international cooperation agencies. These experiences show how important it is to have a strengthened organisational structure, with coordination between the whole community and UNORCAC and the Women's Central Committee to take ownership and face the challenges that arise.

1 Introduction to UNORCAC and its land use

1.1 UNORCAC's vision

The Union of Peasant and Indigenous Organizations of Cotacachi (UNORCAC) is a second-tier territorial organisation whose members are from various local groups. It was born out of the struggle against discrimination, racism and the marked social inequality and poverty found in the Indigenous communities of Cotacachi. Its presence in the territory is seen locally as a vindication of the rights of the Indigenous peasant people. The vision of UNORCAC is outlined in its 2008 policy and strategic plan, which also outlines its strategic objective to 'promote diversified agroecological production and the conservation of Andean crops to guarantee food security and sovereignty':

> *We are a representative social organisation, with territorial jurisdiction within the canton of Cotacachi. We demand social, ecological and economic justice and we are recognised nationally and internationally. Our communities, families and organised groups actively participate in the construction of the Good Life* – Alli Kawsay. *We have a strong cultural and territorial identity. We revalue and preserve ancestral knowledge and wisdom. We apply an economic model based on respect for Pachamama [Mother Earth] and reciprocity. We have fertile and productive land and we develop complementary activities to agricultural work. We all participate in a quality education and health system. We are critical and proactive. We promote the praxis of interculturality and the realisation of a just and supportive society.*
>
> *We protect, care for and respect Pachamama, the centre of our universe, since the life of all beings depends on her. Land, water, biodiversity and the wisdom linked to them are strategic natural resources for our survival and development. The communities affiliated to UNORCAC have legalised, fertile and productive community and individual lands. We have water for human consumption and irrigation, a vital resource that we take care of. And we recover our ancestral and cultural practices of soil, seed and agrobiodiversity conservation.*

In addition, UNORCAC has established the Women's Central Committee, an organisation that addresses the specific problems faced by women farmers of the Andean area of Cotacachi. The committee evolved from UNORCAC's Commission for Women, Family and Health that was established in 1996. Within this structure, women organised themselves to have their own voice in influencing decision-making. Then in 2008, under the leadership of compañera María Juana Morales Caiza of the community of Morales Chupa, the UNORCAC Women's Central Committee was legalised. The committee 'promotes, motivates and strengthens autonomous women's organisations from their own culture to build inclusive communities' and promotes their rights and empowerment (UNORCAC).

1.2 UNORCAC's founding principles

UNORCAC is legally recognised by an Agreement of the Ministry of Agriculture and Livestock No 0139, 21 April 1980. The union is made up of 45 grassroots communities and organised groups including water boards and micro-watershed committees; women's, youth, cultural, sports and productive groups; and savings and credit cooperatives, among others. It is an affiliate of the National Federation of Indigenous and Black Peasant Organisations (FENOCIN), a national organisation.

UNORCAC is recognised and represented at local and national levels. As a social and political actor, it is an interlocutor between state institutions that responds to the needs of the communities it represents. It also negotiates with international development cooperation agencies to secure funding and partnerships for projects. Its actions have evolved according to various social, economic, political, and cultural scenarios and dynamics. All of this is made possible due strong governance and internal organisation, where the operational agility of the women's organisation stands out in particular.

1.3 Location

UNORCAC's offices are located in the canton of Cotacachi in the province of Imbabura. This is in the Interandean Zone, which is comprised of four agroecological subzones that include a variety of ecosystems plus the buffer zone of the Cotacachi Cayapas Ecological Reserve. The Interandean Zone of Cotacachi consists of two distinct biophysical zones: croplands (2,300m to 3,000m above sea level) and *páramo* (above 3,000m). The zone is the ancestral and historical settlement of the Indigenous population but also includes an influx of colonial-era *haciendas.* The Interandean Zone is located on the eastern slopes of the volcano known as Mama Cotacachi. It is home to 60.7% of the total population of the canton of Cotacachi in the parishes of El Sagrario, San Francisco, Quiroga and Imantag.

1.4 Membership

UNORCAC membership includes approximately 3,500 peasant families. These families have on average half an hectare to one hectare plots of land, known as *chakras*. The majority of families are dedicated to subsistence agricultural activities and animal husbandry. Their traditional production systems use different agroecological approaches in the different climatic zones. Roughly 80% of their production is for home consumption and 20% is destined to be sold at local fairs.

1.5 Land-use patterns

In terms of ownership, 70% of the *chakras* or plots are managed by families who possess land title deeds. Another 20% is leased. The remaining 10% is managed by a process known as division. Division is a production strategy for food security purposes, using native and local varieties. It is based on an agreement between the owner of the land and the person who is going to sow the land. Both parties define the variety of crops to be planted, the amount of seed required, and participate in the work of the production cycle. At harvest, the parties divide the produce according to the effort invested.

Agricultural land is usually fertile. Some is irrigated while other areas are not. Land is also often set aside for grazing animals. Some families have *chakras* from 2,600m to 3,400m above sea level where they grow crops typical of this colder climate (such as broad beans and tubers such as mellocos and ocas) and graze livestock. However, these Indigenous communities are surrounded many colonial-era *haciendas*, characterised by largescale monoculture crops based on biochemical and technological land use that degrades soil and water. Despite being the ancestral owners of the entire territory, Indigenous communities (such as the Tunibamba) have had to fight for decades to reclaim their lands. Legally, these lands are communally owned, indivisible, inalienable, imprescriptible and non-seizeable and are to be used for agroecological production. For example, following a struggle to reclaim their land, communities in the native forest of Peribuela are now conserving an area of forest currently considered a sanctuary due to the fragility of its diversity. Similarly, after the community of Morochos secured their communal lands, they developed a *páramo* management plan that introduced alpacas to better conserve the *páramo* watershed and biodiversity.

2 Agrobiodiversity in the landscape

For this case study, UNORCAC randomly selected 10 men and 10 women farmers to take part in a quick questionnaire survey to better understand the agrobiodiversity the farmers manage. The results were then discussed for verification by the author. For the purpose of this case study, and with the help UNORCAC staff, the group responses were disaggregated into two respondent categories of men and women.

2.1 Cash crops grown by men

According to the surveys carried out, men mainly grow maize, beans and some fruit trees for commercialisation purposes (see Table 1). These are the crops that have the best chance of selling well. Figure 1 shows the number of different crops grown and sold by the 10 male farmers surveyed for this case study. However, the broader diversity of crops grown (as indicated in Table 5) is not captured by such a limited sample size.

A villager from Morochos weeds maize during the December weeding season © UNORCAC

Men tend to have a larger amount of land than women. Most of their crops are grown for sale, with about a third kept for family consumption. Mesías Lita, a producer who participates in the community market *La Pachamama Nos Alimenta* (Pachamama Feeds Us) stated that ‘everything that is sown is for eating and selling‘. That is to say, farmers optimise the small amount of land to grow some varieties such as cape gooseberries alongside tubers such as the

white carrot, both of which are grown for sale and home consumption. They interplant the avocado crop with rows of maize and beans for sale and the remainder for consumption. These diverse food systems are an important part of small-scale subsistence agriculture.

To help promote the commercialisation of farmers' crops from the *chakras*, UNORCAC and the Women's Central Committee established the community fair *La Pachamama Nos Alimenta*, which is also managed by the Women's Central Committee. UNORCAC provides the physical and logistical space for an average of 120 producers to market their produce every Sunday, depending what is in season.

Men producers often share the marketing of their produce so that they can collectively sell larger volumes of crops at wholesale markets, while the women tend to sell to local markets. However, at *La Pachamama Nos Alimenta* community fair, producers sell their produce individually rather than selling aggregated produce as a group. During the global pandemic, farmers also opted to sell home-delivered baskets of produce as a strategy to maximise sales while minimising health risks.

Men's commercial activities earn them a weekly income of around US$425 and upwards at harvest times. Some crops (such as cape gooseberries) are sold to UNORCAC's value-added enterprise Sumak Mikuy, which produces dried fruit.[1] Any income generated by the men is used for reinvesting in agriculture, loan repayments, children's education, paying for basic services (such as water and electricity), food for the household and animal husbandry.

Figure 1. Cash crops sold by men by the number of men farmers surveyed out of 10

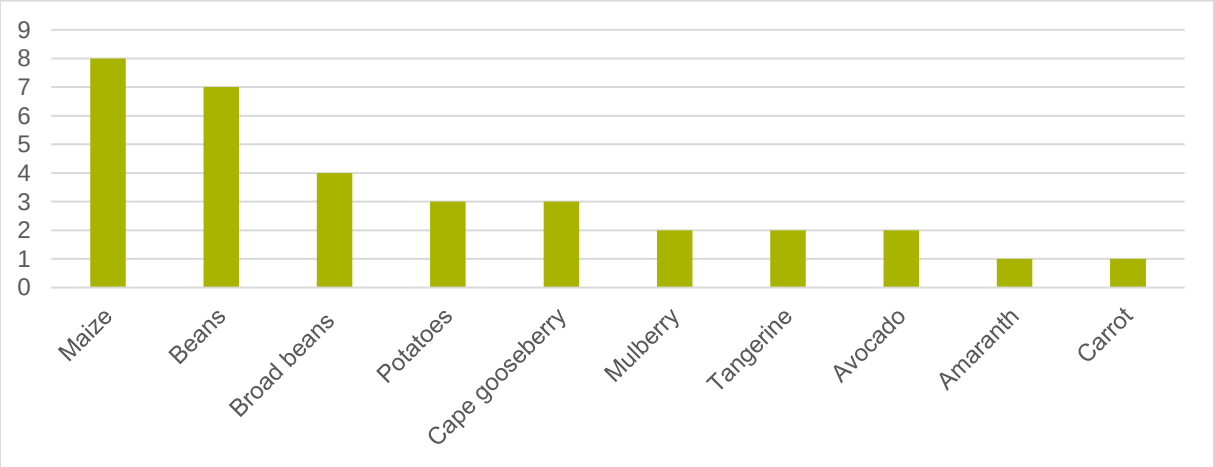

Table 1. Cash crops grown by male farmers and estimated percentages of produce sold

Farmer #	Grains (% for sale)				Tubers (% for sale)		Fruit (% for sale)			
	Maize	Beans	Broad beans	Amaranth	Potatoes	Carrot	Cape gooseberry	Mulberry	Tangerine	Avocado
1	50%	50%	50%	50%	50%	50%	90%			
2	30%	60%	60%							
3					90%					

[1] Sumak Mikuy adds value to fresh-food crops such as the cape gooseberry, spicy rocoto pepper (*aji rocoto*) and wild fruits such as *mortiño*. It has a defined national market and exports abroad. Its main suppliers are producers from the *páramo*.

4	40%	40%					70%	90%		
5	70%	80%	80%							
6	30%				80%					
7	40%	40%					90%	90%		
8									90%	90%
9	60%	80%	80%							
10	70%	80%							90%	90%

2.2 Cash crops grown by women

According to the results from the surveys, women cultivate mainly maize, beans and tubers for sale, but each of these crops is characterised by a high degree of variability as shown in the cover photo for maize. In contrast to men, almost 70% of produce is grown for the family's home consumption and the remaining 30% is destined for commercialisation at the *La Pachamama Nos Alimenta* community fair and other local fairs (but not the larger wholesale markets frequented by men). The women's approach to crop variability allows many native varieties to be preserved. Farming and animal husbandry is an activity carried out by the whole family, but due to the migration of men to jobs outside the city, women manage their *chakras* together with their children.

However, the current food security situation is not sufficient to counteract malnutrition problems, which can be exacerbated by poor health. Families are encouraged to avoid disease by:

- Adopting food safety measures in food handling,
- Accessing safe and quality piped water (as water obtained from catchment points is untreated, which can affect people's health) and,
- Accessing services, especially those related to sewage disposal.

In addition, the communities are fighting for access to health programmes from the state.

An Indigenous woman household head and her children harvesting mellocos and ocas tubers in the *páramo* © UNORCAC

In addition to growing grains and other main crops, women focus on growing a wide diversity of vegetables. For income generation, women also sell varieties of tubers, dried grain derivatives, flour and eggs. In comparison to men, they tend to sell a higher number of varieties of crop but at a lower percentage of their overall production (see Figure 2). The average weekly income from sales is between US$35–60. Income is used to pay for their children's education, food for the household, paying for basic services (such as water and electricity), breeding small livestock animals (such as guinea pigs, chickens and pigs), and purchasing new livestock and animal feed.

Figure 2. Cash crops sold by women by number of female farmers surveyed out of 10.

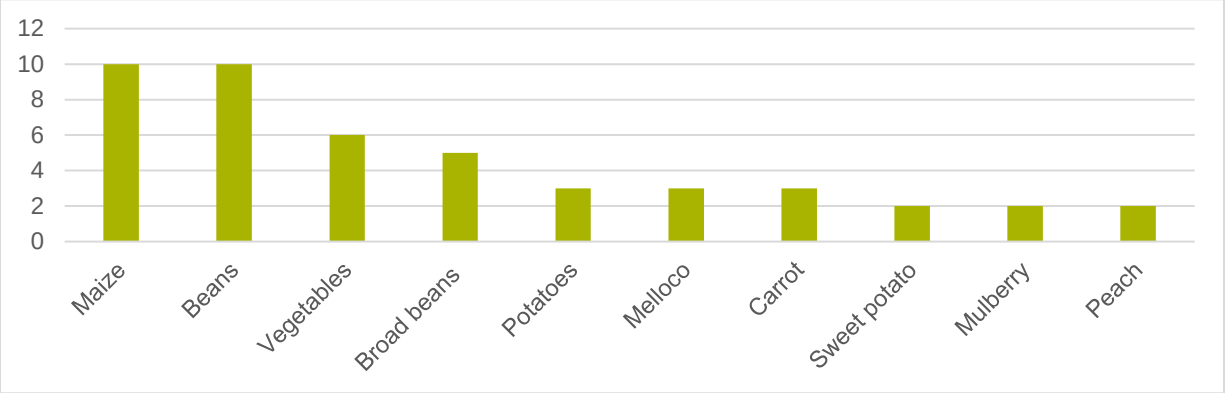

Table 2. Cash crops grown by women farmers and estimated percentages of produce sold

Farmer #	Grains (% for sale)			Tubers (% for sale)				Fruits (% for sale)		Vegetables (% for sale)
	Maize	Beans	Broad beans	Potatoes	Sweet potato	Melloco	White carrot	Mulberry	Peach	Carrot, onion, radish, cabbage, lettuce, chard etc
1	40%	80%	80%	30%		70%		90%		90%
2	20%	20%		40%	40%		70%			90%
3	30%	50%	50%				60%			
4	10%	70%							90%	80%
5	60%	50%							90%	90%
6	40%	40%								
7	50%	70%		40%				80%		
8	40%	40%	60%		50%		70%			90%
9	30%	40%	60%			50%				
10	40%	50%	90%			30%				90%

2.3 Subsistence crops grown by men

Farm activities are culturally rooted in Indigenous communities and offer many benefits for the families, including producing food, generating an economic income and paying for medicine and housing etc. The men surveyed stated that everything they grow is for food, including that

destined for commercialisation. Table 3 shows the subsistence food crops grown by the men farmers surveyed for this case study. These crops are preferred because of their nutritional value and cultural importance.

Table 3. Main subsistence food crops grown by men farmers surveyed

#	Grains (subsistence)						Tubers (subsistence)			
	Maize	Beans	Broad beans	Pea	Quinoa	Artichoke	Potato	Oca	Melloco	Sweet potato
1	x	x	x	x	x		x	x	x	x
2	x	x	x	x			x	x	x	x
3			x				x	x	x	
4	x	x	x	x	x	x	x			x
5	x	x	x	x	x	x	x			
6	x	x	x	x		x	x	x	x	
7	x	x	x	x	x	x	x			
8	x	x		x						
9	x	x	x			x	x	x	x	
10	x	x	x	x						

2.4 Subsistence crops grown by women

For women, land provides a deeper sense of belonging. As bearers of knowledge, for example about nutrition and flavours, women have a broader vision of the diversity of what is planted. Diversification of their crops is necessary because they know what they need on a daily basis to sustain the health of their families.

Growing maize, beans and various tubers and raising small livestock animals are activities that women manage. Each crop or animal is part of the diet preferred by different women for their cultural, nutritional, medicinal and symbolic values at different family and community events and celebrations of the agricultural calendar. In the highlands, women and their families also grow crops that only occur in colder climates to integrate into their diet. Women also complement their families' diets with processed products such as salt, vegetable oil/fat, sugar and others that can be bought in the market.

Table 4 shows the main subsistence crops preferred by women – but also shows how all women are also familiar with and use a wide variety of culinary vegetables and medicinal plants, all of which involve substantial agrobiodiversity (see also Table 5).

A woman farmer planting maize on her plot of land located in the *páramo* at 3,200m above sea level, El Morlán community © UNORCAC

Table 4. Main subsistence food crop preferences of the women farmers surveyed

#	Grains (subsistence)				Tubers (subsistence)			Fruit	Medicinal plants	Vegetables
	Maize	Beans	Broad beans	Peas	Potatoes	Oca	Melloco	Avocado		Cabbage, chard, onion, coriander, carrot, radish, lettuce etc
1	X	X	X		X		X		X	
2	X	X		X				X	X	X
3	X	X	X	X	X			X	X	
4	X	X	X	X			X	X	X	X
5	X	X	X	X	X			X	X	X
6	X	X	X	X	X			X	X	
7	X	X	X	X	X	X			X	X
8	X	X	X	X	X	X	X		X	X
9	X	X	X	X	X				X	X
10	X	X	X	X		X	X	X	X	X

2.5 Wild products harvested by men

The high zone from 3,600m above sea level is known as the *páramo* ecosystem, which is where most of the water comes from that supplies both the rural communities and the city. The Indigenous male population also takes advantage of the native forest species that occur in that region. Timber is used in the construction of houses (sills and pillars), and to produce firewood and also farming tools such as *charina de arado* (part of a plough), *orquetas* (for weeding), *kuti* (rope) and pickaxes. They also harvest *zuro* for making baskets. When asked about the main items harvested, men listed mainly wood, including *watzi*, olive, *killu yuyu*, *motilón* and *zuro* (a species of liana).

2.6 Wild products harvested by women

For the women, the *páramo* is essential for providing wild fruits, medicinal plants and firewood from trees and bushes after clearing and burning (a very common practice for sowing). However, there are some wild varieties at risk such as wild fruits (*wild uvillas, lluchu uvillas, tzímbalo, chupalón*) and medicinal plants such as olive and laurel. The main products collected by women were listed as forest plums, *mortiño* fruit, firewood from *watzi* and *killu yuyu* trees, and medicinal plants including these 14 species: *kancer kiwa*, *santa maría*, laurel*, guallwa, pumamaki, killu yuyu, mortiños, chugunda/zagalán, chupalón, urku uka, culantro de pozo (zanjas), tifo (quebradas), trompetillo* and *arrayán.*

2.7 Crop varieties

According to data from research conducted as part of an application for the territory to become a designated Globally Important Agricultural Heritage System (GIAHS),[2] a total of 172 species of plants were found growing on the farms of this region. This agrobiodiversity has a variety of different uses: food (72 species), medicinal plants (84 species), fodder (2 species), forestry (7 species), ornamental (4 species) and rituals (2 species). From the brief research undertaken for this case study, producers detailed 97 species that were present in their *chakras*, showing the remarkable knowledge retained by those producers (see Table 5).

[2] Established by the Food and Agriculture Organization of the United Nations (FAO) in 2022, 'Globally Important Agricultural Heritage Systems (GIAHS) are agroecosystems inhabited by communities that live in an intricate relationship with their territory.' FAO's GIAHS programme has designated over 60 sites around the world. See www.fao.org/giahs/en

Table 5. Agrobiodiversity recorded by producers surveyed for this case study

#	Grains	#	Tubers	#	Fruit	#	Vegetables	#	Grazing for animals	#	Medicinal plants	#	Living hedges
1	Maize	1	Potato	1	Orange	1	Sambo	1	Alfalfa	1	Lemon verbena	1	Alder
2	Beans	2	Oca	2	Mandarin	2	Pumpkin	2	Grass	2	Camomile	2	Lupino
3	Peas	3	Melloco	3	Lemon	3	Cabbage	3	Oats	3	Lemon grass	3	Lechero
4	Broad beans	4	Sweet potato	4	Babaco	4	Yellow carrot			4	Escancel	4	Carrizo
5	Faba beans	5	White carrot	5	Chilguacán	5	Long onion			5	Hallelujah	5	Pumamaki
6	Wheat	6	Mashwa	6	Guava	6	Radish			6	Cornflower	6	Capulí
7	Barley	7	Jicama	7	Granadilla	7	Parsley			7	Rue	7	Kishwar
8	Quinoa	8	Miso	8	Taxo	8	Celery			8	Lavender	8	Torta
9	Amaranth			9	Peach	9	Coriander			9	Mint	9	Guava
				10	Custard apple	10	Cabbage			10	Dill	10	Tocte
				11	Avocado	11	Beetroot			11	Mosquera	11	Granadilla
				12	Mulberry	12	Swiss chard			12	Congona	12	Taxo
				13	Tree tomato	13	Zucchini			13	Marigold	13	Penca azul
				14	Grapefruit	14	Chilli			14	Orchid	14	Penca verde
				15	Grape	15	Kidney tomato			15	Rosemary		
				16	Apple	16	Achojcha			16	Black nettle		
				17	Capulí	17	Chinese turnip			17	Jerusalem artichoke		
				18	Strawberry					18	Violet		
				19	Guava					19	Juyankilla		
				20	Loquat					20	Paico		
										21	Verbamora		
										22	Lemon balm		
										23	Ataco negro		
										24	Dandelion		
										25	Plantain		
										26	Aloe		

3 Crop cultivation and rearing livestock: knowledge sources

3.1 Biocultural heritage

Within the Indigenous cosmovision, there are four very important celebrations in the agricultural festival calendar that reflect the intrinsic relationship between humans and nature. These celebrations are associated with the stages of growth and production of maize, the basic crop grown for the food security and sovereignty of Indigenous families. Celebrations in the agricultural festival calendar are described below.

Pawkar Raymi (21 March): This festival celebrates the month of flowering and tender grains. The first tender grains are harvested and families prepare *fanesca*, a dish based on a mixture of tender grains that includes cucurbits such as sambo and pumpkin. In addition, on March 21, the Indigenous communities perform rituals and ceremonies for the blossoming of flowers at different sacred sites such as springs.

Community leaders preside over a ritual during a spring ceremony © UNORCAC

Inti Raymi (June 21): The corn has now reached maturity. Families also harvest maize for both food and seed storage to ensure they have seeds for the next agricultural cycle. It is the most eagerly awaited celebration in the Indigenous world as the sun is traditionally revered as a supreme deity, and is thanked for having consented to the fertilisation, growth and maturation of food. The ritual for thanking the sun and Pachamama involves dancing and an abundance of food prepared for the community to share. Ceremonies and rituals include making offerings and taking energising baths in the springs and then later dancing in the central square of Cotacachi.

Koya Raymi (21 September): September is dedicated to femininity and fertility as families prepare the land for sowing maize, the staple food of the Kichwa people. The first rains begin to appear around this time, which is ideal for seeds to germinate and begin their cycle. Ceremonies and rituals are performed to highlight the importance of fertility and fecundity in relation to the moon, the earth and women. Ceremonies and ritual baths in springs are practised and offerings are made to the Earth so that the seeds can fertilise.

The Koya Raymi celebration takes place in September. Here, girls are preparing the land for planting in the La Calera community © UNORCAC

Kapak Raymi (21 December): The seed has begun to take shape and is in its first stage of life. It requires agricultural labour to remove weeds so that the maize can continue to develop and bear good fruit. Ceremonies and rituals are held with offerings in gratitude to the Pachamama.

In addition to these four celebrations, there are other family and religious celebrations for events such as new houses, marriages, baptisms, and the day of the dead, when the preparation of food based on grains prevails and represent events to unite the community and food is shared among all members. The raising of farmyard animals such as guinea pigs, chickens and pigs are the main ingredients in the dishes prepared for these family and community celebrations. In addition, the ancestral drink is *chicha de jora* made from sprouted, cooked and sweetened corn.

Although it is true that this cycle is mainly for maize and beans, there are also products such as peas and barley that have two production cycles because they last four months.

In the Indigenous cosmovision, life revolves around traditional community practices that are still in force in the communities of the high Andean zone of Cotacachi. Some of these include:

- **Minga:** This refers to the practice of providing collective farm labour or other services for the general welfare of the community. It forms the fundamental basis of community development and community and family cohesion, based on solidarity and reciprocity. This practice highlights the distribution of roles, rather than hierarchies, in community and family activities.
- **Barter:** Bartering is an expression of Andean complementarity and reciprocity. The agriculture practiced by the Indigenous and peasant communities of Cotacachi is mainly oriented towards growing food for home consumption, but families also participate in and benefit greatly from bartering or exchanging surplus and diverse agricultural and livestock produce between the different altitudinal zones, as well as useful implements necessary for daily life.
- **Pampa Mesa:** This ancestral tradition of eating a communal meal together is known as 'the common table' or 'the table of all'. Blankets are placed on the ground, where food is placed within everyone's reach so that all can share.

Women preparing the centrepiece for a ritual ceremony at Cuicocha Lake © UNORCAC

3.2 Intergenerational knowledge transfer within households

Agricultural activities integrate all family members in the whole agricultural cycle. The traditional knowledge of agriculture, plant and animal management, and the use and conservation of seeds comes from and is transmitted from parents to children, from grandparents to grandchildren, with greater relevance from mothers to children and grandchildren. The role of women as conservationists and the custodians of knowledge (about seeds, agro-culinary

knowledge and the cultural and medicinal uses of food) is highlighted because of their strong cultural and spiritual ties with the land.

However, young people are now less interested in producing from the land. They consider agriculture to be an unprofitable activity and opt for other jobs, regardless of whether this involves migrating to other cities. For this reason, most custodians of knowledge are adults aged between 40 and 70 years.

3.3 Knowledge transfer between neighbours

UNORCAC and the Women's Central Committee work with producers in the communities to strengthen their knowledge about nutrition, crop and animal management, and seed exchanges. These activities are already part of the annual operational planning of the Women's Central Committee and resources are managed through projects with international cooperation agencies and other strategic allies. These are major events that are promoted by the local and national media, as is the case of the *Muyu Raymi* seed fair. These events also promote the economy and tourism at the cantonal level, with the participation of community members, local organisations and authorities. These initiatives include:

- **Community exchange tours:** These visits allow communities to exchange experiences and include tours of plots, agro-tourism sites, value-added initiatives and bioknowledge centres. Community exchanges are facilitated by the Women's Central Committee and take place twice a year (February and November).
- **Muyu Raymi seed fair** (once a year in August, prior to planting).
- **Exhibitions and festivals of gastronomic heritage:** Festivals include those dedicated to the preparation of *fanesca*, the festival of *chicha de jora*, and the festivals of bread, among other preparations of ancestral gastronomy. This activity is carried out by the Women's Central Committee with the management of resources from UNORCAC.
- **Product exchanges at the zone level** (Andean, urban and Intag) are also managed by the Women's Central Committee in alliance with other women's organisations at the cantonal level, with the participation of organised women and feminist collectives.

3.4 Organisational knowledge networks

UNORCAC has implemented several activities for community producers to enable them to acquire knowledge and improve their families' nutrition, crop management, and plant and animal management, including:

- Implementation and training in agroecological production
- Introduction and management of fruit trees
- Training in native crop management
- Training in small livestock management
- Workshops on preparing biological inputs
- Workshops on the importance of conserving agrobiodiversity
- Workshops on gastronomy and the culinary use of native crops, and
- Community exchange tours.

These workshops, trainings and exchange tours are part of UNORCAC's annual planning. A key topic of discussion and analysis within UNORCAC is climate change and its effects, and for this reason UNORCAC focuses more attention on the conservation of agrobiodiversity, with diversification seen as fundamental to riding out the effects of climate change.

There are open calls for the participation of community members in training workshops. Inclusion criteria include that there is a balanced number of men, women and young people due to the importance of gender and generational approaches. As far as possible, these training workshops are facilitated by producers who have been previously trained and qualified as trainers. Women between 35 and 60 years of age are those who participate the most and put into practice what they have learnt.

The Muyu Raymi seed fair is one of UNORCAC's key events for the exchange of knowledge. This event has been held for 20 years in the canton of Cotacachi, and was an initiative promoted by women producers who were concerned about the loss of native seeds in their communities. The seed fair was established as a meeting of conservationists and/or seed guardians, so that through the exchange they could all have access to culturally relevant seeds (see also Section 4.3.1).

A group of women from the Women's Central Committee participating in the gastronomic fair at the Muyu Raymi seed fair © UNORCAC

4 Cultivating and managing seed and animal resources

4.1 Harvesting and multiplication

The three main strategies applied by farmers is to use their own seed gathered from previous harvests, inheriting seeds from their parents or grandparents, or obtaining them through seed exchanges. Determining the volume and weight of seeds or tubers to be set aside for the next year's planting depends on the type of plant and the size of land to be cultivated.

At harvest, women select and reserve seeds and tubers for food, for sowing the next crop, to sell and to feed livestock. The best grains are stored in clay pots, tanks and *soberados* (the upper part of a tiled house kept for seeds). Another storage mechanism is the use of drying racks or *wayunkas* for maize.

Community members also multiply and exchange livestock. For example, when someone is given an animal by another community member, they pay the former owner later with the offspring.

4.2 Bartering for and purchasing seeds and plants

Within the community economy, bartering is an ancestral practice based on the principles of solidarity and reciprocity rather than monetary value. This practice is common within Indigenous communities for the exchange of seeds and different varieties of plants and in this way allows for the widening the diversity of varieties they can incorporate into their agricultural systems. Bartering also takes place at the community fair *La Pachamama Nos Alimenta*, where producers exchange products to complement the products from their own households.

At the organisational level, the Women's Central Committee carries out an exchange every year in April to barter Andean products with products from the subtropical zone of Intag, with the participation of groups of women from both zones. The aim is to obtain products, plants and seeds, taking into account their nutritional, medicinal and cultural value (among others). This event also strengthens the bonds between different families and organisations.

4.3 Formal systems: community or organisations' warehouses or purchasing systems

UNORCAC and the Women's Central Committee have implemented a number of measures which directly affect their members abilities to access seed and maintain agrobiodiversity. The most prominent are listed below.

4.3.1 The Muyu Raymi Seed Fair

The Muyu Raymi Seed Fair has been running for 20 years. It is held in August for one day only, with an open call for participation, with the objective of facilitating spaces where producers can access native seed varieties, promote peasant family agriculture and promote food security and sovereignty. In this space, bartering is practised as part of the subsistence economy of families, but it is also possible to buy and sell seeds. The seed fair is expensive and UNORCAC requires cooperation funds to pay for it. Each fair receives approximately 5,000 visitors. The fair involves the participation of about 400 seed conservationists (of grains, tubers, seedlings) and includes areas dedicated to ancestral gastronomy, ancestral medicine and fresh agroecological products, and also showcases related local enterprises involving derivatives and value-added processed products.

4.3.2 La Pachamama Nos Alimenta community fair

UNORCAC believes that the *La Pachamama Nos Alimenta* community fair is its best strategy for supporting subsistence farmers. It operates every Sunday and enables producers to sell any surplus of agricultural products grown for family consumption and generate an additional income. Crucially, the community fair promotes agroecological crops, which offers producers an alternative to the main municipal market, which sells most conventional products. One of its most relevant characteristics is that the fair is collectively owned by community producers, eliminating the middleman. The fair also enables farmers to barter products of interest – be it fresh produce, seeds or plants – and enables them to obtain a wider variety of food for their families and seeds or plants for their plots of land.

4.3.3 The Bioknowledge Centre

The Bioknowledge Centre is a demonstrative and interactive space for working with educational units to promote the agrobiodiversity of the territory. A wide variety of medicinal plants are displayed there and there is a space for the demonstration of ancestral medicine practices. It also includes a communal seed bank, which enables the multiplication and restitution of seeds to producers. The community seed bank stores 12 varieties of maize and 39 varieties of beans. However, the Bioknowledge Centre is expensive to sustain and can only be maintained with external funding.

4.3.4 UNORCAC and INIAP’s seed multiplication and distribution programme

Together with the National Institute of Agricultural Research (INIAP), UNORCAC has worked on seed distribution to farmers. Seeds are collected from the communities and then multiplied by INIAP to be later returned to the communities and producers. For seed distribution, UNORCAC and the Women’s Central Committee plan a date for delivering seeds to farmers that fits in with the sowing season.

5 Enterprise strategies and agrobiodiversity

5.1 Cash-crop enterprises

The enterprise strategies promoted by UNORCAC are based on adding value to products such as cape gooseberries, the spicy pepper *aji rocoto* and wild fruits such as *mortiño*. UNORCAC set up Sumak Mikuy (meaning 'excellent food'), a company that is dedicated to the production of dried food products that are sold on the national market and (before the pandemic) international markets. The dried cape gooseberry and *aji rocoto* are popular as ingredients in energy bars and chocolate bars.

The Women's Central Committee also manages another microenterprise, the processing plant for the Sara Mama brand's Chicha de Jora drink (meaning 'mother corn'). An ancestral drink made from germinated corn, the brand promotes the cultivation and conservation of corn. It is also promoting and conserving *chicha de jora* to Indigenous communities, as this traditional drink is currently being displaced by other soft drinks. This product has been on the shelves of Fair Trade shops and restaurants nationwide.

These strategies have motivated the continued cultivation of native products. Furthermore, the cultivation of these products such as cape gooseberry does not imply the replacement or loss of other native products of the *chakra* but rather allows these underutilised varieties to continue to be cultivated and further generate incomes for the families who produce them and to conserve their biocultural heritage.

5.2 Changes in cash crops over time

Over time, UNORCAC and the Women's Central Committee have set up a number of businesses that have changed what crops are supplied and sold.[3] These include:

Runa Tupari Native Travel – Encounters with Indigenous People: This business initiative was founded by UNORCAC in 2000. It focuses on homestay tourism where visitors can experience the richness of local traditional agricultural production systems and biocultural heritage. The families have community lodges where they receive tourists. Community-based tourism has allowed the local community to appreciate and value their agro-centric identity while also generating an income, and a percentage is directly allocated to community development.

Sumak Mikuy: This microenterprise dried fruit initiative adds value to underused native varieties of crops such as cape gooseberries. This allows the families to earn an income by taking advantage of the little land they have on their farms to grow fruit and, at the same time, it focuses efforts on the conservation of agrobiodiversity and clean production.

[3] These initiatives developed by UNORCAC with the management of cooperation resources in no way promote selective crops.

Chicha de Jora Sara Mama: This enterprise promotes an ancestral drink with great cultural and nutritional value, and encourages the cultivation of maize while generating income for women.

Muyu Raymi seed fair: This annual event promotes peasant family farming. It identifies the different species and varieties cultivated by farmers and enables them to exchange and sell their seeds, exchange knowledge, and showcase their agro-culinary heritage and ancestral medicine practices. While not an enterprise in itself, it enables farmers to generate an additional income while also exchanging information on what products are in demand on the market.

La Pachamama Nos Alimenta community fair: Managed by the Women's Central Committee for the sale of agroecological products, the fair is attended by 330 women producers and a smaller percentage of men. It is an important space for capitalising on commercial opportunities for a diverse range of products that underpin the maintenance of agrobiodiversity within the *chakra* system. Bartering makes it particularly suited to farmers who have a wide range of subsistence products to exchange with one another.

Bioknowledge Centre: This demonstration centre focuses on conservation, scientific research, education, training and teaching and the promotion of tourism with the company Runa Tupari. While not an enterprise in its own right, it does serve as a training centre for other commercial activities such as the tourism enterprise.

Hambi Warmikuna (Women Healers) Ancestral Health: These ancestral health providers are organised for the promotion and strengthening of ancestral medicine and conservation of the *chakras*. These women hold much of the traditional knowledge pertaining to medicinal plants within the communities.

5.3 The role of UNORCAC in improving market access

Members of UNORCAC and the Women's Central Committee have used their traditional agricultural systems mainly to provide access to food and as a means of subsistence. But they have also gradually developed more sophisticated means of marketing and complementary activities based on agrotourism and value-added microenterprises as strategies to sustain local agrobiodiversity.

Actions such as the multiplication and distribution of native seeds and the transfer of knowledge have allowed native varieties to be mobilised from producer to producer and to be used and conserved by the families in the community. The cultivation of cash crops focused on the market does not mean the displacement of other native varieties of cultural relevance, as these varieties are also cultivated and the surpluses sold. Producing native crops has had no negative impacts on agrobiodiversity nor are any native products destined for export.

5.4 Future plans for agrobiodiversity conservation and use

UNORCAC has a strategic action plan for the conservation of agrobiodiversity and to sustain the *chakra* system of the Indigenous communities, including the following six actions.

5.4.1 Conservation of the Indigenous *chakra* system

1. Promoting the recognition of the lands of Indigenous communities of Cotacachi as biocultural territories and conservation areas: To further this aim, UNORCAC has submitted a proposal to FAO nominating the Andean *chakra* system of the Kichwa communities of Cotacachi as a Globally Important Agricultural Heritage System (GIAHS).

2. Improving and encouraging local seed systems to promote the use of adapted varieties: UNORCAC is supporting a functional and diverse local seed system that facilitates access to and use and on-farm conservation of cultivated plant genetic resources for food and agriculture (PGRFA). To achieve this, UNORCAC will or will continue to:

- Continue to identify farmers to be trained as seed producers and train farmers' groups in quality seed production
- Continue to establish community seed banks, with the participation of local leaders in their maintenance and monitoring
- Continue to encourage local seed systems through seed fairs, events and field days, and facilitate community exchanges to encourage dialogue and the exchange of seeds between farmers and other relevant actors
- Design and implement an information system and permanent monitoring of local agrobiodiversity to ensure local agrifood systems are sustainable, and
- Continue to raise awareness and train rural populations (including Indigenous and local communities) about the importance of local seed systems for conservation and use.

5.4.2 Conservation of traditional knowledge

3. Strengthening and reaffirming local and traditional knowledge systems as a basis for territorial development and preserving cultural identity: UNORCAC is working to ensure that traditional knowledge related to agrobiodiversity is identified, systematised and promoted as instruments for food and nutrition security, income generation and climate change adaptation. To achieve this, UNORCAC will or will continue to:

- Run capacity-building and training workshops on issues related to agricultural practices, technologies and production systems, as well as seed conservation and its applications in gastronomy, natural medicine and other uses
- Build interinstitutional linkages with universities and research centres to develop participatory research processes
- Generate and disseminate materials on issues related to agrobiodiversity knowledge
- Promote education about the conservation of agrobiodiversity and ancestral knowledge in the canton's schools
- Identify, systematise and promote oral stories, festivals and celebrations, rituals and traditions, fairs and meetings and other cultural events linked to agrobiodiversity
- Offer sponsorships and other financial and technical support for cultural, artistic and ritual events related to agricultural cycles and the use of agrobiodiversity, such as the Muyu Raymi fair,
- Conduct training on the protection of ancestral knowledge, preventing illegal access to Indigenous lands and the development of biocultural protocols, and

- Promote agroecological production through crop diversification to achieve benefits in terms of food security, economic income, cultural value and ancestral medicine.

5.4.2 Sustainable use

4. Strengthening research to develop and identify local species that are adaptable and/or resilient to climate change: UNORCAC is gathering information on a diversity of species that can respond to the needs of different users and achieve sustainable agriculture in the region. To achieve this, UNORCAC will or will continue to:

- Identify the ecogeographical and morphological characteristics of species of importance for local food security in a participatory manner
- Establish collections of diverse and promising local varieties and promoted their use through seed multiplication and distribution to respond to issues related to food security, climate change and market demand, among others
- Promote information exchanges at community level through tools such as seed and knowledge exchange fairs, farmer-to-farmer training and community registers, and
- Adapt its seed quality-control system to the needs of small-scale seed producers, by adopting more appropriate protocols and mechanisms.

5. Diversifying crops grown in *chakras* as a climate risk-management strategy with additional income generation, health, and food and nutrition security benefits:
The Cotacachi peasant *chakras* produce a significant number of edible species, which directly benefit producers, improve their diet and promote new income-generating alternatives. UNORCAC will or will continue to:

- Implement and strengthen biodiversity on farms to ensure stable yields, resistance to pests and diseases, and a greater diversity of products
- Restitute to farmers the seed of locally adapted varieties that have been selected in a participatory manner by the farmers in the characterisation process, and
- Promote agroecological practices in peasant production in the communities of Cotacachi.

6. Strengthening short marketing circuits[4] for agrobiodiversity production: The rural fair for agroecological producers in Cotacachi has been strengthened due to the number of participating producers selling quality agrobiodiversity products, which has enabled them to increase their incomes. UNORCAC will or will continue to:

- Expand and improve the physical infrastructure of the fair
- Develop a participatory management model for the women producers' fair, and
- Implement a participatory system of guarantees for agrobiodiversity producers with the involvement of consumer representatives.

[4] Short marketing circuits are a type of food commercialisation involving a maximum of one intermediary.

6 Conclusions and recommendations

6.1. Conclusions

In Ecuador, the Muyu Raymi seed fair is the first and only experience with both provincial and national scope that has allowed the exchange of germplasm among farmers, facilitated access to a wide range of crops and varieties for food purposes, shared skills and knowledge of crop production, and evaluated the agrobiodiversity of seeds at the local level.

UNORCAC has built the capacity of farmers to better manage their plots and improve local food production, while generating better incomes and improving their quality of life. Its business strategy is conserving agrobiodiversity and native varieties in danger of extinction, while also promoting native crops and the cultural identity of Indigenous and peasant communities of Cotacachi. Together, the work of UNORCAC and the Women's Central Committee is crucially important for the recognition of the region's biocultural and agrobiodiverse heritage, for strengthening the role of farmers in conserving agrobiodiversity, and promoting the use of traditional knowledge so that culture, identity and practices are maintained and transmitted from generation to generation.

6.2 Recommendations

In discussion with the members of UNORCAC, several recommendations are advanced here. UNORCAC should continue to:

- Work jointly with grassroots communities to achieve the recognition of the Andean *chakra* in Cotacachi as a Globally Important Agricultural Heritage System. This should ensure that central government allocates budgets through its competent governing bodies (such as the Ministry of Agriculture and Livestock and the Undersecretary for Family Farming) so that initiatives such as those promoted by UNORCAC are considered a priority. This in turn provides a model for replication in other territories and provinces for the conservation of agrobiodiversity and traditional knowledge.
- Support and strengthen the Muyu Raymi seed fair as well as other enterprises and value-added initiatives. This will further help to promote peasant agriculture, food sovereignty, commercialisation, the preservation and use of traditional knowledge, agrotourism and conservation, while also adding value to native products.
- Manage resources and funding to achieve its strategic action plan for the conservation of agrobiodiversity and to sustain the *chakra* system of Indigenous communities.
- Seek out and engage with international cooperation agencies, institutional allies and non-governmental organisations (NGOs) to mobilise resources and support the institutional strengthening of UNORCAC and the Women's Central Committee. This should also help to avoid duplication of efforts.
- Recognise and make visible the crucial role of women in agricultural activities and as custodians of knowledge by strengthening women's capacities, economic autonomy and livelihoods, as well as promoting women's rights through local and national networks of women producers.

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