

**Indigenous agroforestry systems empowerment
as participatory sustainable development strategy for the Amazon
basin: "Chakra Kichwa Amazónica" of Ecuador**

Silvia Corna

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*I dedicate this research to the indigenous communities of the Ecuadorian Amazon,
with whom I shared one of the most enriching years of my life*

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**INDIGENOUS AGROFORESTRY SYSTEMS EMPOWERMENT
AS PARTICIPATORY SUSTAINABLE DEVELOPMENT STRATEGY FOR THE AMAZON BASIN:
"CHAKRA KICHWA AMAZÓNICA" OF ECUADOR**

SILVIA CORNA

ABSTRACT

KEYWORDS: Forest management, agroforestry systems, traditional ecological knowledge, amazon, sustainable development policies, international cooperation, indigenous knowledge, Chakra Kichwa Amazonica, Ecuador

In a context of climate crisis, the Amazon Forest is considered a key ecosystem for global climate regulation and biodiversity preservation. Indigenous populations inhabited the forest for centuries, developing extremely biodiverse agroforestry systems which favour the regeneration of the natural ecosystem. However, today the environmental and cultural richness of the Amazon is increasingly threatened by deforestation, in large part related to the advancement of the conventional agriculture frontier. The present research aims at proposing that empowering these traditional ecological systems could be employed by local and international development cooperation as a participatory strategy to promote sustainable development, and so to contribute to preserve the Amazonian ecosystem services and enhance food security. A case study of *Chakra Kichwa Amazonica*, indigenous agroforestry system of the Ecuadorian Amazon, serves to investigate concrete empowerment actions, to be eventually replicated in other areas of the Amazon Basin. This exploratory research concludes that empowering traditional agroforestry systems can be a valuable strategy to promote sustainable development in the Amazon Basin, but not itself sufficient to ensure a participatory approach.

**EMPODERAMENTO DOS SISTEMAS AGROFLORESTAIS INDÍGENAS COMO ESTRATÉGIA DE
DESENVOLVIMENTO SUSTENTÁVEL PARTICIPATIVO PARA A BACIA AMAZÔNICA:
"CHAKRA KICHWA AMAZÓNICA" DO EQUADOR**

SILVIA CORNA

RESUMO

PALAVRAS-CHAVE: Gestão florestal, sistemas agroflorestais, traditional ecological knowledge, amazônia, políticas de desenvolvimento sustentável, cooperação internacional, saberes indígenas, Chakra Kichwa Amazónica, Equador

Num contexto de crise climática, a floresta Amazônica é considerada um ecossistema fundamental para a regulação global do clima e a preservação da biodiversidade. As populações indígenas habitaram a floresta durante séculos, desenvolvendo sistemas agroflorestais extremamente biodiversos que favorecem a regeneração do ecossistema natural. No entanto, hoje a riqueza ambiental e cultural da Amazônia é cada vez mais ameaçada pelo desmatamento, em grande parte relacionado ao avanço da fronteira agrícola convencional. A presente investigação visa propor que o *empowerment* destes sistemas ecológicos tradicionais possa ser utilizada, pela cooperação para o desenvolvimento, como estratégia participativa para promover o desenvolvimento sustentável, e assim contribuir para preservar os serviços ecossistêmicos amazônicos e melhorar a segurança alimentar. O estudo de caso sobre a *Chakra Kichwa Amazonica*, sistema agroflorestal indígena da Amazônia equatoriana, é utilizado para investigar ações concretas de empoderamento, a serem eventualmente replicadas em outras áreas da Bacia Amazônica. Esta pesquisa exploratória conclui que o *empowerment* de sistema agroflorestais tradicionais pode ser uma estratégia valiosa para promover o desenvolvimento sustentável na Bacia Amazônica, mas não é por si suficiente para garantir uma abordagem participativa.

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Introduction

The Amazon River basin is home to the largest tropical rainforest on Earth, covering 6-8 million km², 40% of the South American continent. The Amazon Forest is a humid and warm biome, enclosing an immense environmental and cultural richness: it hosts 40,000 species of plants and trees, 3.5 million species of insects and 2,000 of mammals and birds; 33 million people reside in the region and more than 400 indigenous nationalities inhabit 27.5% of its territories. The Amazon provides a great variety of local and global ecosystem services, such as clean air, water, food and medicines, and hydrological regulation, together with services involving cultural and identity aspects (Müller, 2020; Borja et al., 2017).

The Amazon Forest plays a key role for global climate regulation, which is particularly relevant in a context of climate change. According to the possible scenarios described by the Sixth IPCC Report, global temperatures will rise at least until the second half of the present century, the sea level is expected to rise irreversibly in a scale of hundreds to thousands of years, while extreme climate phenomena, such as heavy precipitation, droughts, heat waves and ice and snow loss, will intensify during the next decades (IPCC, 2021). Through evapotranspiration, the Amazon recycles around half of the precipitation it receives, regulating humidity and influencing the rainfall regimen at regional and global levels. The humidity originating in the forest is transported by the winds to other parts of the continent, where it originates precipitation, a phenomenon known as "flying rivers" (Marengo et Souza Jr, 2018). Moreover, the Amazon is responsible for sequestering and stocking 9% of the global carbon (Müller, 2020).

Despite having a fundamental function at regional and global levels, the Amazon rainforest is subject to high deforestation rates. The causes mainly lie in the expansion of the conventional agriculture frontier, to leave space to monocultures such as soybean and sugar cane and to intensive livestock farming, together with the recent increase of fire frequency and size. With deforestation, the Amazon not only loses its carbon storage capacity, but it also releases carbon stocked in soil, subsoil and biomass, resulting in a substantial increase of global temperature (Marengo et Souza Jr, 2018).

However, for thousands of years the Amazon Basin conserved its primary forests, even though they were populated by human settlements, where native populations produced their food to survive. Traditional agricultural practices started to be substituted by intensive and more environmentally impacting ways to produce food with the industrial agriculture innovations introduced by the “green revolution”, from the 1970s. Conserving its role of provider of raw material in the global market (as a consequence of colonialism), Latin America increased the agricultural production intended for exportation, progressively reaching the Amazonian borders (Hecht, 1999).

Agriculture in the Amazon has been practiced for centuries, but in an extensive and nomadic way, which ensured the restoration of the forest. Indigenous populations were distributed in the territory, and agriculture was intended for self-sufficiency. In many different areas of the Amazon, native populations designed their unique agroforestry systems, imitating the natural patterns of the forest and adapting to climate and soil conditions (Miller, Nair, 2006). Agroforestry systems combine different species of trees and other crops, creating a biodiverse system which offers a variety of ecosystem services (Kumar and Nair, 2006). Despite population growth and a progressive tendency to sedentarism, many of these agricultural systems have been preserved until the present date, adapting to the current needs of the populations, but they are presently at risk of disappearing (Orrico, 2017).

On the other hand, in the last decades development cooperation has been very active in the Amazonian Basin with the aim of stimulating regional development and promoting forest preservation, eventually proposing top-down solutions derived from the western development paradigm (Castro, 2004). This thesis aims at investigating the potential of the empowerment of indigenous agroforestry systems as a participatory sustainable development strategy for the Amazon Basin. A case study on the indigenous agroforestry system Chakra Kichwa Amazonica, of the Ecuadorian Amazon, will serve to explore the potentialities of specific empowerment actions, supporting the general aim of the research. The reason for the selection of this specific case study lies in the direct experience I had in the Ecuadorian Amazon. Being interested in deepening the theme of traditional ecological knowledge and agroforestry systems, I applied to the Italian programme “Corpi Civili di Pace” in the Amazon city of Tena, where I worked for nine months, between 2019 and

2020, with ENGIM NGO, in support of the indigenous agroforestry system Chakra Kichwa Amazonica.

This thesis intends to contribute to the literature that promotes the revalorization of traditional agricultural systems, and investigates the potential role of participatory and sustainable strategies in the Amazon Basin. Criticisms of the development paradigm and top-down approach in the context of development cooperation are abundant in the literature, as well as studies on the potential of traditional knowledge and agroforestry systems to promote sustainable development. Nevertheless, there are important gaps in regards to specific studies on the potentialities of indigenous agroforestry systems as a participatory and sustainable strategy, adopted by international development cooperation programs within the Amazon Basin.

The main research question that this exploratory research intends to investigate is: *can the empowerment of indigenous agroforestry systems be considered as a valid participatory sustainable development strategy for the Amazon Basin?* While the specific research question related to the case study is the following: *did the addressed actions of ENGIM NGO empower Chakra Kichwa Amazonica, thus contributing to sustainable development in the Ecuadorian Amazon?* The two selected actions for the case study are the creation of the new module “Chakra Kichwa y Agroecología” for the School of Environmental Leadership program (ELA) and the development of “Sello Chakra”, a certification for Chakra Kichwa Amazonica products, which I personally followed during the programme year.

The first chapter is designed as an introduction to the main theme of this research, realized through literature review. Specifically, it aims at investigating the potential of traditional ecological knowledge and agroforestry systems (OB1) and assessing the presence of indigenous agroforestry systems in the Amazon as traditional ecological knowledge under threat (OB2).

Through a revision of the literature, the second chapter questions the approach of development cooperation toward “development” and “sustainable development” (OB3) and explores the potential of indigenous agroforestry systems in sustainable development projects (OB4).

The case study is introduced by the methodology chapter, and it is then divided in one first introductory chapter, aiming at verifying that Chakra Kichwa Amazonica agroforestry system is a sustainable agricultural practice (OB5) and investigating the threats to the conservation of this agricultural practice (OB6), and a second chapter, which explores the empowerment actions of ENGIM NGO towards Chakra Kichwa Amazonica (OB7) and presents the results collected. This section is concluded with the discussion chapter, which puts in relation the information collected through the literature review with the findings of the case study, and aims at assessing if the implementation of ELA's module *Chakra Kichwa y Agroecología* and the creation of the *Sello Chakra* certification contributed (or could contribute, as for the seal) to empower the Chakra Kichwa system, and hence as a sustainable development strategy for the Ecuadorian Amazon (OB8).

The micro perspective adopted through the case study will be then brought back to the macro perspective through the conclusion chapter, to assess if the empowerment of indigenous agroforestry systems can be, more in general, considered as a valid participatory sustainable development strategy for the Amazon basin (OB9).

Chapter 1. Indigenous agroforestry systems of the Amazon: a traditional ecological heritage under threat

I.1 Traditional ecological knowledge (TEK): a basis for the development of agroecology in Latin America

Over the last two centuries, traditional knowledge has undergone a phase of gradual abandonment and devaluation. The word “traditional” acquired a negative connotation, related to concepts such as “simple, savage and static” (Warren, 1995), while industrial revolution and modernization of agriculture were promising a future of innovations, abundance and independence from natural factors. The latter, together with other reasons, such as loss of local languages, led to the progressive erosion of traditional knowledge (Gómez-Baggethun et al., 2013).

TEK (Traditional Ecological Knowledge) is defined by the academy as a “body of knowledge, beliefs, traditions, practices, institutions, and worldviews developed and sustained by indigenous, peasant, and local communities in interaction with their biophysical environment” (Toledo, 2000). These types of knowledge share a cosmological, and mostly ecocentric, perspective, where human beings are considered as an integral part of a whole, a community of living beings. Those practices and approaches have been recently defined as “ecological” because they involve valuable strategies for sustainable ecosystem management.

Traditional knowledge, in fact, has been long considered as an obstacle to the process of innovation and development, and especially after the “great acceleration” of the second half of the 20th century, academics began to question whether it would survive the passage of the new millennium, adapting to technological development, urbanization and globalization of markets, or it would disappear (Berkes et al., 2000, Gómez-Baggethun et al., 2013). The erosion of traditional knowledge reached its peak in most of the western countries; on the other hand, in southern world’s countries, it continued to represent the

basis for many livelihood strategies and therefore to be preserved and transmitted, even if it experienced great losses due to colonialist and neo-colonialist processes.

In recent decades, however, traditional knowledge entered a phase of renewed interest: numerous scientists started to study local practices and strategies and recognized their validity and complementarity with western scientific knowledge (Agrawal, 1995). The primary reason for this shift in approach lies in the exacerbation of the environmental emergency, and hence in the need to find alternative solutions. It was in this context that traditional knowledge, for centuries considered as mere cultural and folkloric heritage, was again taken into account in order to identify ecosystem management strategies to respond to the current environmental problems (Gómez-Baggethun et al., 2013) and *“contribute to the conservation of biodiversity, rare species, protected areas, ecological processes, and to sustainable resource use in general”* (Berkes et al., 2000, p. 1251). In fact, even if not all the traditional practices and approaches are environmentally sustainable, a lot of them turn out to be, due to the necessity for resource regeneration and risk prevention, which have always been fundamental aspects for the survival of human communities.

The greater potential of this knowledge is inherent to its specificity: traditional knowledge is grounded to the territory, and it is based on a deep knowledge thereof, resulting from centuries of observation and adaptation to local conditions (IFAD, 2016). In fact, since it is the fruit of long-term observation, once forgotten its regeneration is practically irreversible. (Gómez-Baggethun et al., 2013). On the other side, western scientific knowledge, which makes use of more accurate and objective measuring instruments, developed with the intent to be universally valid. The origin of this approach must be found in the positivist method, which modified the dialogue with the natural world, starting to consider it as a machine rather than a living entity (Hecht 1999).

An example of the implications of implementing universal solutions is represented by the Green Revolution: from the 1970s industrial agriculture was spread all over the world, with the intention of facing the long-standing problem of world hunger, through the introduction of short-term solutions such as fertilizers, pesticides and machinery. The production growth decreased the cost of products for the urban areas, but, as Hecht points out, it had more negative than positive impacts on rural communities, contributing to

increasing the economic gap (Hecht, 1999). Moreover, industrial agriculture led to a series of environmental problems, such as severe soil degradation and water pollution and contributed to the process of erosion of traditional knowledge and loss of rural communities' resilience.

Indigenous peoples have been increasingly recognized as the greatest guardians of traditional knowledge (IFAD, 2016). Both their condition of greater isolation, which has kept them away from the processes of globalization, and their belief system, that protected them from an unsustainable management of natural resources, contributed to a greater preservation of their traditional ecological knowledge. IFAD's (International Fund for Agricultural Development) report *The Traditional Knowledge Advantage: Indigenous people's Knowledge in Climate change*, published in 2016, represented one of the major steps in internationally formalizing the recognition of traditional knowledge and valorising indigenous peoples' role. This report recognises their fundamental importance in a context of climate change, both for mitigation and adaptation. This recognition could be summarised by this passage of the report's introduction: "*indigenous peoples have millennia of experience in the collection and application of information on the local environment to better plan and manage the risks and impact of natural variability and extreme climatic phenomena*" (IFAD, 2016).

A dialogue between western scientific knowledge and traditional knowledge would be desirable to find localized solutions and address the new challenges of the present times. A great contribution in this process is attributable to the agroecological movement. As a response to the environmental problems resulting from the Green Revolution, Agroecology started to emerge in Latin America between the 1970's and 1980's. Miguel Altieri's book *Agroecología: bases científicas de la agricultura alternativa*, one of the first and most important theoretical texts of the movement, describes Agroecology as an approach more than a specific discipline, including different methods deriving from the agricultural sciences, ecology and indigenous agroecosystems (Altieri, 1999). Agroecology seeks to recover the practices of traditional, small-scale and family farming, with a new, more conscious perspective that prioritizes the conservation of natural resources and the forms of social organization of peasant communities, rather than production at all costs. The

study of native agricultural systems provided a major part of the base material to develop hypothesis and alternative production systems.

The basic principles of Agroecology include: recycling of nutrients and energy, substitution of inputs, improvement of organic matter and biological activity of the soil; diversification of plant species and resources in time and space; integration of crops with livestock, and optimization of interactions and productivity of the entire agricultural system. Sustainability and resilience are achieved through practices of diversification and complexity, such as polycultures, rotations, agroforestry, use of native seeds and local breeds of livestock, natural pest control, use of compost and green fertilizer and an increase in soil organic matter (Altieri, 2010). Organic agriculture based on the simple substitution of chemical inputs to organic inputs, is not considered an agroecological practice, when it makes use of extensive monocultures, heavy machinery, massive irrigation and bare soil, because it does not assure the preservation of biodiversity, water, soil and food for the future generations. (Oliveira, 2014).

The work of Conklin (1956) has been particularly important for the reevaluation of indigenous practices such as shifting agriculture, importance of polycultures, crop rotation and agroforestry systems, and created the conditions for the development of Agroecology (Hecht, 1999). According to Altieri, even if the traditional agroecosystems are developed in different contexts and geographical areas, they share several characteristics: high levels of biological diversity (including wild plants), which plays a key role in ecosystem regulation and in the provision of ecosystem services; a set of strategies for the management and conservation of landscape and land, as well as for the management of water resources; resistance and strength to deal with perturbations and change (both human and natural induced); connection with the traditional heritage; importance of social and cultural aspects and of communitarian values (Altieri, 2010).

Ultimately, the complementarity of traditional and scientific knowledge, firmly defended by the agroecological movement, is not the only reason to justify the importance of revalorizing indigenous knowledge in a context of environmental crisis. The 370 million people who compose the world's indigenous population reside in the 80 percent of the planet's biological biodiversity (IFAD, 2016), which reflect the presence of remarkable

natural resource management strategies. The subsistence of many indigenous peoples is in fact rather based on ecological exchange than on economic exchanges, to guarantee an uninterrupted flow of goods, raw materials and energy (Toledo, 1999). Indigenous and traditional knowledge are testimonies of a world where humans and nature were not yet separated, and a sustainable management of the ecosystems was the only way to ensure survival (Eisenstein, 2013) From this perspective, the preservation and promotion of Traditional Ecological Knowledge, could represent an essential strategy for a future of harmonious cohabitation between all the living beings.

I.2 Agroforestry, a compromise between forest cover and agricultural production in a context of climate change

Agroforestry is an agroecological land use management technique that combines woody vegetation (trees or shrubs) with crops and/or livestock. The term was coined in the late 1970s, when alternatives started to be searched back into traditional agriculture practices to respond to the environmental and social side effects of the Green Revolution. It is essentially “a new name for a set of old practices”, as Nair clarifies in his book “Introduction to Agroforestry”, since agroforestry has been practiced throughout the world over centuries (Nair, 1993).

In Europe, until the Middle Ages, it was common practice to clear derelict forests and replant trees at the same time as other agricultural crops (Steppler and Nair, 1987), and studies have proved that in the Mediterranean region early agroforestry systems have been developed since the origin of farming, being a key element of the landscape throughout the history (Kizos and Plieninger, 2008). In Asia, the Hanunoo selectively cut forest trees in order to take advantage of their shadows by the end of the rice-growing season, while in tropical America farmers produce their food by simulating forest structure in order to obtain the same beneficial effects (Steppler and Nair, 1987). Those are just a few of the hundreds of examples that could be mentioned.

According to the World Agroforestry Center, agroforestry can be defined as: *“a collective name for land-use systems and technologies where woody perennials (trees,*

shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components” (Lundgren and Raintree, 1982). This implies that agroforestry systems (SAFs) involve at least one woody perennial in combination with a plant or animal, their cycle usually lasts more than one year, they produce more than one output, and they are more ecologically and economically complex than monoculture (Nair, 1993).

Agroforestry practices got increasing attention from the researchers during the last fifty years, as they have been recognised as a valuable compromise between agricultural production and forest cover, assuring a series of ecosystem services which would be otherwise absent without the presence of trees. As Kizos and Plieniger attest: *“agroforestry systems are mixed and multifunctional by definition. Their functions are not purely productive, as the presence of trees also provides environmental services such as soil improvement, reduction of surface runoff and conservation of biodiversity with their many different soil and air microclimates”* (Kizos and Plieninger, 2008). Trees provide habitats for animal species, and they manage to bring nutrients from subsoil to topsoil, making them available for the plants with shallower roots, while they offer important provision services such as food, medicines and construction material (De Oliveira, 2014). Since agricultural development is one of the major causes of deforestation, agroforestry can represent an agroecological alternative to support human communities’ livelihood and to provide some of forest ecosystem services for plants and animals (Gama-Rodrigues et al., 2006).

Nevertheless, agroforestry systems are primarily appreciated for their key function in climate change mitigation and adaptation. SAF can contribute to restoring degraded areas, which is considered a major strategy to increase carbon stocks and provide for climate change mitigation, while they can simultaneously support climate change adaptation by assuring food production for vulnerable communities (Porro et al., 2012). FAO classifies agroforestry systems as “climate-smart agriculture” (CSA), since they contribute to: resilience and climate change adaptation, greenhouse gases reduction, and sustainably increase food security by enhancing productivity and agricultural income (FAO, 2019).

As for adaptation strategies, the diversification of plants which characterizes SAFs represents a valuable ecological barrier against the incrementation of plagues and diseases resulting from climate change, and to increase farmer's resilience and food security. Trees can be strategically used to face the rising temperatures, by taking advantage of their shadows, and to protect crops from strong winds and torrential rains (Montagnini et al., 2015; FAO, 2019).

As for climate change mitigation, the presence of trees can absorb a greater amount of carbon compared with conventional agricultural practices. The potential of Carbon absorption for SAFs is very variable, from 0,29-15,21 Mg C ha⁻¹ year⁻¹ for the aerial part, and 30-300 Mg C ha⁻¹ for the soil. This data substantially depends on the composition of SAF: systems hosting a greater number of perennial species, such as tropical *homegardens*, have a greater carbon storage capacity compared to those which have a significant presence of annual species, such as *alley cropping* (Montagnini et al., 2015).

In order to increase stability and resilience, agroforestry systems can imitate the complexity of natural ecosystems and favour the interactions between its elements. Successional Agroforestry is a technique based on the reproduction of the ecological succession, whose final step is the creation of a food forest. These agroforestry practices are a practical result of the dialogue between traditional ecological practices and modern techniques. The succession is induced and therefore sped up, by adding productive plants which can prepare the condition for the next plant to grow without the need of external inputs (Guimarães and Mendonça, 2019). The aim is optimizing the natural processes, by favouring an abundance of resources to create a higher quantity and quality of life and increase the complexity of organic matter (Oliveira, 2014). One of the most recognized successional agroforestry techniques is "Syntropic Agriculture", which was conceived and implemented from the '80s in Brazil by Ernst Götsch, as a result of his interaction with the indigenous Amazonian populations (Guimarães and Mendonça, 2019).

Tropics are in fact the areas of the world where agroforestry practices have been more broadly developed, long before agroecological principles started to spread, resulting in a huge fan of traditional systems. This is directly related to the specificity of these territories: rains are frequent and intense, and the soils are generally poor and prone to slaking, crusting and compaction. Since "*one of the most widely acclaimed advantages of*

agroforestry is its potential for conserving the soil and maintaining its fertility and productivity” (Nair, 1993, p.261), these practices have been largely employed by the traditional farmers in this area.

The Amazon Forest has been shaped and modified by its inhabitants and their agricultural systems. Black hearts, a fertile soil layer that was found in some areas of the Amazon, originated from the decomposition of organic waste of human settlements. In fact, as reported by Müller, *“contrary to what many believe, studies suggest that 11.8% of Amazonia’s terra firme forests are anthropogenic in nature, resulting from the management of biodiversity by indigenous peoples”* (Müller, 2020, p.12). Indigenous agroforestry systems have contributed to this process and to the preservation of this giant forest, supporting the regeneration of the fragile Amazonian soil (Kumar and Nair, 2006).

I.3 Indigenous agroforestry systems in the Amazon basin

I.3.1 Origin and evolution

Indigenous agroforestry systems have a long history in the Amazon basin, which began long before the European arrival. The first inhabitants of this vast forest, the so called “Paleo-Indians”, were fruit gatherers and fishers, and were living in this area at least 11,200 years ago (Homma, 2003). Evidence of the first Amazonian plant domestication was found next to rivers in Colombia, Ecuador and Peru, indicating that some plants started to be cultivated around 9,000 years ago, either accidentally, through seeds discarded next to dwellings, or intentionally (Miller, Penn, Van Leeuwen, 2006). The cultivation of cassava, which still represents the staple food for many of the indigenous populations of this area, was already common by the Tupi people 3,500 years ago (Homma, 2003).

However, the first conclusive evidence of the ancient origin of agroforestry systems in the Amazon basin and their biodiversity could be found in the reports of the first European explorers in the sixteenth century: Francisco de Orellana and Carvajal described the villages along the Napo River, which they navigated between 1541 and 1542, as large, socially stratified, and rich in food plants varieties (Miller and Nair, 2006). Homma, in his book *“Historia da agricultura na Amazônia: da era pré-colombiana ao terceiro milênio”*, reports

that at the time of the European arrival: *“O legado da agricultura indígena na Amazônia compreendia o conhecimento da cultura da mandioca, o aproveitamento de centenas de frutas nativas, plantas medicinais, técnicas de caça e pesca, corantes, oleaginosas, aromáticos, tóxicas [...]”*. Parts of these useful plants have been exported by the colonists in the old continent and some of them became important components for western medical development (Homma, 2003, p.17).

Colonization led to the decimation of many Amazonian populations through diseases, warfare, and slavery and to the consequent loss of a great wealth of knowledge and agrobiodiversity. Despite this, many elements of their agroforestry systems survived, in some cases down to the present date, being part of the current agricultural practices of indigenous peoples (Miller and Nair, 2006). Agroforestry systems were planted and managed around the houses, where the vegetation was cleared for the purpose, while useful spontaneous species were spared and combined with fruit trees and staple crops. According to Miller, Penn and Van Leeuwen *“these various practices may result in several configurations of fruit tree establishment, such as the homegarden of fruit trees and other useful condiments and medicinal plants grown in close proximity to the house, a belt of fruit trees surrounding a village, fruit trees interspersed with field crops, orchards of mixed fruit trees, and fallows of forest species enriched with fruit trees. These last configurations have been termed ‘swidden-fallow agroforestry’”* (Miller, Penn, Van Leeuwen, 2006, p.7)

Despite the main purpose of these agricultural systems being subsistence even after the European arrival, crops such as cacao and coffee soon acquired an important commercial value. Both cacao and coffee well combined with the shade of other plants and were produced in traditional agroforestry systems, but while cacao is a native Amazonian plant which was already cultivated by the indigenous populations (even if just the jelly and sweet envelope of the seeds was consumed), coffee was introduced in the eighteenth century by the Portuguese colonists (Miller and Nair, 2006). The importance of these two commercial crops can be seen still today in many Amazonian regions.

Another relevant change in agricultural management after contact with the Europeans, was the progressive abandonment of the migratory approach to agriculture: the low density of native Amazonian populations allowed a frequent displacement of their settlements. This

practice was very common because it enabled an easier finding of food, through fishing, hunting and gathering activities, and made agriculture more productive. When the resources were running out and the soils were less fertile, indigenous groups used to move to other lands, allowing the forest to completely regenerate (Wadsworth, 2000). However, migratory agriculture ceases to be sustainable in the case of considerable population growth, as the reduction of fallow time can strongly affect the regeneration of the forest and the soil.

Indigenous agroforestry systems have been developing along with the ecosystem and they integrated into the forest without drastically transforming it. Dense agroforestry systems made of tropical plants have proven to be ideal to enable a long-term production with no need of external input, as the roots of the trees can contain erosion, and the complexity of an agroecosystem resembling nature make it resilient to diseases and to difficult climate conditions. The spiritual and reciprocal approach toward nature that many of the indigenous groups have conserved until today, also contributed to preventing an intense exploitation of the resources. For these reasons Miller and Nair consider that *“Indigenous agroforestry systems in Amazonia represent a fine-tuning of knowledge concerning the interaction of plants and their environment, and involve as well interactions between agricultural, social, and cosmological systems”* (Miller and Nair, 2006, p.158).

1.3.2 Types of Amazonian indigenous agroforestry system

Homegardens are today's most common indigenous agroforestry practice in Amazonia (Miller, Penn, Van Leeuwen, 2006). There is not a universal definition of the term, as they have been developed in different places and they vary in composition, but Kumar and Nair, in the introduction to their book *“Tropical Homegardens, A Time-Tested Example of Sustainable Agroforestry”*, trying to bring together definitions of several authors, describe them as *“intimate, multistory combinations of various trees and crops, sometimes in association with domestic animals, around the homestead”* (Kumar and Nair, 2006). According to the authors, they are *“the oldest land use activity, next only to shifting cultivation”*. The main characteristic of homegardens is a remarkable agrobiodiversity, which is not fortuitous, but the result of an accurate selection of useful plants for subsistence. They are known by different folk names, such as *“huertos”* or *“jardins”* in Peru,

“quintais” and “sitios” in Brasil and “chakras” in Ecuador, among others (Miller and Nair, 2006).

The potential of these systems lies in their capacity of assuring the livelihood of the families that practice them, without substantially disrupting the surrounding environment. They supply staple food as cassava, plantain, corn or beans, a huge variety of fruits, wood for construction and craft, fibres, medicines, and ritual plants. (Miller, Penn, Van Leeuwen, 2006). When villages are isolated, indigenous groups minimize the displacements to markets, and agroforestry systems assure them all they need for subsistence. However, communities which still practice agroforestry but are located next to urban centres, tend to integrate more to the dominant society and to its induced needs, and they either sell the excess of their production or they even produce commodity crops which are specifically intended for selling. Amazonian homegardens are therefore appreciated both for their potential to provide economic and nutritional benefits to the local population and for being important reservoirs of agrobiodiversity (Coomes, 2008).

Indigenous communities that live next to the Amazonian rivers in Peru, the so called “Ribereños”, are an example of groups that base their livelihood on homegarden practices. “Huertos” are configured as rectangular areas around the house, which are constantly mulched with organic waste and manure from domesticated animals, which forage freely in the plot (Coomes, 2004). Coomes found a total of 309 useful plant species in 15 communities along the Corrientes River in northeastern Peru (Coomes, 2008). This incredible agrobiodiversity is extremely valuable as it assures food sovereignty and a huge number of other ecosystem services. According to the study, the “huertos” diversity seemed to be related to different factors. The cultural aspects are certainly one of the most determinant, in fact homegardens of Achuar communities (where agrobiodiversity is a sign of prestige) are much more biodiverse than the Urarinas one; but other aspects as the frequency of seed exchange, wealth (land asset, social and cultural capital) and closeness to urban centres can also be determinant. While other studies evidenced that the proximity to markets can affect the conservation of a traditional and biodiverse system (Gray, 2007), the study by Coomes reveals that in this specific case the new opportunities offered by markets contributed to encouraging agrobiodiversity (Coomes, 2008).

Homegardens nowadays are mainly a permanent type of agriculture, as most of the indigenous villages tend to not to be displaced from one place to the other, however, other agroforestry techniques coexist with them in the Amazon, and are sometimes practiced by the same group, for different purposes. In the study conducted by Coomes in the Ribereño communities of Nuevo Triunfo, published in 2004, is evidenced that the production of homegardens is complemented by “swidden-fallows”, which are employed in the highlands and lowland with different management strategies (Coomes, 2004).

Along with homegardens, “swidden-fallows” are one of the most remarkable and most widespread indigenous agroforestry techniques of the Amazon basin. Also known as “shifting cultivation”, swidden-fallow agroforestry consists in clearing a small plot of primary or secondary forests, mulching or burning the vegetation and then planting crops, that benefit from the incorporated organic matter or from the wood ash; after two to four years, the plot is left to rest and to regenerate, while another area is opened. However, the fallowed plots are usually not completely abandoned, but rather actively managed to extract forest products and other useful products from the permanent crops (Gray, 2007; Jong, 1996).

The term “*Swidden-fallow agroforestry*” indicates a huge variety of practices that maintain regional characteristics, as they arose and developed in different areas. Jong, in the article “Swidden-fallow agroforestry in Amazonia: diversity at close distance” underlines that older fields acquire a central role in some Ribereños communities of Peru, where they are used as an important space for the production of fruit trees (Jong, 1996). This could be seen in a logic of successional agroforestry, where the natural succession is encouraged by the farmer, and the different stages are managed and intended for a specific production. The swidden fallow systems are usually less biodiverse than homegardens, as staple food plants occupy a central position, but still impressive compared to western agroforestry systems: in the seven plots studied by Jong, he found 92 species, of which approximately half were domesticated and the other half were native, all of them intended both for auto-consumption and for sale (Jong, 1996).

The Machiguenga Gardens are an example of a melding of the two techniques described in the previous paragraphs. Machiguenga peoples are inhabitants of the Upper Amazon

forest in Peru, who still practice forest products gathering, along with agriculture, and they usually move their settlements after a few years of exploitation of an area. Johnson describes their unique agroforestry practices as follows: *“when Machiguengas decide to move to a new settlement, they clear a large new garden and plant it. Meanwhile, they continue to reside at the old site, where they live from existing gardens”* (Johnson, 1983, p. 31). Swidden-fallow fields are then converted into homegardens, which produce a smaller quantity of staple crops, but a greater variety of other useful plants. In its study, Johnson found 80 useful plant species in a single community (without considering all their varieties). The author describes the Machiguenga as *“thoughtful and knowledgeable horticulturalists who successfully meet their subsistence needs without causing irreversible degradation of their environment”* (Johnson, 1983, p. 61).

Swidden-fallow agriculture is sometimes used as a synonym of slash-and-burn agriculture, as one of the most common techniques used for vegetation clearing is fire. This practice has been long stigmatized, since, even if the ash can favour the growth of plants in the first instance, the fire provokes fertility loss and carbon emissions (Roncal-García et al., 2008). But while it was previously believed that slash-and-burn agriculture was an important driver of deforestation, many authors argued that this technique has neutral or even positive impacts on biodiversity when employed in low population regions (Johnson, 1983; Gray, 2007). However, it also must be taken into account that in the Amazon, swidden-fallow agroforestry clearing is also frequently done with the “slash-and-mulch” method, where the organic matter is left on the ground until it decomposes (Zurita-Benavides, 2017). This results in a more environmentally sustainable practice, as instead of reducing soil fertility, it enhances it.

The Waorani peoples of the Ecuadorian Amazon employ slash-and-burn for agroforestry systems based on staple food such as cassava and plantain, but prefer slash-and-mulch for most of the other crops, as they consider mulching fundamental for an abundant harvest. Their agroforestry system, the “kewenkore” is still not very well studied, but according to the research of Zurita-Benavides published in 2017 and on personal field observation, there is evidence that some useful plants are grown under the native forests or in natural clearings (personal observation, 2019; Zurita-Benavides, 2017). Agricultural practices between Waorani peoples are mainly devoted to subsistence, since many of the

communities are isolated, without access to the road. Their contact history is recent, as they were approached by evangelistic missionaries only in 1953. Before that moment they were nomadic, and they were collecting most of their nourishment in the forest, while agroforestry was mostly employed for staple food, which was planted in isolated areas of their territory and then left without management, coming back just for the harvest. This type of agricultural management has enabled the conservation of a dense and biodiverse forest in a large proportion of their territory (Zurita-Benavides, 2017).

The Kayapó peoples of the Brazilian Amazon, are a good example of complex agroforestry management, where different techniques are employed according to the specific purpose and location. "Apete" are man-made tropical forest patches created in areas outside the villages, as food reservoirs, which could be identified as swidden-fallow agroforestry systems. The soil is accurately created by filling depressions with mulch, where useful plants serving for food (tubers, roots, fruits, nuts), medicine, material for construction of objects and houses, poisons, body paints, ceremonial items, etc., are successively grown. Old "apetes" are mainly used as a source of wood, fruits and medicines, and some specific spots in the forests are intervened to favour the creation of "resource islands", or food forests in the clearings. Trails that connect one place to the other are also employed as a food reservoir for the displacements, resulting in a trailside food forest, while the hilly and well-drained spots are used for the planting of tubers. Moreover, the Kayapó employ homegardens around their houses, where they have fruit trees and medicinal plants. Plants are always disposed in association, considered as communities rather than single units, and each plant has an ideal companion (Posey, 1985). In the conclusions of his study, Posey comments "*the Kayapó example teaches us that sophisticated management must be based upon recognition of likeness between ecological units*", and he invites us to rethink the concept of natural landscape (Posey, 1985, p. 156). The agroforestry management implemented by the Kayapó people is certainly a remarkable example of coevolution between this population and the forest.

1.3.3 Threats to the preservation

However, indigenous agroforestry systems are under threat. The overwhelming wave of globalization is reaching even the most isolated places, creating new needs that require

money to be satisfied. Many indigenous populations succeeded in incorporating commercial crops in their traditional agroforestry systems and finding a balance between production for subsistence and for selling, or integrating these practices with other sustainable activities such as ecotourism or valuable food processing. Nevertheless, others are progressively changing and intensifying their land use. Gray, based on the studies of different authors, concludes that new market-oriented activities of Amazonian indigenous populations often include shortened fallow times, chemical inputs, cattle raising and cash cropping, which can affect long-term sustainability (Gray, 2007).

Gray compares the land use of 5 indigenous populations of the Ecuadorian Amazon: Waorani, Kichwa, Cofanes, Shuar and Siona-Secoya. The study reveals that more isolated communities such as the Waorani and Cofanes have smaller cultivated areas (1 to 2 hectares), devoted mainly to subsistence, and the lowest rates of clearing, while Kichwa communities located close to market town are progressively adopting a “colonist-style” production and Shuar peoples undertook activities such as cattle ranching and cash cropping. Siona-Secoya were the population with the highest rate of forest clearing, livestock and monocultures, according to the study (Gray, 2007).

The master thesis of Orrico evidences that the main causes of change of land use for the Siona-Secoya lie in factors such as population growth, modernization of agriculture, unplanned touristic development and lack of economic alternatives (Orrico, 2017). Traditionally, the Siona Secoya peoples were exclusively basing their livelihood on hunting, fishing and the production of their “chakras” (agroforestry systems), which were extremely biodiverse: according to the historical record for biodiversity, in the past the chakras of the Siona-Secoyas hosted up to 103 species, versus the 56 identified at the time of the study. During the green revolution, many communities substituted their chakras for monocultures, and this had considerable negative impacts on fertility (due to the progressive soil erosion), long term production, carbon stockage and habitat conservation, among others. These changes had also important repercussions on the diet of this population, which is scarcer in nutrients, compared to the old one (Orrico, 2017).

The examples reported in this section evidenced that Amazonian indigenous agroforestry systems are a remarkable strategy for ensuring both food security and environmental

sustainability, nevertheless, this traditional ecological knowledge is in danger of disappearing. Miller et al. conclude that the progressive erosion of agroforestry ecological heritage could be contained through policies and rural development projects, to create awareness around the validity of these systems and eventually turn them more economically sustainable (Miller, Penn, Van Leeuwen, 2006).

Chapter II. Sustainable development and indigenous agroforestry systems in the Amazon Basin

II.1 Sustainable Development and 2030 Agenda (SDGs): a critical perspective

Sustainable development is a concept which has acquired a growing importance in the international and local political agendas. Since its first introduction in the international discourse, it has been subjected to different interpretations and constant readaptation, according to the shifting social contexts and the exacerbation of social inequalities and environmental crisis, and accompanied by a wide variety of indicators. For these reasons, the term has generated several controversies and criticism.

One of the most famous and first definitions of sustainable development is the one contained in the *Brundtland Report* of the *World Commission on Environment and Development* of the UN of 1987, where it is referred as development that “*meets the need of the present without compromising the ability of future generations to meet theirs*” (WCED, 1987). However, the debate around this concept had started at least one decade before, with the *United Nations Conference on the Human Environment* held in Sweden in 1972 and in the *World Conservation Strategy* of the IUCN of 1980, where poverty was identified as one of the main causes of environmental degradation and thus its eradication considered fundamental to achieve sustainable development (Ricalde et al., 2005)

Nevertheless, it was the Earth Summit of 1992 in Rio (UNCED) which definitely turned “sustainable development” into a well-known concept, through the Agenda 21, an action agenda which was meant to address the major global concerns, such as “poverty, hunger, ill health, illiteracy and the deterioration of the ecosystems” by the 2000 (UN, 1992). The Agenda 21 was structured in four sections, including “Social and Economic Dimension”, “Conservation and management of resources for development”, “Strengthening the role of major groups” and “Means of implementation” and had the initial intent of achieving global sustainable development by 2000 (UN, 1992). The Agenda 21 represented a first attempt to address the major global issues through a joint effort. However, as remarked by Castro in

his critical essay on sustainable development, the Agenda, instead of proposing changes to the social paradigm, was rather suggesting trade liberalization as main strategy to reach sustainable development in the “underdeveloped countries” (Castro, 2004); at the end of the century, many of the global problems and crisis that the Agenda 21 was addressing, were exacerbating.

The Millenium Development Goals have been the first step toward the formalization of concrete global objectives to reach sustainable development, through the creation of specific indicators. The MDGs were proposed within the United Nations Millennium Declaration and Summit of 2000, covering the period of time between 1990 and 2015. However, they were still exclusively intended for “developing countries”, which were supposed to “improve their condition” by reaching the following 8 goals: (1) to eradicate extreme poverty and hunger, (2) to achieve universal primary education, (3) to promote gender equality and empower women, (4) to reduce child mortality, (5) to improve maternal health, (6) to combat HIV/AIDS, malaria, and other diseases, (7) to ensure environmental sustainability, (8) to develop a global partnership for development (UN, 2000).

According to Liverman, the MDGs were proposing a “*top down, competitive, results based, and narrowly focused on what can be counted*” sustainable development, without recognizing in colonialism and post colonialism the root of poverty, hunger and inequality (Liverman, 2018, p. 5-6). In the MDGs the “developed” countries were not included in the target of the goals: the global south countries were supposed to reach the same standards of the global north, to contain poverty and environmental degradation. The addressed areas were: Northern and Sub-Saharan Africa; Latin America and the Caribbean; the Caucasus and Central Asia; Eastern, Southern, Southeast, and Western Asia; and the Pacific Islands (Liverman, 2018). According to Castro, the first adoption of the sustainable development concept in the international agenda has rather been a mainstream response to the environmental movement (which since the decade of the 1970’s were alerting about the limits to growth) with the intent of perpetrating the neoliberal model of development (Castro, 2004; Meadows, 1972). In the final official report of the UN, MDGs have been described as “the most successful anti-poverty movement in history”; nevertheless, Hickel brings evidence that a statistical manipulation was conducted, while poverty and hunger

trends worsened during the implementation of the MDGs, with root on the perpetuation of the neoliberal model (Hickel, 2016).

The 2030 Agenda, adopted at the UN General Assembly of 2015, represented a big step toward the recognition of a shared responsibility for the present social and environmental crisis. It contains 17 SDGs and 169 targets which are addressed to all the UN member states (not just to “underdeveloped” countries), and they are intended to “end poverty, protect the planet, and ensure prosperity for all” (UN General Assembly, 2015). They cover three different areas of sustainability, social, environmental and economical, and they are identified in the following: (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being, Quality Education, (5) Gender Equality, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation and Infrastructure, (10) Reduced Inequality, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Action, (14) Life Below Water, (15) Life on Land, (16) Peace and Justice Strong Institutions, (17) Partnerships to achieve the Goal (UN General Assembly, 2015).

They SDGs address the environmental aspect in greater detail, expanding the generic objective of the MDGs expressed in the 7th goal, “to ensure environmental sustainability”, through 6 specific goals (goals 6, 7, 12, 13, 14, 15) and indicators, which explicitly address biodiversity and ecosystems, climate change, clean energy and responsible consumption and production (UN General Assembly, 2015). All the UN member states are finally responsible for reaching those goals, abandoning the paternalistic approach underlying the MDGs goals, and admitting a responsibility toward the global crisis.

Despite recognising the merit of having enhanced debate over sustainability in research, policy and practice, various authors point out the contradictory nature of SDGs. In particular, these authors argue that the 2030 Agenda economic goals can only be reached at the expense of the environmental goals (Eisenmenger, 2020; Liverman, 2018; Carant, 2016). Poverty is still considered as the main problem to address, as it can be seen from the preamble of the 2030 Agenda: “We recognize that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development” (UN General Assembly, 2015).

This would justify the strong focus on the economic aspects of development within the SDGs, such as income increase and industrial development, to be necessarily achieved through resource exploitation (Eisenmenger, 2020, p. 5).

Both Carant and Eisenmenger refer that while the environmental aspects are specifically addressed in various goals, planet boundaries as biophysical limits (Rockstrom et al., 2009) are not really taken into account as indicators; in fact, among the 29 that directly refer to the natural environment, *“only two represent absolute indicators that monitor total trends in resource use”* (Eisenmenger, 2020, p. 3; Carant, 2016). The lack of efficient indicators on resource use, would not call into question measures such as the increase in foreign direct investments (FDI) in the “developing countries”, which is promoted as one of the main strategies between the SDGs, but has already been shown to contribute to resource degradation (Plank et al, 2018). The study conducted by Plank et al. demonstrates that “wealthy developed countries” are mainly responsible for driving global raw material consumption and that the latter has increased due to recent changes in international trade patterns (Plank et al, 2018).

Industrialization is definitely promoted within the SDGs as the most desirable path for all “developing countries”, even if it would entail a higher resource use. The environmental goals focus on resource efficiency through technology rather than recognizing overconsumption as the root of the ecological crisis. According to this approach, the consumption model is not to be dismantled, but it is rather necessary to turn the production processes more sustainable, through new technologies that can save natural resources. However, as Castro remarks, *“the problem with achieving environmental sustainability via efficiency is that issues of the scale of resource exploitation are not taken into account”* (Castro, 2004, p. 11)

In conclusion, SDGs targets and indicators prioritize economic growth over ecological integrity and that they continue to promote GDP growth as a predominant strategy to eradicate poverty and hunger, therefore they could fail in bringing transformative change and long-term sustainable development (Carant, 2016; Eisenmenger, 2020). In fact, *“SDGs efforts to reconcile economic development and environmental protection may produce a ‘Faustian bargain’ where environment is subordinated to the ‘economism of development*

thinking” (Liverman, 2018, p. 11). However, despite the evident limitations, SDGs can be considered as a starting point of the long path to bring awareness and transformation at different levels of the social structure.

II.2 From developmentalism towards SDGs and bottom-up strategies: the shifting approach of the international cooperation

One of the main limits that impede “Sustainable development” from being a profoundly transformative idea is the direct influence of the concept of “development” and its historical meaning, which has determined the policies of governmental and non-governmental organizations during the last century.

Since the discourse of Henry Truman 1949, the term “development” started to indicate a unilinear path: the western model of economic growth and modernization. The US president, by using the word “undeveloped” in his speech, to refer to the global south countries, claiming the need for these countries to develop following an unilinear path (Truman, 1949). This “developmentalist” approach has guided the UN and the Official Development Assistance (ODA) since the end of the second world war until the 1980s. The conviction was that “underdevelopment” was caused by a low productivity and scarce innovation, which were impeding the modernization of the global south societies (Layrargues, 1997). In its broadest sense, “development” means more than economic growth and modernization: according to Guzman, it could be defined as *“the awakening of the potentialities of a biological or sociocultural entity”*. However, positive scientific thinking and liberalism have put the accent on the quantitative aspect of development, that is growth, which has been applied to the economy. For this reason, “development” progressively started to be used to indicate the historical trajectory followed by the western countries and acquired a strong ethnocentric connotation, aided by the colonialist approach of pre-eminence towards the other societies (Guzman, 1999).

The international cooperation was born as an attempt by the “developed” states to support the other countries in this common path, under the principle of “replied development”. The state members Organisation for Economic Cooperation and Development (OECD) agreed to

dedicate at least 0.7% of their gross domestic product for this cause. During the first decades from the birth of international cooperation, development projects were in large part financed by institutional organizations, as, according to the popular Keynesian theory, the role of the States was considered as fundamental to promote economic growth and social stability (Brunold, 2004).

At the same time, a parallel current was growing, what Unceta calls “humanist”, which was placing people at the centre, rather than economic indicators, and promoted the creation of non-governmental organizations (NGOs). The modes of action of these organizations were assistance-based, intended to promote equality, health, education and basic needs over economic growth. The approach, however, was mostly paternalistic and ethnocentric, based on the same conviction of the need for a unilinear path of development for all. Organizations of Civil Society were acting with different methods from the one adopted by the ODA, but with a similar intent, and they were considered as complementary (Unceta, 2003).

During the 1980s, the “developmentalist” approach adopted by the Official Development Assistance Organizations was progressively substituted by the neoliberalist approach, under which welfare could be reached not through significant States interventions but rather through market deregulation and public policies dismantling. The international cooperation underwent a crisis: States resources targeted to development projects drastically decreased and their results started to be measured through macroeconomic indicators such as public deficit and inflation (Alonso and Mosley, 1999). This approach, promoted in particular by the World Bank, was still ethnocentric in its implementing rules: development experts were deciding for the beneficiaries of the projects, as if *“they knew what this societies need: to be part of the international market, to have liberal democratic institutions, to be modernized [...] no regard for cultural and institutional diversity”* (Castro, 2004, p. 206). Even if the World Bank definitely recognised with its report of 1992 that development was more than economic growth, it continued to promote it as a main strategy (World Bank, 1992). In fact, according to this view, social and environmental issues can be addressed through the achievement of economic welfare, which would enable environmental protection and compensation for the ecological damage.

The first real effort of governmental organizations to include the social dimension in the governmental conception of development was the *Human Development Index*, created in 1990 by the UN, which was considering 3 dimensions: life expectancy, education and standard of living. Two years later, the Agenda 21 gave some guidelines for including those and other aspects of development to redirect the actions of development organizations, but Brunold depicts it as weak attempt, since it was totally based on organization's individual will and, furthermore, the Agenda was full of contradictions (Brunold, 2004).

International cooperation was in a period of crisis, because the results obtained until the end of the century were not very encouraging, and the States were investing increasingly less in development projects. In this context, non-governmental cooperation progressively introduced the concept of "human and sustainable development", which definitely questioned the idea of well-being based on an infinite economic growth and gave priority to the social and environmental aspects of development. The beneficiaries no longer had to be passive recipients of economic aid, but they had to actively participate in the development process (Unceta, 2003).

MDGs have represented the first effort to include this perspective in the international discourse: the UN created universal indicators that could be employed in institutional and non-institutional development projects, which included innovative concepts such as that of sustainable development. Besides the limits evidenced in the previous chapter, some authors suggest that MDGs have contributed to the prioritization of measurable activities and to the fragmentation of policies, affecting, in some cases, the success of development projects (Carant, 2016; Castro, 2004).

The formalization of the concept of Sustainable Development through the SDGs, has posed a big step for international cooperation: the inclusion of developed countries in the target represented a first recognition of the limits of western model, exported in the global south for more than half a century. However, as discussed in the previous chapter, the position adopted by the UN was still influenced by the colonial heritage of a paternalistic and top-down approach toward global south countries. As Eisenmenger claims: "*with their strong focus on economic growth, the SDGs direct industrializing countries towards known trajectories of development. This may alleviate some social and economic, while*

aggravating other, mostly ecological sustainability challenges, similar to those created by historical industrialization processes in the Global North” (Eisenmenger, 2020, p. 5). Furthermore, the post-colonial structure of the markets had important repercussions on the redistribution of wealth. According to the “Dependency Theory”, emerged in Latin America in the second half of the twentieth century, the configuration of the market fomented economic inequalities, by relegating periphery countries to the role of suppliers of raw materials for the developed countries. The prices were (and still are) fixed by the former colonial countries, which buy raw material at low cost and charge manufactured goods with high added values (Brunold, 2004).

The impacts of the development projects implemented during the last century are difficult to calculate, but they certainly had significant influences on the cultural and structural aspects of the global south societies, improving life conditions on one hand, but also creating new induced needs. For example, they exported a western idea of poverty, which is fundamentally questionable. After all, *“what exactly is poverty? Can Third World communities that have natural wealth and the capacity to fulfil many of the basic needs of its inhabitants be considered poor?”* (Castro, 2004, p. 16).

Poststructuralists have been particularly influential in Latin America: they have been arguing that the concept of development itself must be overcome, in its construction of the poor and the underdeveloped, and represented the starting point for the post-development currents (Mattioli and Nozica, 2017). “Development” is a term that brings along with it a specific imaginary, related to the means of production and consumption of the western societies, charged by a “network of meanings” which can influence language, thoughts and actions (Guzman, 1999). In this perspective are placed, among others, intellectuals like Vandana Shiva, who talks about *maldevelopment*, and Serge Latouche, with the concept of *degrowth* (Raffa, 2013), together with intellectuals from Latin America, proposing counter-current alternative like the one of *Buen Vivir*, which will be examined in detail in the framework of the case study of the present research (Kothari et al., 2014).

On the other hand, authors like Ignacy Sachs rather theorize the redefinition of the word “development” in a concept that can include all the specific paths adopted by each ecoregion, the so-called “ecodevelopment” (Sachs, 2009). According to Layrargues,

ecodevelopment radically differs from the concept of sustainable development because it does not propose a unilinear neoliberal path for all the countries, while it recognized the limits of the growth and of free market and it prioritizes localized solutions (Layrargues, 1997).

Post-development and ecodevelopment movements share the need to overcome the conviction that the natural capital can be substituted by manmade capital, a disconnection from the material limits of our world that has justified the overexploitation of natural resources (Mattioli and Nozica, 2017). And, more in general, they reject the commercialization and capitalization of nature, which is, as Castro states, “at the center of the ecological degradation”. On the other hand, in the international sustainable development paradigm, “*nature is viewed as a resource that has to be used efficiently, not as something to be respected and to be used for the common good*” (Castro, 2004, p. 210-211).

In many of the so-called “underdeveloped” societies, nature has never been objectified, because this process is the result of a disconnection of the humankind from nature which they may have never undertaken. Many indigenous and rural societies have followed other paths of “development” that did not include the overexploitation of nature, because they have considered the maintenance of the ecological balance as a priority, as seen in chapter 2. For many of these societies, humans are an integral part of nature, and therefore its exploitation is naturally avoided. According to Montibeller, the economic reductionism derived from anthropocentrism leads to particularly serious social outcomes in the “third world countries” (Montibeller, 1993).

Abandoning a top-down neoliberalist approach, international cooperation would recognize the right of communities to choose their development path, taking consideration of their cultural and historical features. Development projects should have the intent to support communities in this process, as a form of compensation for the debts that western countries maintain with global south countries. They should help to assure them the conditions to develop in the way they choose, by dismantling the dynamics of human and environmental exploitation and assuring a more equal distribution of natural resources. Many global south societies have been embedded by dynamics of globalization, and

development projects have often contributed to this process; international cooperation should rather empower and support them to resist the dynamics of the global markets, by creating socially, economically and environmentally sustainable alternatives. Bottom-up approach should be privileged in finding solutions for development projects: traditional ecological knowledge, for example, could be taken in consideration and valorised as a local strategy for improving living conditions while assuring environmental sustainability.

In this sense, international cooperation should adopt a one-to-one approach, recognizing that global south societies can teach valuable strategies to reaching global sustainable development. SDGs can be a good guideline, but there must be a joint effort to overcome the World Bank's conception of sustainable development as "development that lasts", and make sure that the inclusion of the western countries as a target of the SDGs is not just a mere recognition that the environmental degradation can affect development itself and an attempt to promote ecological neoliberalism (Castro, 2004). As proposed by Sachs, and reported by Gentil, development should be "inclusive", and opposed to "*exclusive and wealth-concentrating development*" (Gentil, 2007).

As Brunold suggests, the "revolution of efficiency" could be substituted for "the revolution of sufficiency", to reduce overdevelopment and redistribute natural resources (Brunold, 2004). Localized paths of development, such as "Buen Vivir" in Latin America or the "Ecological Swaraj" from India (Kothari et al., 2014), can help to build an inclusive concept of sustainable development, to finally overcome the assumption that humans can only express their potential through the exploitation of nature and radically change the role of the international cooperation.

II.3 Agroforestry systems as sustainable development strategy in the Amazon

The Amazonian basin experienced a history of "development" which differs from other Latin American areas in some ways, but still shares many patterns. The dense forest has made access to globalization more difficult, but it has not excluded it from the process of exploitation. Since the colonial times, natural resources have been extracted at various

rates of intensity and indigenous populations have long been discredited and subdued. As they didn't fit the ethnocentric standards of development of the colonies, these people have been considered as "savage", and the exploitation of their territories was justified by processes of "civilization" and conversion to the Christian religion. Nevertheless, the exploitation of natural resources and the submission to imposed unfavourable market dynamics has been perpetuated until the present time (Pokorny et al., 2010).

Development projects during the twentieth century have been mainly promoted by national institutions, based on western standards of development. The "Superintendencia de Desenvolvimento da Amazonia" (SUDAM) was founded in 1966 in Brazil with the intent of managing fiscal incentives for the Amazonian region. This institution was financing private projects that promised to contribute to the economic development of the Amazon region, but they obtained scarce results in terms of implementation of these projects. The occupation of Amazonian territories was also promoted by the "Programa de Integração Nacional", through the displacement of peasants in the area and the creation of roads and agricultural infrastructure, which was intended to overcome regional economic disparities (Pereira, 1997).

International cooperation slowly settled in the Amazon area at the end of the century. One of the first attempts at collaboration with the Amazonian indigenous population through an international development project was the "Projeto Integrado de Proteção às Populações e Terras Indígenas da Amazônia Legal" (PPTAL) of the German Cooperation, at the time GTZ. This project had the main objective to foment a sustainable management of the tropical forest, recognizing its important role in mitigating climate change and preserving biodiversity. The GTZ made an agreement with the Brazilian institutions in 1992, and since then it has contributed to the demarcation of indigenous territories together with the FUNAI (Fundação Nacional do Índio) and it has promoted a long series of projects focused on the support of the indigenous populations for the formulation and implementation of their legitim rights (Valente, 2020)

However, not all the international projects have been conceived with an anti-colonialist approach, or centred on the redistribution of natural resources and in the support of local manners of development. Pokorny et al., underline that many governmental and non-

governmental organizations have been implementing projects inside the Amazon area to foment economic development through the inclusion in international exportation markets, the diffusion of agro-industrial techniques and the extraction of natural resources, which has led to controversial results. Most of the projects did not consider the potential of local practices to ensure an environmentally and socially adapted development (Pokorny et al., 2010).

The Amazon Forest is now in the spotlights of the world for its growing importance in mitigation of climate change and for offering other vital ecosystem services, and it becomes increasingly urgent to find strategies to conserve its ecosystems, while assuring a decent life for its human population, promoting sustainable and inclusive development.

This dissertation proposes a specific strategy: the empowering of indigenous agroforestry systems as a bottom-up development strategy which can be employed in governmental and non-governmental development projects, to assure locally based sustainable development. Through the previous chapters, it has been demonstrated the potential of indigenous agroforestry systems, which are traditional ecological practices that combine the ecological advantages of local, input low and territory-adapted traditional systems and those of biodiverse agroforestry practices. It has been also proven that the Amazonian region has a rich tradition of indigenous agroforestry systems, which assured the livelihood of Amazonian populations for centuries without causing irreversible disruption to the forest ecosystem.

Indigenous agroforestry systems can contribute to a bottom-up, participatory concept of sustainable development, designed on the real needs of the populations and considering their local strategies of food security and preservation and regeneration of natural resources (González and Kröger, 2020). SDGs can be used as a reference to understand which major global concerns can be addressed through indigenous agroforestry systems. In this regard, Montagnini and Metzel claim that *“development challenges are in part the result of the sectoral (compartmentalized) approach that dominates government systems that tends to attribute the SDGs to separate conventions and Ministries, [...] agroforestry, as an integrative mindset and culture, can help create synergies between the SDGs in multifunctional landscapes”* (Montagnini and Metzel, 2017, p.15).

Indigenous agroforestry systems can simultaneously help to address several Sustainable Development Goals, such as n. 2 (zero hunger), by assuring a rich and diverse diet, n. 3 (good health and well-being), through nutritive products and medicinal plants, n. 5 (gender equality), as both women and men can help in the family activity, n. 6 (clean water), as the root system can capture, store and purify water, n. 7 (affordable clean energy), through the production and replantation of native timber trees, n. 12 (sustainable production and consumption), as this type of production does not disrupt the ecosystem integrity, n. 13 (climate action), through the carbon capture service offered by the trees, and n. 15 (life on land), as these systems offer habitats for animals and they host a high biodiversity.

Nevertheless, these systems can contribute in a substantial manner to goals n. 2 “end hunger, achieve food security and improved nutrition, and promote sustainable agriculture” and to goal n. 13, “take urgent action to combat climate change and its impacts”.

Indigenous agroforestry systems can address hunger and malnutrition through a great variety of species with high nutritional value (2.1, 2.2), and help to increase the production through a more plant-intensive use of the land, imitating the dense tropical forest (2.3). They can also contribute to a more sustainable and resilient agricultural production, that maintains the ecosystem integrity, adapts to climate variations and extreme events, improves the soil and contributes to the conservation of genetic diversity (2.4, 2.5) (Montagnini and Metzler, 2017). For this reason, they can be considered as a valuable strategy for development projects which aim to address hunger-related problems in the Amazonian region.

Nevertheless, indigenous agroforestry systems’ impact goes beyond the objectives of the SDG n. 2: they not only can provide food security, but also “food sovereignty”. This concept was conceived by the peasant social movement “La Via Campesina” in 1995, to give new relevance on the way of addressing hunger: food should be diversified, and people should have the right to produce it using their local agricultural systems and define how self-sufficient they want to be. While they usually integrate high valuable products, which can be sold in the markets, Amazonian agroforestry systems can ensure self-sufficiency (as they were doing in the Pre-Columbian times), which is a fundamental feature to reach resiliency.

Indigenous agroforestry systems can help to equilibrate the imbalances of the food system, by giving decision-making power back to the communities (Boone and Taylor, 2015).

As regards to climate change, addressed by the SDG goal number 13, indigenous agroforestry systems can contribute to its mitigation better than other agricultural systems, because of the plant density and the presence of trees, important CO₂ reservoirs, while the diversified production and complexity of the agroecosystem make it more resilient to change. FAO has considered agroforestry systems as “climate-smart agriculture”, as they both contribute to mitigation and adaptation, *“while enhancing the achievement of national food security and development goals”* (Montagnini and Metzler, 2017).

Indeed, Amazonian indigenous agroforestry systems can overcome the SDG goals in terms of social and environmental sustainability, because they are not conceived within the western ethnocentric model of development and efficiency, but they are mostly developed in the hearth of ecocentric cultures, which prioritize the balance between all the living beings and their ecosystem over economic growth and other measurable standards.

However, it must be remembered that traditional agroforestry is not sustainable for definition: this substantially depends on the ecological interactions between the components and the management practices employed. Stamp, in his book on indigenous agroforestry and sustainable development remarks that *“agroforestry’s contributions to development are sustainable only if change in both the human communities and the landscape ecosystems on which they depend for their livelihood show healthy continuity or ongoing improvement”* (Stamp, 1998, p. 35). Human ecology can help to evidence the importance of the interactions between people and the agroecosystem: a balance between the satisfaction of human needs and the ecosystem integrity can be reached when humans cooperate with the ecological processes. As observed in the studies analysed in chapter 1.3 on Amazonian agroforestry systems, such Homegardens and Swidden Fallows, this cooperative approach is usually adopted by the native peoples who developed and implemented those systems, as they maintained a strong connection with the natural environment.

Even if indigenous agroforestry systems have proved to be a valuable livelihood strategy, they face huge challenges in this historic moment and their survival is at risk (Miller et al.,

2006). In the last decades, national policies have promoted the conversion toward industrial agriculture through incentives measured on productivity and have not recognized the environmental and social value of those systems. The lack of awareness about the benefits of these practices, both on the part of farmers and authorities, has contributed to their abandonment. This was compounded by a legislative vacuum on agroforestry, which is not considered as agriculture, not as silviculture and not even as an environmental protection strategy, in most cases. In addition, resource degradation due to external factors such as the expropriation of indigenous' original lands, the construction of infrastructures and roads and the exploitation of natural resources by big international companies, amplify the risks of abandonment and loss of this ecological knowledge (FAO, 2015; Montagnini and Metzler, 2017). Global warming and growing population pressure only add to these challenges.

International and national development projects can serve a key role in supporting indigenous agroforestry systems, while promoting sustainable development. They could contribute to creating awareness around the benefits of those practices, influencing producers, politicians, and consumer choices. Governmental and non-governmental organizations could contribute to improving the dialogue with local and national institutions, to removing legal restrictions and readdressing incentives: payment for ecosystem services could be a concrete strategy to foment the employment of local biodiverse agroforestry systems. They could also help to connect producers with fair trade channels and potential local consumers, opening access to alternative markets and offering important technical advice on how to face new climate challenges (FAO, 2015). Finally, organizations could contribute to spreading this local knowledge in the Amazonian areas where it is disappearing, using participative approaches such as the "Farmer-to-Farmer" methodology (Boone and Taylor, 2015).

Instead of promoting top-down strategies, such as "project agroforestry" (based on scientific research and development principles), sustainable development projects could favour territorial valuable practices, as they are better integrated in the local human and natural ecosystem (González and Kröger, 2020). As Stamp claims, *"in contrast to project agroforestry, indigenous agroforestry is embedded in local culture and landscape. It draws primarily on local initiative and resources, and changes according to perceived needs*

changing availability of and the resources such as water, land labour” (Stamp, 1998, p. 4). The contribution of development projects in support of those systems is fundamental because, as seen in chapter 1.3, many of them are slowly being converted to simpler agroecosystems, losing their potential to provide ecosystem services, ensure food sovereignty and address other major issues, due to the already listed external factors, among others.

This approach could be resumed in the “Participatory rural appraisal” (PRA), a method which is employed in rural areas by some non-governmental organizations, which incorporates local people’s knowledge in the planning and implementation of development projects. PRA criticizes top-down and transfer-of-technology approaches and promotes the dialogue between local knowledge and scientific knowledge, because *“the resulting combination of indigenous and Western components is likely to be more sustainable than full reliance on the Western system of modern agricultural science with its high dependency on external inputs”* (Stamp 1998 p. 39). Technical recommendations do not substitute, but they are integrated in the traditional practices. The goal of PRA is the empowerment of local people, by using experimental and cyclical strategies to foster their own path of development and expression of their potentialities (Chambers, 1994).

Finally, indigenous agroforestry systems can represent a valid participatory sustainable development strategy for the Amazonian region, to address major global goals as the one of food security and food sovereignty, while ensuring environmental sustainability and contributing to many other goals. Through the PRA approach, indigenous agroforestry systems can be supported to help them to resist in a world that still does not give sufficient importance to the maintenance of the ecological stability and to a harmonious relation between all the living beings. Overcoming anthropocentrism is a major challenge of our millennium, indigenous knowledge could contribute to this objective.

Chapter III. Methodology

Through a case study on a specific indigenous agroforestry system, the Chakra Kichwa Amazonica of Ecuador, this exploratory research will deepen the themes presented through the literature review, with the final objective of offering a valuable example to give a first answer to the main research question: *can the empowerment of indigenous agroforestry systems be considered as a valid participatory sustainable development strategy for the Amazon Basin?*

The literature review (chapter 1 and 2) brought evidence that indigenous agroforestry systems can be considered as traditional ecological knowledge which align with various Sustainable Development Goals and can address even more ambitious challenges: the creation of an inclusive concept of sustainable development and the provision of agroecosystem services while assuring food security, food sovereignty and possibly self-sufficiency (OB1). Nevertheless, it has been observed that these traditional systems are at risk, due to factors such as the lack of awareness on their socio-ecological benefits, adverse policies and unfavourable market conditions, among others (OB2). After questioning the approach of development cooperation toward “development” and “sustainable development” (OB3) it has been proposed that indigenous agroforestry systems could be employed as a participatory sustainable development strategy (OB4).

Chakra Kichwa Amazonica of Ecuador was selected to serve as a case study to explore the role of development projects in empowering indigenous agroforestry practices. The choice of this specific system was led by the possibility of studying it up close and of directly participating into different actions of empowerment. The Italian NGO “ENGIM” has developed a collaboration with the Kichwa communities to support this agroforestry system, by including different actions in their projects. During the year that I spent working with them, I followed two specific actions, which I analyse as instrumental case studies for this research.

The case study was chosen as the methodological framework for the experimental section of this research because the main subject of this research is broad and, as different authors suggest, it should be studied by considering a concrete example. Gil, in “Métodos e técnicas

de pesquisa social” indicates that case study can help to explore situations whose limits are not clearly defined (Gil, 2008) and Yin in his book “Case study research, design and methods” claims that it helps to delimitate and deeper understand the subject of the investigation (Yin, 2001). The case study usually considers phenomena which are contemporary and real, and examines them in their context (Benbasat et al., 1987): the empowerment actions which are taken in consideration for this research were actually implemented by ENGIM NGO between 2019 and 2020, with the aim of promoting the indigenous agroforestry system “Chakra Kichwa Amazonica”.

The function of the case study on Chakra Kichwa Amazonica is instrumental: it has a supporting role, to help answer the main research question. Unlike intrinsic case study, where “case is dominant” and “of highest importance”, Stake indicates that “for instrumental case study, issue is dominant” (Stake, 1995).

More specifically, this case study is intended to explore the research question “*did the considered actions of ENGIM NGO empower Chakra Kichwa Amazonica, thus contributing to sustainable development in the Ecuadorian Amazon?*”. The specific actions taken into account are two: the creation of the new module “Chakra Kichwa y Agroecologia” (CKyA) for the School of Environmental Leadership program (ELA) and the development of a certification for the products cultivated with Chakra Kichwa system, the so called “Sello Chakra”. In 2019 the Italian NGO Engim financed an edition of ELA, an environmental leadership course implemented by the regional institutions of Napo (Ecuador), and promoted the creation of the new module “Chakra Kichwa y Agroecologia” with the intent of creating awareness on the importance of the conservation of sustainable agricultural practices. In the same year, ENGIM participated to the process of creation of the certification “Sello Chakra” for the products grew in Chakra Kichwa Amazonica, with the aim of encouraging chakra production by promoting a fair commercialization thereof. As Benbasat et al. report, in the case studies “one or few entities are examined” (Benbasat, et al, 1987); in this specific case, ENGIM NGO’s empowerment actions toward Chakra Kichwa Amazonica are taken in consideration as a single case study, but different elements of analysis are included, so that it can be identified as a “single embedded case study”, according to Yin’s definition (Yin, 2001).

These two specific activities were selected for different reasons: the main one is that I was personally responsible for their implementation during the time I spent in the Ecuadorian Amazon, and the second is that they can be considered as different and complementary ways of encouraging the use of Chakra Kichwa Amazonica system. The aim is to assess if the “CKyA” module can contribute to create awareness on the socio-ecological benefits of a traditional Chakra, and if “Sello Chakra” can help to turn the system more economically sustainable. However, this research focuses on the outcomes of the first activity, while it gives “Sello Chakra” a secondary importance, because the process of implementation of the latter is still in an initial phase, and only projections could be done, in order to give support to the results of the research on the “CKyA” module.

This case study adopts a mixed methodological approach: the formulation of the questions was based on a real situation and a process of prolonged observation, which can be depicted as a characteristic of a qualitative research approach; however, both quantitative and qualitative techniques were used in data collection. According to Yin’s perspective, in fact, case study should combine quantitative and qualitative sources (Yin, 2001). Maia in her manual “Questionario e Entrevista na Pesquisa Qualitativa” also considers quantitative and qualitative approaches as complementary and highlight the advantages of this integrated “multimodal” approach: *“Os dois enfoques realizam observação e avaliação de fenômenos, estabelecem pressupostos como consequência, testam e demonstram essas suposições, revisam tais ideias com testes e propõem novas avaliações e observações”* (Maia, 2020, p.9). While the quantitative approach collects numerical data, which can be used for statistical elaboration, the qualitative method prioritizes descriptions and observations, and together they can provide a more complete information to reach a same objective.

The introductory part of the case study addresses the following goals through the recollection of published and unpublished material, complemented by information recollected through direct observation: (OB5) *to verify that the Chakra Kichwa Amazonica agroforestry system is a sustainable agricultural practice*, (OB6) *to investigate the threats to the conservation of this agricultural practice*, (OB7) *to explore the empowerment actions of ENGIM NGO towards Chakra Kichwa Amazonica*. The experimental part of this research, which employs both quantitative and qualitative data collection methods, is intended (OB7)

to verify if the implementation of ELA’s module “Chakra Kichwa y Agroecologia” and the creation of the “Sello Chakra” certification are effective to empower the Chakra Kichwa system, and hence as sustainable development strategy.

III.1 Modulo Chakra Kichwa y Agroecologia

Both quantitative and qualitative data were collected.

III.1.1 Quantitative Data

The first method employed for data collection is the questionnaire, which is intended to understand if the participants of the School of Environmental Leadership (ELA) experienced an opinion and behaviour change towards Chakra Kichwa Amazonica after receiving the module “Chakra Kichwa y Agroecologia”.

This quantitative method was selected for the main data collection for different reasons. The questionnaire is presented by Quivy and Campenhoudt as the ideal method to test attitudes, behaviours, opinions, level of knowledge and awareness on a specific issue, which is the main aim of this inquiry. Moreover, the method presents advantages related to data collection efficiency and to data comparison (Quivy and Campenhoudt, 2018). Additionally, the impossibility to realise data collection in the place, due to an early return from the project (because of the beginning of the pandemic), has led to favouring this method for a practical reason: the difficulty in realising numerous interviews with indigenous respondents in remote mode.

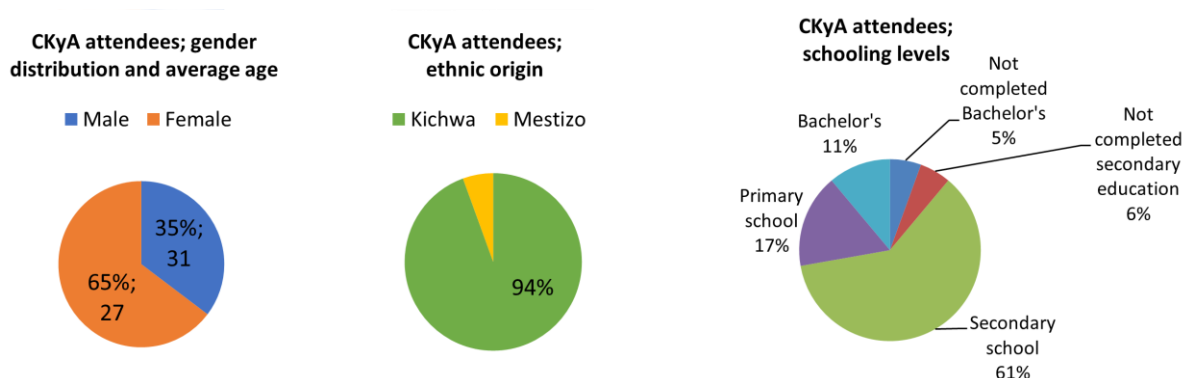


Figure 1. Characterization of the attendees of the module Chakra Kichwa y Agroecologia (Source: ELA2019 database)

The selection of the sample was based on the following logic: it included the participants of the School Environmental Leadership 2019 which attended at least 2 out of 3 days of the module “Chakra Kichwa and Agroecologia”, which took place in December 2019. Maia points out that the questionnaire should exclusively ask for information which is not known (Maia, 2020): the characterization of the participants is thereby based on the information collected and elaborated through an Excel at the beginning of the ELA 2019 course. However, the information here reported is exclusively referred to the attendees of this specific module. As represented by Figure 1, the sample is represented by 18 people, 11 female (61% of the total) of an average age of 27 and 7 males (39% of the total) of an average age of 31. 94% of the participants identify themselves as Kichwa (indigenous), while only 1 respondent identifies as “mestizo” (mixed ethnicity). This specific edition of the ELA course was especially intended for young people and women, members of Kichwa producers’ associations, and this is reflected in the configuration of the respondents of this questionnaire. The levels of schooling are very varied: some participants only attended primary school, while others completed a university Bachelor (Figure 1).

Additionally, through the questionnaire, specific information about the attendees’ closeness with Chakra Kichwa Amazonica was obtained: 10 respondents out of 13 directly manage their own chakra and 12 out of 13 contribute to the management of the familiar chakra. The only respondent who does not deal with a CKA directly is the girl whose parents are Andean immigrants (mestizo); nevertheless, according to an exploratory interview, she has some knowledge about CKA because she would like to have one in the future. Her answers were not excluded from the analysis.

The questionnaire was structured following the model of the Outcomes-Based Evaluation, which was selected in the light of the nature of the course in which the module CKyA is incorporated, the environmental education program “Escuela de Liderazgo Ambiental (ELA)”. Thomson and Hoffman, in their book “Measuring the Success of Environmental Education Programs” describe the Outcomes-Based-Evaluation as *“one of the more important means of program evaluation being used by non-profit organization”*: its goal is to understand the outcomes, *“the true changes that occur to people, organizations and communities as a result of your program. These are the actual impacts, benefits, or changes for participants during or after your program, expressed in terms of knowledge, skills, values*

or behaviours.” (Thomson and Hoffman, 2004, p.19-20). The outcomes of environmental programs are usually measured through a pre- and post-questionnaire, which has the aim to identify the values, opinions and behaviour shifts of the participants.

The tool selected to administer the questionnaire is the Google Form, for its intuitive and accessible configuration, and the language employed is Spanish, which is the second language of the participants (after Kichwa) and the language in which the course was held. The questionnaire is structured in 2 sections, “Antes de recibir el modulo” and “Despues de recibir el modulo”, each one divided in two parts, “opinions” and “behaviours”. The two sections are identical, but the first one invites the respondents to answer according to their opinions and behaviours toward Chakra before receiving the module, while the second one after receiving it. In the part on opinions, respondents are asked to express their level of agreement on different statements about Chakra Kichwa Amazonica, using a Likert scale of 5 points, which includes the option “I don’t understand the question”. Maia suggests including this kind of option in order not to force the respondent to give a random answer (Maia, 2020). In the part about behaviours, respondents are asked to choose between different options which consist in Likert scales or other numerical scales (percentages, numbers...), to describe the agricultural management practices which they employ in their Chakras. As suggested by Maia, statements and questions are organized in thematic blocks and the disposition of the questions is made in order not to influence the answers.

The questionnaire was implemented between December 2020 and January 2021, one year after the ELA module, using a direct and remote mode: Kichwa respondents were asked to access the questionnaire through smartphones or (when possible) computers and to complete it directly. These modalities are usually considered as the easiest and most agile by the literature (Maia, 2020; Quivy and Campehoudt, 2018) but in the Kichwa communities the access to the internet is limited, which makes the task harder. However, 70% of the total participants answered the questionnaire (13 people), which is considered a threshold to validate the answers.

Intrinsic limitations of the quantitative method, such as the superficiality of the answers, and the impossibility of going deeper or to reformulate the questions (Quivy and Campehoudt, 2018), combine with other limitations of this specific questionnaire. The main

limitation is the difficulty of the participants to project themselves in the past, which is required in the first part of the questionnaire (“before receiving the module”). According to the Outcome based Evaluation method, the questionnaire should be implemented before and after each environmental education program (Thomson and Hoffman, 2004), following a “longitudinal strategy” (Maia, 2020), however, the need to restructure the investigation due to the anticipated return, disabled the implementation of the pre-questionnaire. Moreover, linguistic limitations can affect a deep comprehension of the statements and questions of the questionnaire: even if Spanish is the second language of all the respondents, not all of them dominate it, and some of them have comprehension difficulties due to educational gaps.

Data collected through the questionnaire have been elaborated through descriptive statistical analysis (graphics and comparative tables), by comparing the answers of the section “before receiving the module” and “after receiving the module”, with the aim of assessing if opinions and behaviours towards Chakra Kichwa Amazonica changed after receiving the course. Each answer was given a value from 0 to 3 (opinions) and from 0 to 4 (behaviour) according to the Likert scales employed (negative statements were reformulated in positive and the result reversed); answers have been grouped in thematic blocks (A-E; A-D) and the value corresponding to each thematic block were averaged, to make data more accessible. General graphs have been elaborated by averaging the answers of the respondents for each thematic block. Furthermore, in order not excessively simplify the participants’ data, and to make interesting correlations, the attendees were organized in social categories: sex (women/men), age (under 30/over 30) and education (basic/middle/high); these data were elaborated in specific graphs, to compare each sub-category.

This analysis method was employed for both opinion and behaviour section, in order to facilitate comparison and to give relevance to the differences per social category. However, for the behaviour section, Likert scales are different for each statement, according to the type of information requested (they are not standardized as the ones of the opinion section). For this reason, and in order not to lose interesting information in this simplification, this data elaboration will be complemented with considerations on the

answers to the single statements, which, in case of behaviour, will be given a particular relevance, through the inclusion of additional graphs.

This analysis would determine if this specific action contributing to create awareness on the socio-ecological benefits of Chakra Kichwa Amazonica and eventually influence the management practices of these Kichwa producers and their families, thus promoting sustainable development. Due to the already listed limitations of this quantitative method, these results are supported by the ones collected through a qualitative method: the interview.

III.1.2 Qualitative Data

Interviews are here considered as a complementary technique, because they can deepen the themes addressed through the questionnaire. According to Quivy and Campehoudt, the interview is an appropriate technique to analyse the sense that the respondents give to their systems of values or to their practices (Quivy and Campehoudt, 2018); similarly, Ribeiro states: *“a entrevista é a técnica mais pertinente quando o pesquisador quer obter informações a respeito do seu objeto, que permitam conhecer sobre atitudes, sentimentos e valores subjacentes ao comportamento, o que significa que se pode ir além das descrições das ações, incorporando novas fontes para a interpretação dos resultados pelos próprios entrevistadores”* (Ribeiro, 2008, p. 141). Through this qualitative method, it is possible to understand the reasons behind the answers that the respondents gave regarding their opinions and behaviours toward Chakra in the questionnaire, and obtain richer and more nuanced elements.

The interviewees were selected by considering two determinant aspects: the age, which, based on observations and research on Chakra, can be linked to the grade of conservation of traditional ecological knowledge, and the schooling level, which can influence the approach adopted toward Chakra and its socio-environmental advantages, especially among the younger generation, which has often lost part of their traditional ecological knowledge heritage. In order to enable information crossing, 3 among the 13 effective respondents were selected according to the criteria listed above: one person older than 50 years old, one person younger than 30 with higher education, one person younger than 30 with basic education.

The interview type employed is the semi-structured interview: it is based on an interview script, but open questions are privileged and a flexibility in question formulation is held in consideration (Maia, 2020; Quivy and Campenhoudt, 2018). This type of interview was preferred for this specific situation because the aim of this qualitative section is to understand if an effective opinion and behaviour change toward Chakra Kichwa occurred consequently to the CKyA module: specific information must be collected, but the possibility of reformulating questions could enable a deeper understanding. Interviews were conducted in April 2021 by telephone; this modality was selected because of the impossibility to realise onsite interviews.

Interviews have great advantages in terms of depth and complexity of the answers; nevertheless, they present some inconveniences: information is not immediately accessible, and it can be difficult to be related with the information collected through the questionnaire. In this case, the ability of the researcher is essential to obtain valuable data: the interviewer must be a good listener, manage not to influence the respondents and consider their social and cultural context to prevent unpleasant situations and acquire more reliable information (Liljedahl, 2018). Information collected through the interviews will be read in connection with the information collected through the questionnaire: final conclusions will be then made on the outcomes of the ELA module Chakra Kichwa y Agroecologia, in order to determine if this specific action has created awareness on the benefits of Chakra Kichwa and contributed to the conservation of traditional ecological practices, thus promoting a sustainable development.

III.2 *Sello Chakra* certification

Sello Chakra certification is the other empowerment activity I was personally following during my year of collaboration with ENGIM. The NGO, together with other local and international organizations and the indigenous producers' associations, worked at the elaboration of this Participatory System of Guarantee (PSG), which had the objective of certifying Chakra Kichwa Amazonica products, recognizing the agricultural system as environmentally and culturally valuable. The process of creation of a PSG is long and complex, because it has to dispose of a solid organizational structure in order to be

operational (Sacchi et al., 2015). For this reason, until the end of 2020 the certification was still in the stage of the definition of the mechanisms of functioning.

In the context of this case study, *Sello Chakra* is threatened as an empowerment action promoted by development actors along with the module *Chakra Kichwa y Agroecología*, but it is given a secondary role as compared with the latter, due to the embryonic stage of the process. Since the producers were not certified until the date of the research, it was not possible to measure the real impacts of the certification on the conservation of Chakra Kichwa Amazonica and the promotion of sustainable development in the region. For this reason, this section of the research is limited to projections, using pre-existing databases, combined with exploratory interviews.

The technique of existing data collection is acknowledged by the literature as a valid research technique. This type of data is defined as “secondary” or “documentary” and they can consist of manuscript, printed or audio-visual documents (Quivy and Campehoudt, 2018). In the case of Sello Chakra, a set of unpublished digital documents is combined with published sources. Projections are mainly based on the rules and principles of *Sello Chakra*: a set of standards that the farmers have to guarantee in order to get the certification, which requires the conservation of the traditional ecological practices related to Chakra Kichwa Amazonica. Exploratory interviews complement the material to make more reliable projections: the 3 interviewees selected for data collection on the ELA module, which are members of Kichwa organizations of producers, were asked to express their opinion about Sello Chakra as well. The goal of those exploratory interviews is to understand if farmers would be encouraged by the certification to preserve their traditional ecological techniques of agricultural management.

This section of the research should be considered in light of its exploratory and supportive function, due to the intrinsic limitation of the techniques employed. Further research should be done in the future, in order to evaluate the real impacts of the Sello Chakra certification on the conservation of Chakra Kichwa Amazonica.

III.3 Generalization

The data collected through the techniques listed above, will be analysed in order to understand if the actions promoted by ENGIM NGO considered in this study, effectively empowered Chakra Kichwa Amazonica, thus contributing to sustainable development in the Ecuadorian Amazon. The nature of this case study is instrumental: the final objective is to support the theory elaborated through the literature review.

Generalization is not an automatic process, however. Yin distinguished between two main types of generalization: the statistical and the analytic one. The methodologist suggests that case study should avoid statistical generalization, because the case study does not represent “a sampling unit” and cannot be treated as if it was; analytic generalization should be preferred: “a previously developed theory is used as a template with which to compare the empirical results of the case study” (Yin, 2001, p. 38). In this specific case, a theory was elaborated through a consistent literature review: the case study would serve a supportive role. The empirical results will be put in relation with the references collected in the first chapters, to determine if this particular case study can help to understand if international and local development organizations can have a key role in empowering indigenous agroforestry systems in the Amazon, and thus if the latter can be used as a sustainable development strategy.

Nevertheless, the reliability of the results is limited, as being this a single case study and because of the exploratory nature of the present research. More case studies should be conducted in order to bring evidence in support or in opposition to this theory, following the replication logic suggested by Yin (Yin, 2001).

Chapter IV. Introduction to the case study: Chakra Kichwa in the Ecuadorian Amazon

IV.1 Geographical and cultural context: the Ecuadorian Amazon and the Kichwa culture

The Ecuadorian Amazon covers an area of 116.604 km², which represents 47% of the national continental territory (figure 2) (Torres, 2015). Precipitations are frequent and intense, around 3000-4000 mm annually, the average temperature is 25° and the topsoil is generally thin and prone to erosion (due to the intensive rains), namely when not completely covered by the natural dense vegetation (Vizcaino, 2009).

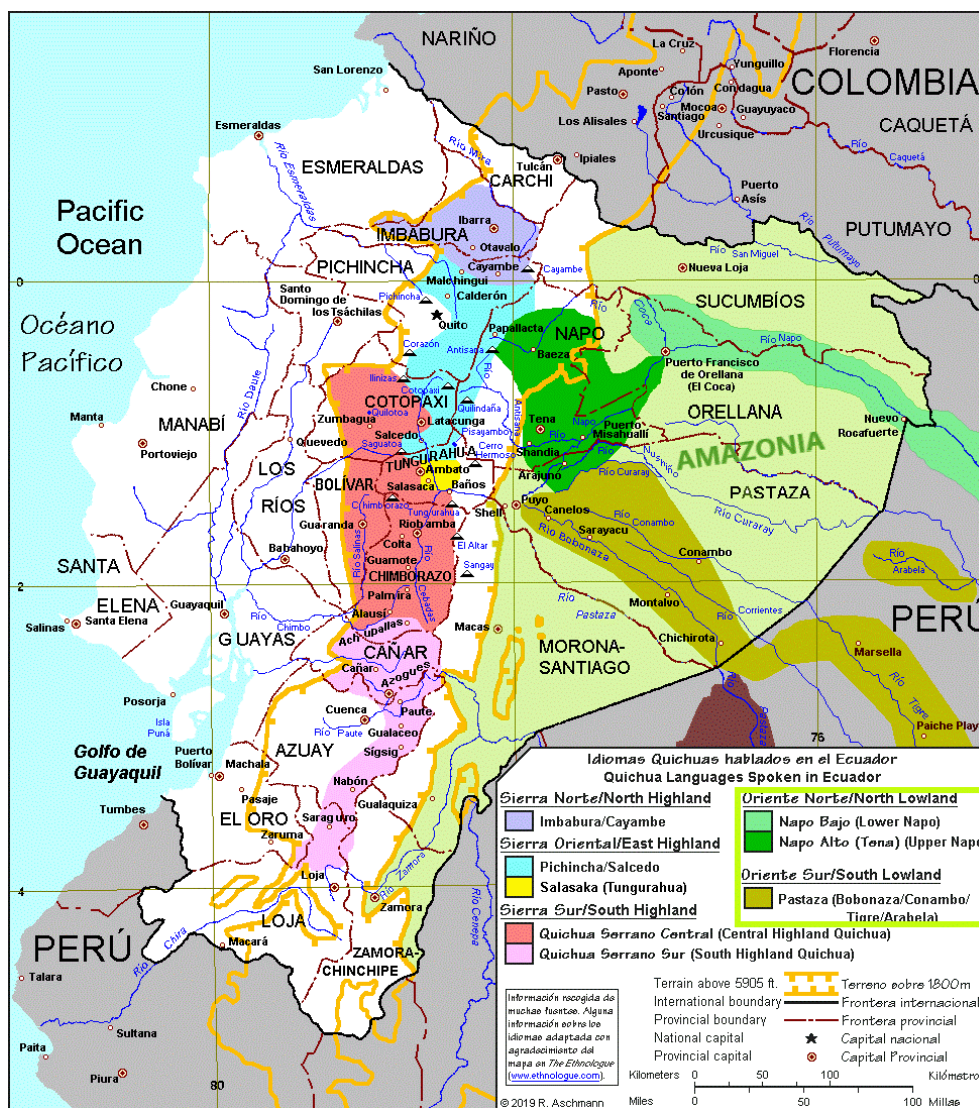


Figure 2. Ecuadorian Amazon and Kichwa groups (Adapted from Aschmann, 2020)

Ecuador is the sixth most biodiverse country in the world, as it shelters 10% of the world's species (Ospina et al. report a total number of 18.198 vascular plants, 5.500 of which are endemic); a large proportion of this biodiversity is conserved in the Amazon area (Ospina et al., 2017). This plant and animal biodiversity is accompanied by a rich ethno-biodiversity: 10 different indigenous nationalities inhabit the Amazonian lands of Ecuador, occupying 85% of this territory, which corresponds to 6 million hectares of native forest. Many of these ancestral lands have been entitled during the last decades and 26% of the whole Amazonian territory of Ecuador was progressively converted into national parks and ecological reserves. Nevertheless, these territories are constantly threatened by extractivism, which is the primary source of income of the Ecuadorian state: already in 2014, 61% of the Ecuadorian Amazon was divided in oil blocks, while 5% was under mining concession; these activities are main drivers of deforestation, along with timber extraction and the advance of the agricultural frontier, and they are slowly converting the area in the extractive periphery of the Ecuadorian state (García Serrano, 2014; Lyall, 2021).

The roots of the Ecuadorian economic system are to be found in the colonial history of the country: the raw material exportation model implemented by the Spanish colonizers originated a dependence dynamic which was perpetuated down to the present century (Prebisch, 2012). The exploitation of the Amazonian area, which slowly began after the first arrival of Francisco de Orellana through the Napo River in 1541, intensified with the phase of rubber extraction between the XIX and XX centuries, whereby indigenous populations were enslaved to work by immigrants coming from other parts of the country. The encounter between the Amazonian populations and the *mestizo* peoples (mixed origin, European and indigenous) resulted in a progressive transformation of the local costumes and in the introduction of unknown epidemics (Varga, 2007). These processes of acculturation and demographic reduction had already begun in the first years of the colonization of the Ecuadorian Amazon, with the invasion of the colonists and the cruel repression of the indigenous rebellions, the new European diseases and the evangelization campaigns (Muratorio, 1998), but they were reiterated in each new wave of intensive resources exploitation.

The most prominent example is the one of petroleum discovery in the Amazon: after the successful exploration campaigns led by Texaco-Gulf between 1967 and 1970, crude began

to be extracted in a huge portion of the Amazonian territory of Ecuador, which was concessioned to the company for 40 years (Cvetich, 2017). For the first time the State had to recognize and deal with the local indigenous populations: the Amazonian inhabitants represented less than 1% of the total population (they were not even cited in the national reports of the beginning of the XX century), but the concessions that the State had recently signed encompassed their ancestral lands, and they constituted an obstacle for their implementation. The Ecuadorian authorities decided then to favour the entrance of north American missionaries to help with the process of integration: by transforming the indigenous populations in “Ecuadorian citizens”, through Cristian conversion and acculturation, they would facilitate the dialogue and control the revolts (Varga, 2007). Without sufficient instruments of comprehension and proper mechanism of consultation, the Amazonian populations were suddenly overwhelmed by big transformations, brought by the exploitation activities: new infrastructures, alternative livelihoods, new customs and values.

Petroleum extraction soon became the first source of income of the Ecuadorian state, supplanting the role of agricultural products: in the first five years (1971-1975) the exportations of crude increased by 400%, while the production of cocoa and other commercial products was suffering a recession, due to a loss of fertility led by monocultures. The Agrarian Reform of 1964 tried to address the problems caused by the land scarcity in the Andean and coastal area by permanently allocating portions of Amazonian lands of 50 hectares each to any farmer that would have demonstrate to productively use them: to prove it, 80% of the trees standing in the plots had to be cut down within the first five years. The settlers, which were familiar with other morphological and climatic conditions, applied their agricultural practices without success, often ending in debt. These dynamics had a disrupting effect both on the landscape and the life of the Amazonian populations, which either decided to cohabit with the newcomers and incorporate new practices, or to migrate to the east, into the deepest forest (Varga, 2007; Hutchison, 2016).

Almost exclusively inhabited by native populations until 1960, the Amazon Forest progressively began to be “colonized” by *mestizos* farmers and extractive companies employees: according to the Ecuadorian National Institute of Statistics and Census,

between 1950 and 2001 the population of the Amazon passed from 46,471 inhabitants to 548,419 (INEC, 1950; INEC 2001). Native peoples were no longer the “forgotten”, but also more independent, groups they used to be: the Ecuadorian government progressively included them in the nationalist and development projects, which, together with the above-mentioned factors, contributed to “*force the indigenous people into a culture, system and ideology that was not their own*” (Hutchison, 2016).

The Kichwa population is the most numerous indigenous group of Ecuador and of the Amazon, and has always been the main recipient of national policies addressed to indigenous populations (Varga, 2007). The Amazonian Kichwas are around 60,000 peoples, the most numerous group living in the Ecuadorian Amazon along with the Shuar, but the total of Kichwa speakers of the country amounts to more than 700,000 peoples according to the last official census of 2010 (the 2020 census is still in phase of elaboration) (INEC, 2010). However, the costumes of Amazonian Kichwas differ completely from the one of the Andean Kichwas: in fact, this Amazonian group originally included a variety of native populations of the forest, which were speaking languages that are nowadays extinct and had no blood ties with the Andean population. The Kichwa language was imported by the Inca colonizers to the Ecuadorian Andes before the Spanish colonization, and it was used as a commercial language between the different populations. However, the definite rooting of the Kichwa language in the Amazon area is attributable to the missionaries, which during centuries employed it as *lingua franca* to convert the different groups, and to the Andean immigration (Muratorio, 1998).

The Amazonian Kichwas of Ecuador live between the provinces of Napo, Orellana, Sucumbios and Pastaza and they are divided in two main groups according to the geographical position: the *Napo Kichwas* (Napo) and the *Canelos Kichwas* (Pastaza). Their livelihood is mainly based on agroforestry production, hunting, fishing, wage labour and other small businesses, intended either for self-sufficiency or commercialization, to varying degrees (Jarret, 2017). Traditionally, women are responsible for agricultural production, domestic works and childcare, while men are focused on hunting, fishing and constructing activities. Nevertheless, the progressive resources degradation (due both to exploitation activities and growing population pressure), transformed the traditional work division: since hunting and fishing became increasingly less viable, nowadays men either collaborate

in the familiar agricultural production, or they work at external activities, which can also include temporary or long-term employment in extractive companies (Vizcaíno, 2009).

The Kichwa society is organized in communities which are usually based on different levels of parentage. Each community can be composed by one or more “Montuns” (extended family), in turn subdivided in “Ayllus”, family units which share a house and the surrounding plot. Kichwa communities are traditionally based on values such as solidarity and equality and family ties constitute a powerful supporting factor. The “minga” is a central institution for the Kichwa society: it consists in the communitarian participation in collective works, which usually involve complex activities such as the construction of houses or boats. Kichwa communities are characterized by a strong social component, which is also reflected in the importance they give to visits of relatives and friends (Andy et al., 2012, Muratorio, 1998).

The cosmovision of the Kichwa culture is profoundly linked to the relationship with nature. *Tukuy Pacha*, “the whole” is represented by the combination of space, time and the 3 dimensions of reality: water, earth and air. The harmony between humans and nature is essential to maintain the equilibrium of the *Tukuy Pacha*, and to ensure the *Sumak Kawsay* (good living). Reciprocity and respect are fundamental principles that should guide every human action: the forest should be preserved, therefore only what is necessary for family support should be extracted. The knowledge related to forest management is called “Sacha Runa Yachay” and it is accumulated and handed down from generation to generation. The main guardian of this knowledge is the “Yachak”, the spiritual guide of the community, who has a profound understanding of plants and their properties and can realize rituals to connect with the different dimensions of reality and the spirits of nature. By using the power of plants, the Yachak can cure illnesses, which are basically intended as a disequilibrium between humans and nature. The respect towards plants and animals is fundamental to maintain the balance: before collecting or using a plant, for example, it is necessary to ask the permission of the “amos”, the invisible owners of the plants. Originally, the conception of time was cyclical, profoundly linked with space: everything came into being, developed, died and came to life again. The concept of growth was absent and the one of progress too, as they are intimately related to the linear conception of time; “time passed slowly” and priority was given to the maintenance of the ecological balance (Andy et al., 2012).

However, the previously mentioned historical events and interactions with the western culture (mainly through *mestizo* population), interfered with the Kichwa cosmovision and partially transformed their relationship with nature. Of course, even the cultural aspects which are considered as “traditional” are the result of centuries of exchanges, but in the last decades the transformations gained a major relevance and have been substantially led by external factors (Hutchison, 2016). New generations, in particular, are giving increasingly less importance to the traditional cosmovision and this has inevitable consequences on their conception of nature (direct personal observation). The influence of the western model, which brought a new set of previously unknown necessities which can only be satisfied through monetary exchanges, led to consider the possibility of more intense resources extraction and to focus on the commercialization of the products rather than on self-sufficiency. The concept of poor and rich was absorbed from the western influence, and in the last decades, many Kichwa farmers progressively entered in the free market, adopting new incoming strategies as the cultivation of crops of high market value such as cocoa, coffee, corn or rice or the raising of cattle (Varga, 2007, Hutchison, 2016).

As previously analysed, the extractive activities have a major impact in the process of resource degradation of the Amazonian territories, and they have been perpetuated until the present date. New concessions for mining, oil and timber extraction are commonplace at this historic moment (direct personal observation). The indigenous populations are still not properly consulted to ask permission to extract in their territories (Serrano, 2014), and they are therefore frequently organizing demonstrations and protests. Nevertheless, indigenous movements are not something new for the Ecuadorian country, which experienced a big wave of uprisings during the decade of 90s. The results of these protests have been the titling of various ancestral lands and the creation of the *Constitution of Montecristi* in 2008, which incorporated the Kichwa concept of *Sumak Kawsay* (Buen Vivir) as constitutional principle, recognized Ecuador as plurinational states and was the first Constitution of the world to convert nature into a subject of rights (Villalba-Eguiluz and Etxano, 2017). However, the government promoted a controversial strategy to implement these new rights: the increasing of extractive activities in the short term to create the capital to progressively abandon the extractive model. This rather resulted in the exacerbation of deforestation and the increase of public debt, while no real efforts were

made to ensure the rights of nature or to preserve indigenous territories (Calisto Friant and Langmore, 2015).

The Amazonian Kichwa population is nowadays in a constant struggle between the preservation of their traditions and the modernization, the affirmation of their rights as indigenous populations and as Ecuadorian citizens, the maintenance of an ecological equilibrium and the exploitation of natural resources (Lyall, 2021). Nevertheless, more than half of their ancestral lands are still covered by forests (Vizcaino, 2009), which is remarkable considering that they always practiced an extensive agricultural system in their territories. Chakra Kichwa Amazonica is the agroforestry system that they have been employing for centuries and which still represents their main livelihood strategy. In the last decades it has been increasingly recognised as traditional ecological knowledge (Jarret, 2017).

IV.2 Chakra Kichwa Amazónica, traditional knowledge and ecosystem services

The term *Chakra Kichwa Amazonica* (CKA) encompasses a set of traditional agroforestry systems developed by the Kichwa populations in the Ecuadorian Amazon in order to meet their food requirements (Arevalo, 2009). These practices evolved together with the rainforest, imitating its patterns, ecosystem functions and abundance. The peculiarity of CKA is to combine a high number of species with different purposes, resulting in a high biodiversity: staple food plants are intercropped with fruit trees and palms, medicinal plants, timber trees, ritual and ornamental plants, and other useful plants for fabrics and handcraft (Torres, 2014; GIZ, 2013). This high biodiversity is also reflected in the presence of animals: CKA creates a buffer zone, providing habitats for different wild species, while small livestock such as poultry is also frequently integrated in the system, complementing the dietary needs of the family, and contributing to the fertilization of the soil. CKA is increasingly being recognized for its capacity of assuring food security while providing fundamental ecosystem services and well integrating with the Amazonian ecosystem (Coq-Huelva et al, 2017).

The importance of Chakra for the Kichwa people goes beyond the productive part, as it represents “the heart of the Kichwa communitarian life”: this is the space for traditional knowledge transmission, rituals realization and songs and legends reproduction (Arevalo et al., 2011). It represents the basis of the indigenous economy and of the food security of the family:

“La huerta o chacra, en las comunidades amazónicas, constituyen un micro-territorio, un espacio ecológico, simbólico y social en que se desarrolla material y espiritualmente un sistema económico, sustentado en el conocimiento del suelo, el manejo de toda una diversidad de plantas alimenticias, medicinales, artesanales y utilitarias. [...] La huerta forma la dimensión central de la economía familiar y comunitaria, constituyéndose en las bases de la seguridad alimentaria y el bienestar familiar.” (Andy et al., 2012, p. 232)

Chakra Kichwa Amazonica is a successional agroforestry system, which can be identified as a *swidden-fallow system* or *homegarden*, depending on the stage of the succession and the purpose of the plot (Gutierrez, 2016; Kumar and Nair, 2006). Traditionally, when the Kichwa people were nomadic, chakras were implanted in the forest clearings, before the construction of the family house (Arevalo et al, 2011). In the meantime, the family or the community was still living in the old settlement and harvesting fruits and other useful plants in the old plot. The new swidden-fallow system was mainly employed to produce staple food: this is what Kichwa people properly called “chakra”, where manioc (*Manihot esculenta Crantz*) and plantains (*Musa spp.*), were intercropped with fruit trees, palms, and other plants. The new house was constructed inside this plot and after the first year more plants were progressively introduced, while the previous planted trees were growing bigger: in this stage CKA could be identified as *homegarden*, or what Kichwas call “ushun”. Finally, when the tree canopies were covering the smaller plants and the natural regeneration process was in an advanced stage, the plot was left as a living space and another chakra was started, where the new settlement was displaced; nevertheless, the remaining fruit trees, medicinal plants and other useful plants of the old plot, integrated with the natural grown of the forest, were still periodically harvested. This last stage of the CKA is called “purun” by the Kichwa people, and it is sometimes difficult to distinguish from older secondary forests to an external eye, because of its lushness (Gutierrez, 2016; Kumar and Nair, 2006).

In this regard, various authors believe it is important to point out that the Amazon forest is not a “pristine” space, as it sometimes depicted, but it has co-evolved with the populations living there, which have employed its resources to make their living, while paying attention to their regeneration to assure their future survival (Kumar and Nair, 2006; Coq-Huelva et al, 2017; Jarret, 2017). Coq-Huelva et al. consider Chakra Kichwa Amazonica a remarkable example of co-evolution between people, plants, animals, and the ecosystem: the strong interaction between the agroforestry system and the forest turned the regeneration of the forest into a natural process. The Ecuadorian Amazon is definitely the result of the traditional ecological knowledge and practices maintained by its inhabitants during centuries (Coq-Huelva et al, 2017).

Even though Kichwa communities are nowadays sedentary, they found other strategies to keep the three stages method of temporal management, which can be considered as a valuable example of TEK: while every family has a *homegarden* Chakra around the house, where they usually harvest some staple crops, but mostly fruit trees, medicinal plants and other perennials, they cultivate most of their annual crops in the secondary or primary forest around the community area (GIZ, 2013); these outside plots are managed through the *chakra-ushun-purun* successional practice, and they are afterwards semi-abandoned to slowly be reconverted into secondary forests.

While chakras were traditionally implanted in natural forest clearings, nowadays, due to population growth, their availability got reduced, and the most employed techniques is the *slash and mulch* one: first, the herb and shrub layer is cleared, then trees are cut and part of those is chopped to slowly incorporate it into the soil, while others are employed for construction or sold (Arevalo, 2009). Nonetheless, as Vera-Velez et al. highlights, edible and useful trees and plants are usually left into the plot, which can be considered as a remarkable element of continuity between the forest and the agroforestry system and an important example of traditional ecological practice (Vera-Velez et al., 2019).

The transition from itinerant to sedentary gave more importance to the agricultural production through Chakra, since natural resources from the forest around the communities got reduced, and Kichwa people can count increasingly less on hunting, fishing and recollecting (GIZ, 2013). As a direct consequence of sedentarism, the fallow

period diminished, because of the limited availability of plots around the communities: Arevalo identifies it as varying between 2 and 7 years, while before it could largely exceed 10 years, which Vera-Velez et al. consider as ideal for integral regeneration (Arevalo, 2009; Vera-Velez et al., 2019). The dimension of individual chakras can vary between 0.25 and 1.5 ha for family chakras and 4 ha for productive chakras (Torres et al., 2015; Jarret et al., 2017).

Traditionally, the CKA is a female space, where the “chakramama” produces food to sustain the entire family. The women of the family are responsible for the sowing and they perform rituals to propitiate an abundant production. They are the keepers of most of the traditional ecological knowledge related to the Chakra, which is connected to a deep ability to interpret the natural signals and to maintain a relationship of reciprocity with the forest (Arevalo, 2009; Andy et al., 2012). Before the sowing of manioc, for example, they realise the ritual of “Lumupachina”, to propitiate a good production, they realise a careful consociation with other plants, they can predict rains and days of strong sun by observing the presence of animals and their ways of singing and they can identify fertile and unfertile periods according to the moon’s phases and the fluorescence of trees (GIZ, 2020; Torres, 2015). The “gift” (paju), which corresponds to the agricultural management ability associated with each specific plant, is traditionally passed from women to women by rituals of joint work.

However, gender roles are in a phase of transition, since men are increasingly less dedicated to hunting and fishing: while some of them become employed outside the community, many of them are increasingly getting involved in the management of the family Chakra (Coq-Huelva et al., 2017). A survey conducted by Coq-Huelva et al. asked interviewees who they consider to be the principal farmer: 40% answered that it was the woman, 40% the man, while 20% considered that the couple was equally involved. Nevertheless, Almeida remarks that even in the agricultural activity a work division subsists: in her study in the community of Santa Barbara (Napo, Ecuador) she found that men were responsible for the harvest, while the responsibility for a good production mostly lied with women. Either way, chakra is considered as a family activity, and, in different degrees, everyone is supposed to contribute to the production, including children, who

from a very young age are taught about the traditional knowledge related with the agricultural production and the forest management (Almeida, 2017).

While it was previously intended almost exclusively for family consumption, nowadays CKA also provides products to be sold in the local markets, to complement the new necessities of the Kichwas families. The livelihood strategies vary from family to family, and can be influenced by the distance to the market: some are more focused on the self-consumption and they eventually *sell* the surplus, and others specifically integrate valuable species for selling, such as cocoa or coffee (Arevalo, 2009). The most common plants cultivated by the Kichwa peoples, apart from manioc and plantains, are fruit trees such as *Inga densiflora* (guava, *guaba*), *Pourouma cecropiifolia* (Amazon grape, *uva de arbol*), *Bactris gasipaes* (peach palm, *chontaduro*), *Mauritia flexuosa* (moriche palm, *morete*), *Solanum quitoensis* (*naranjilla*), *Artocarpus atilis* (breadfruit, *frutipan*), *Theobroma bicolor* (mocambo tree, *cacao blanco*), and *Caryodendron orinocense* (*cacay*, *mani de arbol*), medicinal plants such as *Ilex guayusa* (*guayusa*), *Maytenus krukovii* (*chuchuhuasu*), *Croton lechleri* (*sangre de drago*) and *Uncaria tomentosa* (*cat's claw*, *uña de gato*), ritual plants such as *Banisteriopsis caapi* (*ayahuasca*), and *Protium fimbriatum* (*copal*) and toxic plants such as *Lonchocarpus utilis* (*barbasco*) (Gutierrez et al., 2016; Torres et al., 2015). According to a report of GIZ, during the initial implantation and development of chakra at least 20 different species of plants are interplanted (GIZ, 2013). However, Guitierrez et al. report that traditionally it can incorporate more than one hundred species, which can be considered an impressive biodiversity for an anthropic ecosystem (Gutierrez et al., 2016).

In the last decades, plants intended for the family livelihood have been increasingly intercropped with commercial species such as cacao and coffee: while coffee was mostly planted during the 1980s due to the high market prices of the product of that time, cacao is a native Amazonian plant, whose cultivation was yet encouraged by the drop in coffee prices since 1992 (Jarret, 2017). Nowadays, cacao is the most common commercial product grown in the CKA system: only in the Sumaco Biosphere Reserve (an area of 931,930 ha located in the Napo province) there are 12,500 ha of cacao cultivated in the chakra (Torres, 2015). The introduction of commercial crops can sometimes affect the rich diversity of chakras; nevertheless, GIZ reports that many Kichwa farmers already experience the disadvantages of monocultures (such as the price fluctuation and the higher exposure to

pest and diseases) and usually tend to combine it with other crops, conserving the traditional management techniques (GIZ, 2013). According to Torres, in fact, the integration of commercial products such as cacao, rather represented an adaptation to the new necessities of the Kichwa communities which did not substantially affect the preservation of CKA and of the Amazonian landscape (Torres, 2015).

According to the destination of the products and the management techniques, CKAs can substantially vary one from the other. GIZ identifies at least 3 types: one oriented to family nutrition, one focused on commercialization of the crops and one mostly used for timber extraction (GIZ, 2013). It is important to underline that the concept of chakra is not static, as well as all the cultural aspects and practices: it answers to cultural changes, new necessities of the families, and challenges of the markets. As already mentioned, in the last decade it has increasingly been employed as a source of side income, by the intercropping of commercial species. For these reasons, delineating a universal definition of Chakra Kichwa Amazonica is not an easy task.

The association of Kichwa cocoa producers “Kallari”, in 2013 tried to define some orientating principles for the definition of the CKA, highlighting its cultural and environmental aspects. They concluded that the Chakra Kichwa Amazonica is:

- a relatively small area dedicated to agriculture inside the family finca
- managed by the family by employing the traditional Kichwa knowledge
- mainly oriented to the production for the family nutrition
- including edible, medicinal, artisanal and ornamental species
- managed with an organic and biodiverse approach (GIZ, 2013)

Chakra, ultimately, is not just a productive space, but also a cultural space and a garden, and as Coq-Huelva et al. remark “having a beautiful farm has an elevated social value because it is proof of a careful approach to nature” (Coq-Huelva et al., 2017). Traditionally, a diversified chakra, clean of weeds and providing a good production is a matter of pride for the woman, the *chakramama*, and this gives her social prestige in the Kichwa society. The traditional knowledge conserved by the Kichwa women concerning the chakra management is considered “ecological” because it contributes to create a productive system rich in biodiversity, with low inputs and low impact on the surrounding tropical

forest, which offers a multitude of ecosystem services. This is deeply connected to the Kichwa cosmovision of *Sumak Kawsay*, or “good living”, under which the communitarian approach prevails, and it embeds plants, animals and all the natural forces and spirits of the forest. The creation of an agroforestry system where the conservation of this balance is as important as the agricultural production is the direct consequence of a profoundly ecocentric cosmovision. This approach is what substantially distinguishes this traditional practice from modern agroforestry systems, and makes it particularly suitable for the Amazonian ecosystem.

IV.3 How can Chakra Kichwa contribute to SDGs and *Buen Vivir (Sumak Kawsay)*

Chakra Kichwa Amazonica can contribute to local and global sustainable development, by offering a valuable strategy of conservation of the fragile ecosystem balance of the Amazonian basin and to assure the food security of its inhabitants. Vera-Velez et al. find that this agroforestry system “has the potential to reverse multiple adverse effects caused by the disruption of the natural equilibrium, quality and health of the ecological habitats” (Vera-Velez et al., 2019, p. 3). The authors consider it as a remarkable environmentally sustainable forest management system, since the natural vegetation is only partially removed during the implantation of CKA, assuring the conservation of multiple native species.

This agroforestry system can help to overcome the contradictions of the SDGs, in particular the age-old dilemma of achieving the zero-hunger goal (2) without substantially contributing to environmental degradation. SDGs will be here employed as universal parameters to reveal the potential of Chakra Kichwa Amazonica, while the following section on *Sumak Kawsay* (Good Living) has the aim to explain how CKA goes beyond the western conception of sustainability.

IV.3.1 Addressing ecological challenges and contributing to SDGs

Chakra Kichwa Amazonica is a highly biodiverse agroecosystem, which hosts numerous species of trees and wild animals and prevents the erosion of the fragile Amazonian soil. It

can substantially contribute to the 15 SDG “Life on Land”, which intends to “*protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss*” (UN, 2015).

According to Guitiérrez et al., in fact, CKA can welcome up to 107 combined species, which form a complex anthropic ecosystem where each plant has a specific ecological function and destination of use: food plants are among the most numerous, but there are many others which are specifically grown for medicine, rituals, construction, handicraft, cosmetics, decoration and as poison for fishing or hunting (Guitiérrez et al., 2016). Plants are not placed in lines, but in a way that favours the connection and cooperation between them, imitating the natural patterns of the forest. According to Coq-Huelva et al. this extraordinary richness contributes to enhance the Amazonian forest’s biodiversity, “*generating a new type of landscape with high environmental value*”. The authors even argue that “*from an ecological point of view, chakras can be considered as an evolution of the humid Amazonian Forest*” (Coq-Huelva et al., 2017a, p. 15).

This biodiversity is also reflected in the animal presence: Chakra offers an important ecological corridor for wild species, such as reptiles, amphibians, birds, and micro-invertebrates, which would be otherwise affected by the forest fragmentation. A study conducted by Torres et al. brings evidence on the impacts of deforestation (for timber extraction or monocultures implantation) on the presence of reptiles and amphibians. The study reveals that the number of species found inside and around a Chakra with cocoa was higher in comparison with the cocoa produced in monocultures (Torres et al, 2013). CKAs definitely serve as corridors to connect different parts of primary or secondary forest, offering habitats for wild animals, but they also host small livestock species such as poultry, aspect which makes them full-fledged agrosilvopastoral systems and represents an important component of the family diet.

Sustainable forest management is another significant component of the goal n. 15. Humid forests do not only compose the surrounding landscape in which chakras are inserted, but they are often part of the family plots themselves: Coq-Huelva et al. found that on average around 40% of chakra plots are occupied by undisturbed forests (primary) or regenerated

forests (secondary). The percentage substantially varies according to the size of the land: in farms which are bigger than 15 hectares, the area reserved to the forest may even exceed 75%, while in the smaller ones it can amount to less than 5% (Coq-Huelva et al., 2017a). The results of the study of Bravo et al. on a plot in Santa Clara, Pastaza, confirm the data of Coq-Huelva et al.: 55,5% of the agricultural area was covered by forest (Bravo et al., 2019). The tendency towards the preservation of the natural vegetation inside the agricultural plot is related both to the spiritual value of the forest for the Kichwa culture and to its importance as a livelihood strategy, and results in a remarkable sustainable forest management technique.

The presence of dense vegetation which includes trees is a fundamental element of soil conservation, the foundation of a flourishing “life on land”. The local authorities of Napo region warn of the importance of protecting the Amazonian soils, which are considered particularly fragile, and claim that the traditional ecological knowledge developed by the Kichwa people over the centuries can help to prevent the erosion of this subtle organic layer (GIZ, 2013, interview). According to Coq-Huelva et al., fallen leaves and pruning rests coming from Chakras’ trees are key elements for organic matter production and nutrient fixation. Trees also fulfil the important function of capturing inorganic nutrients from deeper soil layers to enrich the superficial ones, and their roots contribute to restrain erosion (Coq-Huelva et al., 2017a).

The characteristics above described, concerning biodiversity, forest management and soil conservation, not only substantially contribute to the SDG number 15, but they also combine to make CKA a sustainable agricultural practice, which aligns with the goal n. 12 “ensure sustainable consumption and production patterns” (UN, 2015). A sustainable production entails the reduction of natural resources employed in the production and the preservation of the ecosystems. CKA is a low input agriculture, which employs local resources and simple tools: the main inputs of the system are human work, solar energy, rain and seeds, while the main tool employed is a *machete* (Bravo et al., 2019).

Traditionally, fertilization and pest control are realized through natural techniques: soil is mostly prepared through the slash and mulch technique, and weeds are controlled manually; even today, in fact, 49.2% of the work time goes to this activity, because of the

high regeneration rates of the humid forest (Coq-Huelva et al., 2017a). Pests are frequently prevented through the plantation of repellent plants such as chili (personal interviews, 2019) and through pruning techniques. Moreover, the incredible biodiversity that characterizes the traditional CKA could be considered itself the best and most natural pest control and fertilizing strategy: as highlighted by Altieri in *The Ecological role of Biodiversity in agroecosystems*, biodiversity creates natural barriers to pests and ensures an adequate supply of nutrients, leading to a greater resilience of the agroecosystem (Altieri, 1999).

Nowadays, some Kichwa farmers occasionally employ pesticides (Bravo et al., 2019); anyway, this is not a frequent habit for different reasons: chemical treatments are often ineffective for the problems they face, the purchase of products is economically unsustainable because chakra has a minimal economic return, and, besides, farmers are increasingly more aware about the consequences of the employment of chemicals on the health of humans and natural ecosystems. According to Coq-Huelva et al., the *“attitudes of refusing “hard” forms of agronomic intervention, as inorganic fertiliser for instance, is an example of what some authors call Sacred Ecologies”* (Coq-Huelva et al., 2017a).

Another major point to consider in order to evaluate the sustainability of an agricultural system is its impact on the climate: a positive balance in terms of production and capture of CO₂, should be regarded as an essential criterion for sustainable food production in a context of climate change. FAO coined the term “Climate Smart Agriculture” (CSA) to promote agriculture practices that are resilient to the changing climate and contribute to its mitigation, while addressing food security needs (FAO, 2019). Chakra Kichwa Amazonica is considered by the literature and the FAO itself as a CSA practice, because of its capacity *“to facilitate the adaptation of local population and the rainforest ecosystems to climatic conditions and their capacity to contribute to climate change mitigation”* (Torres et al, 2015, p. 6; FAO, 2019).

The presence of perennials such as timber trees, shrubs and fruit trees, in fact, results in a high potential of carbon storage. Data collected by Torres et al. in the Sumaco Biosphere Reserve (Napó, Ecuadorian Amazon) show that Chakras with cocoa stock 42% CO₂ compared with the primary forest (334 Mg C ha⁻¹), and 56 Mg C ha⁻¹ more than the cocoa monocultures (Torres et al., 2013); this gap would be even wider when considering a

monoculture of annual crops, which have a significantly lower capacity of CO₂ capture and provide very limited ecosystem services.

The Amazon rainforest has a global importance in terms of climate change mitigation, but it is constantly threatened by deforestation interventions, which are often aimed at monoculture implantation. Chakra Kichwa Amazonica can represent a valid compromise to meet local populations needs while providing fundamental ecosystem services such as emission capture. The flourishing biodiversity of CKA, on the other hand, increases the resilience and adaptation capacity of the agroecosystem, which also suffers increasingly unpredictable atmospheric phenomena and other consequences of climate change (Torres et al., 2015; GIZ, 2020). SDGs address climate change in goal n. 13, “take urgent action to combat climate change and its impacts”, and for the above listed reasons CKA can contribute to its achievement.

Nevertheless, one of the biggest potentials of CKA concerns Food Security (Goal n. 2) and Food Sovereignty, which are, besides, fundamental indicators for FAO’s Climate Smart Agriculture (FAO, 2019). As well as offering numerous ecosystem services which are fundamental for the environmental balance, in fact, it can provide a high variety of edible species that ensure a rich diet for the Kichwa families. Traditionally, the only aim of Chakra was the household livelihood, while today CKA fulfil the double function of food security strategy and income activity: most of the Chakras are primarily intended for family consumption, but the production surplus is frequently sold in the markets, and there are crops which are specifically grown for commercialization (GIZ, 2013).

Cocoa is one of the most cultivated commercial crops and according to data collected from the farmers of the Kallari association (Kichwa producers association, producing cocoa in the traditional chakras), it represents 42% of the family monetary income, while 37% comes from other products’ surplus (Torres et al., 2015). However, it must be said that until now CKA is not particularly profitable in economic terms, considering that the income per farm barely passes 2000 dollars per year. For this reason, Chakra should be always primarily intended for the self-sufficiency of the family, since it has the potential to satisfy most of the basic needs: it produces 3.8 gigacalories per hectare per year, on average 2091 calories per day, which is considered “*above the standards of the subsistence farming systems*”

(Coq-Huelva et al., 2017a, p. 11), as well as natural medicines and construction material. Most Kichwa families are used to having minimum monetary expense, which is possible with good planification of the chakra, by extracting forest products and by exchanging products with other families.

Diversification is fundamental to ensure a complete diet of the household; nevertheless, nowadays some farmers prefer to focus on the production of high valuable products for commercialization, which sometimes results in semi-monocultures and in the loss of resilience capacity of the family (Torres et. al, 2018). However, Chakra could maintain its biodiversity and self-sufficiency potential if high value species (medicinal, cosmetical, etc...) could be emphasized by better marketing strategies, to address the income necessities of families which want to increase their monetary income.

SDGs address the food security issue by giving major importance to productivity and family income, while they do not include indicators to measure the percentage of self-sufficiency and diversity. The concept of “Food Sovereignty” is more appropriate to describe the potential of Chakra Kichwa Amazonica: the agrodiversity ensures a rich diet to the families and an independence from the local markets (which can be distant and difficult to reach) and from the global market (which can be unfair and volatile), while the traditional ecological management techniques are aimed to maintain the ecosystem stability, which contributes to the food security of future generations (Declaration of Nyéléni, 2007). Moreover, the conservation of the surrounding forests represents an important integration of food subsistence, in fact, according to the data of Gutierrez et al., more than half of the Kichwa families interviewed extract products from the forest to complement their diet (Gutierrez, 2016).

Finally, Chakra Kichwa Amazonica goes beyond the western concept of sustainability, which is deeply hampered by the energy-intensive system in which it was conceived, where the resources are consumed at a pace which impede their regeneration.

IV.3.2 Overcoming SDGs through *Buen Vivir*

On the other hand, the local cosmovision, guided by the principle of *Sumak Kawsay* (Buen Vivir), “good living”, prioritizes the balance between all the living beings and their

ecosystem over monetary income. The community, in the Kichwa culture, is a broad concept: it includes “*plants, animals, insects, fish, humans, soul and spirits of the forest, air, soil and water*” (Whitten 1978, p. 840); human beings are in a close relationship of interdependence with their territory and they interact with it according to the principle of reciprocity, aimed at preserving the harmony and communitarian wellbeing (Coq-Huelva et al., 2017b)

Sumak Kawsay is an eco-centric concept, that does not conceive the duality between human and nature (which constitutes the premise of extractivism), typical of anthropocentrism. Kichwa populations traditionally consider themselves as part of nature, so that they do not act with the aim of protecting the “environment” (which is rather a western conceptualization), but of keeping a balance that ensures life itself (Gudynas, 2011). The traditional ecological practices devoted to the conservation of the ecosystem balance are the direct consequences of *Sumak Kawsay* and for this reason they are difficult to be completely understood through a western framework such as the SDGs.

Chakra Kichwa Amazonica is the result of the imitation of the natural patterns of the forest, where polyculture and symbiosis between plants are used as strategies to keep the natural equilibrium and collaborate with nature’s mechanisms, instead of trying to control them. Major agronomic interventions are rather conceived as an obstacle to forest regeneration and for this reason they are rarely integrated, while soil fertility is maintained through the recirculation of the forest’s organic matter (Coq-Huelva et al., 2017b).

According to the authors, the orientation towards self-sufficiency is closely linked to the principles of *Sumak Kawsay*, which promote social-environmental harmony and food sovereignty as a form of stability and security. In fact, 70% of the gross energy produced in food goes to self-sustainment and for exchanges between relatives and neighbours, while the most cultivated crops are staple foods such as plantains and cassava. Nowadays the values of *Buen Vivir* are challenged by the progressive inclusion of commercial crops, but at the same time they also serve as limits and guides for the decisions of Kichwa farmers, who are in fact inclined to integrate these crops inside the chakra model, instead of making a transition to monoculture. Cocoa, for example, which has contributed to deforestation in

other contexts, turns into a sustainable culture when integrated in the CKA (Coq-Huelva et al., 2017b).

The Kichwa concept of *Sumak Kawsay* has actually assumed a major importance in the development of a Latin American alternative to the western concept of development, entering the academic and political context. Indigenous movements and intellectuals of Ecuador have progressively spread it in the country and in the surrounding ones, by proposing the restructuration of society based on a harmonious coexistence within its members and with nature (Acosta, 2010). The western model of progress has revealed its limits both in environmental and social justice, and concepts such as the Buen Vivir, coming from the “periphery of the world” (Tortosa, 2009), started to represent an alternative reference, as well as a contribution to the recognition of the traditional ecological knowledge of populations that have been subjected and discredited for centuries. The integration of this concept in the Constitution of Ecuador in 2008, represented an important step for the reaffirmation of the indigenous origin of Latin America and of its independence from the hegemonic models. Moreover, the integration of the Rights of Nature in the Constitution (as a law body) has been a profoundly avant-garde act, and an example for other countries (Cullian, 2012). Unfortunately, however, the expectations of the indigenous movements of Ecuador have been disregarded, the concept has been misunderstood and exploited by the politicians (Corna, 2019; Calisto Friant, M. and Langmore, 2015).

Chakra Kichwa Amazonica is the living example of the potentialities of *Sumak Kawsay* in environmental and social terms: it offers numerous ecosystem services which are typically associated to the forest, such as the conservation of soil fertility and water reservoirs, CO₂ sequestration, regulation of climate and air and biological control of pests, conservation of genetic diversity and habitats (regulation and support services); while providing provisioning services, such as food, raw material, clear water and medical resources, and cultural services for traditional knowledge transmission and rituals realization (Caballero-Serrano et al., 2017).

Nevertheless, this diverse and rich agricultural system is at risk because of the increasing interaction of the Kichwa communities with the globalized world and the persuasive

influence of the western model. In Ecuador, international cooperation has an important role in supporting this system, employing strategies that could contribute to its survival and to the preservation of *Sumak Kawsay* in the Amazonian Forest of Ecuador, or eventually to their erosion.

IV.4 Threats to the conservation of Chakra Kichwa Amazonica

The actual challenges of globalization that the Kichwa culture is facing are inevitably affecting the resilience of Chakra Kichwa Amazonica. The process of colonization, acculturation and the radical changes in the structure of the Amazonian Kichwa society, already tested the survival of this millenary agroecosystem: the passage from nomadism to sedentarism had profoundly modified the management practices of CKA, and the reduced availability of resources had transformed the role of agricultural production, while also affecting the traditional work division, as seen in chapter 4.2. Nevertheless, Kichwas continued to rely on the ancient livelihood strategies of self-sufficiency (forest products and agroforestry production) for the following centuries from the arrival of the Spaniards, even if increasingly challenged by the systems of colonial and neo-colonial exploitation and the coexistence with other populations.

Many of the transformations that CKA underwent are relatively recent indeed, and could be in great part linked to the progressive permeation of the market and conventional agriculture in the life of indigenous communities, occurring in the last decades (Arévalo, 2009; Gutiérrez et al., 2016). Interventions of national and local institutions, private companies, and development organizations, combined with the road network improvement (which intensified the exchanges with other regions of Ecuador and other countries) have been decisive in this process. The Ecuadorian State started to measure and question the profitability of Chakra Kichwa Amazonia, by comparing it with other agricultural areas of the country, and by including it in the national productivity goals (GIZ, 2020a).

As a result, national institutions started to promote programmes of technical support for the Kichwa farmers, which mostly went in the direction of a transition towards

conventional agriculture, and the application of the guidelines of the green revolution (GIZ, 2020b). According to a report of the German Development Cooperation (GIZ), which works in the Amazonian area of Ecuador since 1962, *“la ampliación de la agricultura convencional es uno de los principales conductores para el debilitamiento integral de la chakra y la degradación de los servicios ecosistémicos que provienen de ella”*; the diffusion of this type of agriculture is here identified as one of the main drivers of the erosion of the agricultural practices of the Amazonian Kichwas, and could be considered as a direct consequence of the influence of the global market.

Different factors concur to the expansion of conventional agriculture to the detriment of CKA. In the last decades, monocultures of commercial products such as cacao and coffee have been promoted as a solution to improve the livelihood of the Kichwa farmers, which are often underselling other chakra products in the local markets to complement their family economy. A study of Torres et al. reveals that a cocoa monoculture generally generates 1/3 more income than cocoa produced in the chakra (Torres et al., 2013); nevertheless, self-sufficiency is not considered here in the equation. Technical support is given to the farmers regarding the products which are most demanded on the market rather than their traditional agro-biodiverse products intended for self-sufficiency, encouraging the farmers to focus on the production for selling.

Agrochemicals are sold to the farmers by private companies, in exchange for buying their agricultural production, or provided by institutional programmes which encourage productivity, generating a dependence and a vicious circle which affects the economy of the Kichwa families, as well as the conservation of the natural ecosystem (GIZ, 2020a). Exotic seeds are often offered by institutional and international programmes, to improve the quality of commercial crops; this inevitably weakens the traditional practices of recollection, conservation and exchange of native seeds, and consequently transforms the composition of CKA (GIZ, 2020b).

Traditional ecological knowledge related to the chakra is threatened by different factors. On one hand, public opinion on the scarce productivity of CKA has contributed to the discreditation and devaluation thereof and of all the ancestral knowledge related to it, leading many farmers to prefer more “modern” agricultural techniques, and to abandon

the practices of transmission of knowledge. On the other hand, young generations are progressively losing interest in acquiring their ancestor's knowledge heritage, and they rather project themselves outside of the communities and the agricultural work, persuaded that chakra is synonymous with poverty. Since it consists of oral knowledge, of which there are few written references, this heritage may be lost forever (Chapalbay et al., 2019). The lack of an adequate education and spread of information on the local and global advantages of CKA, contributes to the exacerbation of this phenomena (Gutiérrez et al., 2016).

The agro-biodiverse production of Chakra Kichwa Amazonica is often sold at a low price by the roadside of towns and cities nearby the communities. The quality of the products, which are nutrient-rich and mostly agrochemicals-free, is not properly paid by the consumers, due, in part, to the naivety of "chakramamas", that set too low prices and yield to haggling. The ecosystem services of CKA are invisibilized and consequently not recognized by the consumers as an added value, or by the institutions in the form of compensation. The lack of an appropriate location for the sale also influences the perception of the consumers on the quality of the products, and makes it impossible to distinguish and properly recognize any Chakra product (GIZ, 2020b). The production commercialized in the national and international markets is also predominately not valorised as organic and sustainable, and hardly competes with the intensive production from the coastal area of Ecuador or other parts of the world (Alemeida Velez, 2017).

Land fragmentation also concurs to the economical unsustainability of CKA: the demographic growth of the Kichwa communities and the new configuration of the families (which are progressively passing from "ayllus", traditional extended families, to smaller family units) leads to the division of the family land in smaller plots, which are sometimes too small to sustain the livelihood of the household (Chapalbay et al., 2019). Besides, sometimes the family opt for selling part of their plots to face their economic issues, or they are forced to cede them because of the pressure of private or public exploitation projects, as mentioned in chapter 4.1 (GIZ, 2020a).

Finally, climate change is increasing the vulnerability of the CKA system, because of the unpredictability and exacerbation of meteorological phenomena. The increase in

temperature and humidity is contributing to more frequent plant's pests and diseases, and the increase in rain intensity is making the plants more fragile. Moreover, climate change has significant effects on the accurateness of the ancestral knowledge related to the chakra: it disrupts the traditional rain season and the behaviour of plants and animals, which are natural signals used for the planification and management of CKA. In addition, the loss of agro-biodiversity can have significant implications on the resiliency of Chakra Kichwa Amazonica to climate change (Chapalbay et al., 2019).

These factors have repercussions on the preservation of Amazonian natural and carbon storage capacity, on the conservation of genetic diversity of native plants and the preservation of traditional knowledge, on long term agricultural production and on the food and health security of Kichwa families, which progressively have diets scarcer in nutrients, fundamentally based on mandioc and plantain, definitely affecting the resilience of Chakra Kichwa Amazonica.

IV.5 The role of development cooperation

In this context, international organizations have acted with different approaches, which have possibly both contributed to the conservation and erosion of the traditional practices of CKA. The interest towards Chakra Kichwa Amazonica grew in conjunction with the declaration of the Sumaco Biosphere Reserve (RBS), a recognition that UNESCO gave to the area around the national park Napo Sumaco in 2000, covering 931,930 ha of Ecuadorian Amazon (Torres et al., 2015). The Biosphere Reserve is located in the Napo region, a predominately Kichwa territory (INEC, 2010), where the traditional practice of CKA is largely employed as a primary livelihood strategy. The management plan, elaborated by the local institutions following UNESCO guidelines, provided for the conservation of the cultural and biological diversity, the implementation of the principles of sustainable development and the empowerment of the logistic support to research and education. Different international organizations were already working in the area, but this represented an impulse to coordinate their actions, in the direction of the conservation of the natural resources, also prompted, from the year 2008, by the principles of the new Constitution of Ecuador. Chakra

Kichwa Amazonica was increasingly taken in consideration because of its ecological benefits, which largely outweighed its economical limitations (Torres et al., 2013; GIZ, 2011).

The German organization GIZ, along with the Universidad Estatal Amazonica (UEA), promoted and facilitated a process of “participative governance of natural resources” with local actors and other international organizations operating in the territory of RBS, as part of the project “GESOREN”, (“Gestion sostenible de los recursos naturales”). In a report of the UEA of 2013, the term is defined as “*el conjunto de reglas (formales e informales), principios e incentivos para lograr el desarrollo sostenible, aplicando mecanismos que guían y coordinan el comportamiento de las personas de acuerdo a objetivos concertado*”; a mechanism of “horizontal interaction” and coordination between local actors to implement sustainable development in the territory (Torres et. al, 2013, p. 21).

International organizations have pursued different actions with the aim of supporting CKA farmers, sustaining their processes of association and progressive independence from external products collection centres and long supply chains (Almeida Velez, 2017). Those actions focused especially on the empowerment of the cocoa value chain, native crop and appreciated commercial product which grows particularly well in the shadow of the Amazonian chakra. In 2008 international organizations supported the creation of the “Mesa del cacao y Chocolate”, with the objective of: valorising and promoting cocoa (with fairs, tours between community-based tourism centres, connections with international buyers...), developing agroecological technologies to sustain the organic production and increase the productivity, and spread information through trainings and technical support (GIZ, 2011).

However, the process of coordination and collaboration for the empowerment of Chakra Kichwa Amazonica experienced a boost after the issue of “Ordenanza Chakra Kichwa” in 2017 on the part of the regional *institution Gobierno Autonomo Decentralizado Provincial de Napo* (GADPN). This ordinance was emitted as a result of the requests of the Kichwa organizations of producers, supported by the development organizations, representing the first official document of recognition of CKA in Napo (GIZ, 2020). The Ordinance aimed to create a system of principles, incentives, measures and mechanisms to empower and foster CKA. It delineated the features that define a Chakra Kichwa Amazonica and established

some strategic objectives, which can be resumed in the following: facilitating the conservation of chakra (through appropriate land management plans, certifications for the products and technical assistance), improve the conditions of commercialization, create promotion campaigns for chakra products, encourage the scientific research, and support the creation of a group of territorial governance between the local actors of chakra, the “Grupo Chakra” (GADPN, 2017).

“Grupo Chakra” is defined as a *“space of horizontal coordination and territorial governance, voluntary and participative, that provide technical assistance, institutional support, citizen oversight, in the implementation of the Ordinance”* (GADPN, 2017, p. 11); following the participative governance process that was already started, this group specifically addresses issues related to CKA. Grupo Chakra is facilitated by the German organization GIZ under its project *Procambio II*, and it is composed of local organizations of Kichwa producers, institutional organizations (such as the GADPN, the Ministry of Environment MAE, public universities...), local enterprises, and the international development organizations working with Kichwa producers. This space has enabled the coordination the already existing projects and to collaborate in the creation of common and shared strategies for the realization of future projects, that are resumed in the following objectives: OB1. Chakra management; OB2. Fair Trade; OB3. Communitarian-based agrotourism; OB4. Organizational strengthening; OB5. Research applied to chakra. The specific objectives of each area address many of the problems evidenced in chapter IV.4, starting with the advancement of conventional agriculture, including the unfair trade conditions and the threat of climate change (GIZ, 2020).

Development organizations have a key role in Grupo Chakra, partly because of the economical availability provided by their projects; some examples follow. GIZ, with its program *Procambio II* (“Increase of resilience to climate change through the protection and sustainable use of fragile ecosystems”), intends to address OB1 specifically through actions directed at increasing the resilience of chakra to climate change, OB2 through actions of diversification and economic empowerment and OB4 through training and awareness on climate change impacts and challenges. ENGIM Ong, (the Italian organization with whom I worked during my stay in Ecuador), through “Proyecto JUNTOS” directed its work to the organizational strengthening of the Kichwa producers’ organizations (OB4), but it also

intervened in other areas, covering most of the strategic objectives of the chakra group (GIZ, 2020). Member organizations, objectives and relative SDGs can be observed in Figure 3.



Figure 3. Grupo Chakra: organizations, strategies, and SDGs (Source: Chapalbay, 2018)

United Nations’ FAO is working in the region in close cooperation with local institutions and it is an active member of Grupo Chakra, mainly contributing to OB2. Napo-GEF (“Conservation and sustainable use of biodiversity, forests, soil and water to achieve Good Living/Sumac Kawsay in the Napo Province”) is a project implemented by FAO between 2015 and 2020 with GADPN and the Ministry of Environment of Ecuador and CKA is here included as a strategy to ensure food production and improve the livelihood conditions of the local communities while preserving the Amazonian ecosystem (FAO, 2018). In 2019 FAO started the “Climate smart cocoa Program”, to empower the cocoa value chain in Napo through the “revaluation of the chakra as a technology of adaptation, resilience and mitigation of climate change, based on the strengthening of the cocoa value chain” (FAO, 2020, p.11).

Finally, there are noteworthy actions which represent a joint effort of Grupo Chakra to address core problems related to commercial valorisation and recognition of CKA as traditional ecological practice. On one hand, the process of creation of a certification for the products of CKA, “Sello Chakra”, which is object of the case study that will be discussed

in the following section: a “participative system of guarantee” for the Chakra products, provided for the Ordinance Chakra Kichwa and promoted by the national and international development organizations of Grupo Chakra, involving the institutional actors and the associations of producers, with the aim of improving the condition of commercialization of Chakra products (GIZ, 2020). On the other hand, the process that led to the declaration of CKA as a “Globally Important Agricultural Heritage System” (GIAHS), a recognition that FAO gives to the *“remarkable land use systems and landscapes which are rich in globally significant biological diversity evolving from the co-adaptation of a community with its environment and its needs and aspirations for sustainable development”*, which CKA obtained in 2020 (Koohafkan, P. and Altieri, M., 2011).

The work of Grupo Chakra is a remarkable example of territorial governance, that has certainly made organizations’ efforts more effective and less overlapping and contradictory. Nevertheless, it should be verified if these actions have been truly effective in restraining the erosion of Chakra Kichwa Amazonica, or they have contributed to trigger processes of transformation in the Kichwa approach to natural resources and livelihood, by applying western logics.

Almeida Velez refers to the example of Kallari, an association of Kichwa producers of the Napo region which mainly focuses on the recollection of cocoa produced with the CKA system, to be sold as a raw material or transformed into chocolate. Kallari was created in 2003 with the support of FECD (Fondo Ecuatoriano de Cooperación para el Desarrollo) and the German organization GIZ, with the aim of addressing the low profits obtained by selling cocoa to intermediaries. These and other development organizations that are present on the territory contributed by equipping the collection centres of Kallari Association with facilities and machineries, training the workers, providing them technical support and helping them to access the international markets. Kallari Association was a beneficiary in several projects of these international organizations, under the heading of the promotion of sustainable development through the conservation of traditional knowledge (Almeida Velez, 2017).

However, as evidenced by the author, the result of these actions is often controversial. In fact, even if the intent is the preservation of indigenous knowledge, the approach

employed by the organizations is often oriented to improve the productivity, strongly influenced by the western logics and structures, and actions are not always planned and implemented with a bottom-up approach, considering the true necessities and cultural values of the beneficiaries. For example, in the case of Kallari, the organization supported the specialization in one single crop, and assisted in placing the products in the international market, with the aim of helping CKA to become more economically sustainable and prevent its abandonment. Nevertheless, by doing so they generated a vicious circle: Kichwa farmers, once self-sufficient, are presently focused on cocoa production and are often obliged to buy food and other products in the local markets. However, cocoa is a seasonal crop and subject to fluctuating prices on the international market, which means that sometimes prices are so low they are only sufficient to cover the costs of production (Almeida Velez, 2017). The consequences on the farmers are the progressive abandon of a biodiverse chakra and the traditional agroecological practices, to increase the production of cocoa and keep pace with the market, while the association remains heavily dependent on the economic support of the development organizations (Fernando, 2003, Almeida Velez, 2017).

Moreover, as advised by Fernando in its critical paper “NGOs and Production of Indigenous Knowledge under the Condition of Postmodernity”, international organizations may consciously or unconsciously tend to distort the concept of indigenous knowledge, on one hand by romanticizing it and assuming it as a static entity, what Spivak calls “strategic essentialism” (Spivak, 1988), on the other by reinterpreting it through the logics of development, presuming that economic welfare is a prerequisite for a worthy life, something that contradicts traditional and cultural values (as would be the case of *Sumak Kawsay*, for the Kichwa people) (Fernando, 2003).

The result can be a “*prioritization of the market on the reproduction of life*”, which eventually contributes to the erosion of traditional ecological knowledge, instead of preventing it (Almeida Velez, 2017).

Chapter V. Case study: Chakra Kichwa Amazónica empowerment as sustainable development strategy

V.1 ENGIM NGO: supporting CKA with “proyecto JUNTOS”

This study case is intended to experimentally evaluate the efficacy of two actions of ENGIM’s “Proyecto JUNTOS”, the NGO I worked with during my stay in Ecuador as Civil Peace Corp (Corpo Civile di Pace), in empowering Chakra Kichwa Amazonica, and thus fostering sustainable development in the region. Through this chapter the actions will be contextualized by introducing ENGIM and “Proyecto JUNTOS”.

ENGIM (Ente Nazionale Giuseppini del Murialdo) is an Italian NGO which derivates from a religious congregation founded in Turin in 1873. It operates on the national and international territory, with the main intention of promoting professional qualification and supporting job placement. Fifty years ago, it started its experience as an organization for international cooperation, realizing projects of “assistance and promotion of local development” in Argentina, Bolivia, Brazil, Colombia, Ecuador, Mexico, Albania, Romania, Sierra Leone, Ghana, Guinea Bissau, Mali, Kenya, Senegal, Sud Sudan, Lebanon, Syria and India.

The NGO started to work in Ecuador in 1995, and it is present today in Quito, Tena, Ambato and Santo Domingo de los Tsachilas, mostly with projects focused on the support and recovery of young people in situations of risk and social marginalisation, through training and education. Since 2007, it has an office in the Amazon city of Tena (at “Casa Bonuchelli”), where it works with the indigenous communities of the Napo region. In the first years in Tena, ENGIM mainly operated in the area of child support, offering a space for afternoon activities to children from 6 to 12 years old in difficult economic or social situation; nevertheless, in the last years it expanded its support to Kichwa farmers and vulnerable women and to the sustainable management of natural resources in the region (ENGIM Internazionale, website).

ENGIM started to specifically focus on the support of Chakra Kichwa Amazonica from 2018 with the project “JUNTOS”, coordinated by the Italian NGO CEFA and financed by the Italian Agency for Development Cooperation (AICS). The general objective of this project is to “contribute to reduce inequalities and rural poverty” in various provinces of Ecuador, “by enhancing models of inclusive, participative and associative value chain, with a particular attention toward the economic sustainability of small producers, to food security and to climate change mitigation and adaptation”. Specifically, it aimed to support the small producers of coffee, cocoa and quinoa of the province of Sucumbios, Napo, Orellana, Manabì and Chimborazo (*Proyecto JUNTOS*, unpublished). The project involves various SDGs, but specifically focuses on n. 2 (zero hunger), n. 12 (sustainable production and consumption) and n. 13 (climate action).

For the region of Napo, in the Ecuadorian Amazon, the beneficiaries are Kichwa producers of cacao and coffee in the traditional Chakra, and ENGIM is responsible for the implementation of the project activities. The project seeks to improve Chakra production and commercialization of cocoa and coffee. During the year 2019-20, the 13 Italian volunteers working with ENGIM for the national programmes of *Corpi Civili di Pace* and *Servizio Civile* were mostly in charge of supporting the activities of this project.

More specifically, the first action of project “JUNTOS” is focused on production improvement, through: A1.1: identification and multiplication of autochthonous genotypes of cocoa and coffee; A1.2: realization of training courses for farmers, on agroforestry and agroecological production techniques; A1.3: creation of agroforestry demonstration plots and organization of interregional exchanges to transfer agricultural practices; A1.4: support to the creation of participatory guarantee systems for farmers interested in certifying their production; A1.5: evaluation of vulnerability of traditional agricultural systems and development of measures of adaptation to climate change (*Proyecto JUNTOS*, unpublished).

The second action is centred on supporting producers’ organizations in their management operations, through: A2.1 realization of capacity building cycles on administration and governance; A2.2 trainings on the post-harvest processing; A2.3 economical support to microenterprises offering services to producer’s associations; A2.4 organization of courses

aimed at the socio-organizational strengthening of the associations; A2.5 organization of visits to exemplary organizations working in the area of Popular and Solidarity Economy (*Proyecto JUNTOS*, unpublished).

The third action is aimed at sustaining the commercialization processes, through: A3.1 analysis for the improvement of the association's infrastructures; A3.2 legal support to obtain international certifications; A3.3 development of strategies for territorial promotion; A3.4 support for the participation of traditional producers in national and international commercialization events; A3.5 realization of campaigns to encourage the consumption of local products (*Proyecto JUNTOS*, unpublished).

During the 15 years of presence in Tena, ENGIM constructed a net with the local and international entities working in the territory, and took part in the processes of participative governance together with organizations such as GIZ, FAO, Maquita, FECD, and the local institutions (GADPN, MAE, INIAP, MAG...). The inclusion of stakeholders in the project "JUNTOS" was strongly facilitated by these previous collaborations. Moreover, through this project, the Italian NGO participated in the joint effort of Grupo Chakra, mostly in terms of socio-organizational strengthening, while it also contributed to the areas of fair trade, chakra management and research (*Proyecto JUNTOS*, unpublished; GIZ, 2020).

During my year of stay, I was responsible for supporting two specific actions of the project. The first one was the "Escuela de Liderazgo Ambiental", a modular training course which was chosen as a methodology for the socio-organizational strengthening of the associations in the implementation of the project "JUNTOS" in Napo (A2.4). Specifically, I was in charge of supporting the realization of the 2019 edition of ELA, financed by ENGIM, and of the creation and implementation of a new module for the school, focusing on the relation between Chakra Kichwa Amazonica and agroecology. The second one was the creation of a Participatory Guarantee System (SPG) for products of CKA, named "Sello Chakra", which was aligning with action A1.4 of the project. Personally, I followed the process of collaboration between international cooperation organizations, institutional entities and associations of producers to define the structure and functioning of the SPG.

These actions were chosen for the case study of this research not only because of the direct experience, but also because of their complementarity and specific characteristics. The first

one (the new module on CKA and Agroecology) could be categorized as “awareness action”, since it aims at making social and environmental advantages of CKA more evident, specifically to those traditional farmers who are considering the option of a transition toward conventional agriculture; an awareness action has usually the aim of informing, leaving to the farmers the freedom to choose how to act consequently. The second one is focused on encouraging the farmers to use traditional agroforestry knowledge and techniques, through the creation of a certification for CKA products, but without putting restrictions on which type of products. Since both of these actions provide a great margin of decision to the farmers on the management of their Chakras, they could represent good examples of international cooperation actions in promotion of indigenous agroforestry systems.

V. 2. Using environmental leadership to empower traditional agroforestry systems

V.2.1 Escuela de Liderazgo Ambiental and the new module “Chakra Kichwa y Agroecologia”

Escuela de Liderazgo Ambiental is a modular course of “environmental leadership” created in 2009 in the Ecuadorian province of Napo, through the collaboration between the German Cooperation (GIZ) and the Minister of Environment of Ecuador (MAE), with the aim of strengthening communitarian leadership skills and to favour local governance in environmental management. From 2011 it was integrated as a permanent tool of environmental education in the provincial autonomous decentralized government of Napo (GADPN). The course is structured as a set of training modules that offer tools for the management of productive and communitarian organizations, combined with another set of modules aimed at strengthening knowledge and skills in the environmental field. The biodiverse territory of Napo hosts a large number of communities and organizations; forming environmental leaders is employed as a strategy to make territorial management more efficient (ENGIM, 2020, unpublished).

Escuela de Liderazgo Ambiental functions through a participatory governance system, in which different actors, including local institutions, NGOs and local organizations, contribute with economic or human resources. Trainers are provided by these entities, interested in the continuity of the school, while participants, mostly belonging to indigenous and/or rural communities, are fully reimbursed to encourage their participation. Over the years, nearly 500 local leaders have been trained with the methodology of the *Escuela de Liderazgo Ambiental* in the region of Napo, and many of them became points of reference for their organizations, intermediators with the institutions or promoters of communitarian projects (GIZ, 2011; ENGIM, 2020, unpublished).

ENGIM NGO financed the 2019 edition of ELA as a strategy for organizational strengthening within the “Proyecto JUNTOS”, addressed to young people and women involved in the organizations of Kichwa producers of cocoa and coffee. Moreover, it supported the update of the ELA modules and the creation of the new module “Chakra Kichwa y Agroecología”. The beneficiaries attended 9 modules of 2 to 3 days each, covering a time frame of 4 months. The methodology employed in ELA is designed considering level and aptitude of the participants: the theoretical part is always supported by group work and integrated by field trips in natural environments or tours to exemplary organizations. Personally, I was responsible for the logistics of the school, for supporting the activities and group sessions, and I have been involved as a trainer in some of the environmental modules.

The module “Chakra Kichwa y Agroecología” was a novelty of the 2019 edition of ELA, conceived with the main aim of valorising Chakra Kichwa Amazonica as a valuable example of agroecological practice, and to create a space of dialogue between traditional and scientific knowledge around sustainable agriculture. A manual was drafted by me and other staff members of ENGIM with the collaboration of GIZ between October and November 2019, while the activities were elaborated by me and another volunteer, following the “learn-by doing” approach of ELA.

The module was designed over 3 days, covering various thematic areas. The first day was conceived as an introduction to the module, aiming at understanding the limits of conventional agriculture and recognizing the value of traditional knowledge, and it included the following themes: history of agriculture in Latina America, consequences of the green

revolution, decolonization of knowledge (*Buen Vivir* and TEK), SDGs and international recognition of indigenous knowledge. The second day was centred on presenting agroecology as a dialogue between traditional agricultural practices and scientific knowledge, and at connecting it with CKA, through these themes: fundamentals of agroecology, agroecology in practice, Chakra Kichwa Amazonica and ecosystem services, problems and threats of CKA and possible solutions, institutional recognition of CKA (*Ordenanza Chakra Kichwa*). For the third day a visit to *Ampuakin*, an association of Kichwa medicine women, guardians of Chakra's traditional knowledge, was organized, with the aim of creating a space to revitalize, learn, and share knowledge, through rituals and observation of traditional practices.

The initial participants were 30 people from different associations of producers, but due to different personal motivations, not all of them attended all 9 modules and concluded the course. "Chakra Kichwa y Agroecologia" was implemented as the last module, in December 2019, and, as reported in the methodology of this research, 17 participants attended at least 2 of the 3 days. Through the impressions collected during the course, it was possible to capture that the participants felt interest in the module, many of them due to their closeness with the thematic. Nevertheless, it was not possible to grasp the change that occurred in their opinion and behaviour toward Chakra Kichwa Amazonica after receiving this course. Through questionnaires and interviews, data was collected with the aim of understanding the possible impacts of this module on the conservation of Chakra, and the validity of this kind of activity as awareness action to empower CKA and to contribute to the sustainable development of the Amazonian region of Ecuador.

V.2.2 Outcomes of "Chakra Kichwa y Agroecologia" module: opinion and behaviour change – quantitative data

Through a mixed methodology, which employs questionnaire and interviews, the outcomes of the module "Chakra Kichwa y Agroecologia" on the attendees were registered, in terms of opinion and behaviour change towards the traditional agroforestry practice of Chakra Kichwa Amazonica. The questionnaire form and the interview transcript can be consulted in the Appendix (A and B).

Cuánto te gustó el módulo "Chakra Kichwa y Agroecología"?

13 risposte

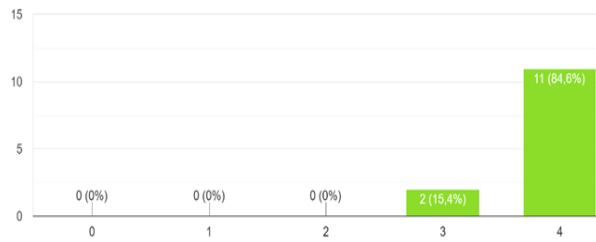


Figure 4. Level of satisfaction on the module "Chakra Kichwa y Agroecología"

At the beginning of the questionnaire, before the pre and post sections on opinions and behaviours, the participants were asked how much they liked the module CKyA and to self-assess their opinion and behaviour change,

Cuánto cambió tu opinión sobre la Chakra Kichwa Amazonica?

13 risposte

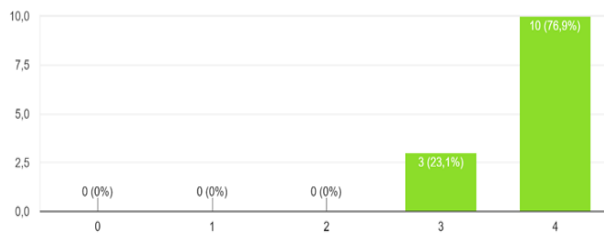


Figure 5. Self-assessed opinion change on Chakra Kichwa Amazonica as a result of the module

Cuánto cambió tu manera de hacer la Chakra?

13 risposte

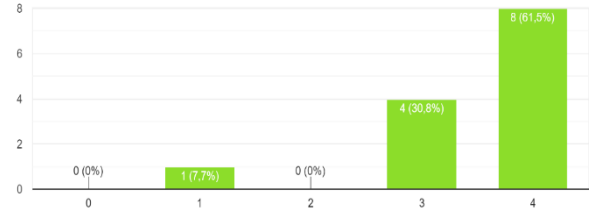


Figure 6. Self-assessed behaviour change on Chakra Kichwa Amazonica as a result of the module

using a Likert scale from 0 to 4.

Respondents expressed a high grade of appreciation of the module (figure 4), while showing a common tendency in self-assessing a change in opinion about Chakra due to the module (figure 5), which is slighter for behaviour, but still significant (figure 6). Through the analysis of the specific sections on opinions and behaviour, and the content analysis of interviews, individual perceptions will be compared and analysed.

The statements of the opinion section (which can be consulted in the Appendix A) are organized in 5 thematic blocks:

- A. "Chakra and industrial agriculture": benefits for man and nature of traditional Chakra, in comparison with industrial agriculture
- B. "Ecosystem services of Chakra": ecosystem conservation (biodiversity, soil, air) and resilience (to pests and diseases) through a traditional CKA
- C. "Chakra Kichwa Amazonica and food security": a biodiverse chakra can provide food security

- D. “Chakra Kichwa Amazonica and traditional knowledge”: ancestral knowledge is important for the management of CKA and it is worth transmitting it
- E. “Chakra Kichwa Amazonica from a global perspective”: Chakra and indigenous knowledge contribute to global challenges and to SDGs

As detailed in the methodology chapter, the answers of the statements of each thematic block (expressed in Likert scale values from 0 to 3) have been averaged; graphs have been

then elaborated by then averaging the values of the respondents, for each thematic block.

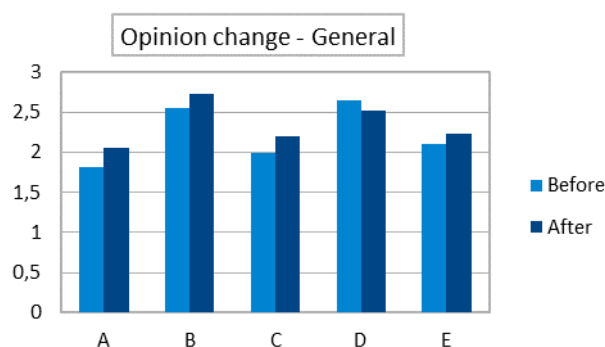


Figure 7. General Opinion Change, module CKyA

As a first consideration it can be observed that attendees of the module CKyA had a good initial awareness about the socio-ecological benefits of the Chakra system (figure 7).

Specifically, they prove to be particularly concerned about the ecosystem services offered by a traditional chakra (B) and the importance of traditional knowledge (D). On the other hand, they are less convinced about the advantages of chakra versus industrial agriculture (A), while as regards to the potential of chakra to provide self-sufficiency, they seem moderately aware (C).

A slight positive opinion change of the attendees’ perception can be observed, for all the categories except for the one on Chakra and traditional knowledge, which registers a slight negative change, although the initial value was very high. In order to partially overcome the limitations related to a general analysis of data, it is fundamental to proceed to the examination of opinion change by social categories.

Opinion change is slightly more evident in men than in women (figure 8). Men seem to be more influenced by the course, in particular as regards categories A and C, while women were already more conscious of the ecosystem services offered by CKA (biodiversity and soil conservation, air quality improvement...) and of the importance of traditional knowledge, and so they probably felt less benefits from attending the course. Interesting to

notice that women register a negative opinion change for the thematic area of traditional

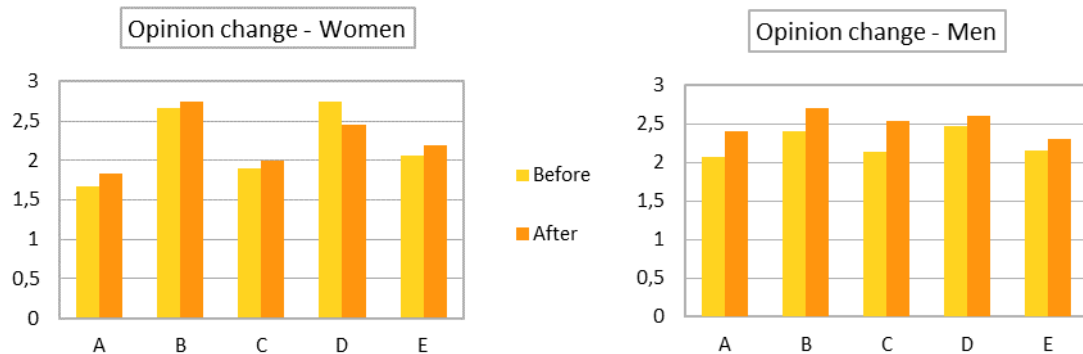


Figure 8. Opinion Change, sex

knowledge, of which they are the principal holders.

Age does not seem to be a relevant factor in opinion change and for this reason corresponding graphs were not reported.

On the other hand, education shows a remarkable tendency: values are generally proportional to the level of education. This not only suggests a positive correlation between education and initial awareness for people who received a higher education, but also a greater disposition to opinion change. This proportional growth from basic to higher education can be noticed in particular for A “Chakra and industrial agriculture” and D “Chakra and traditional knowledge”. Nevertheless, attendees with a middle education, even if less predisposed to opinion change, demonstrate a high level of initial awareness to the topics covered in the course (figure 9).

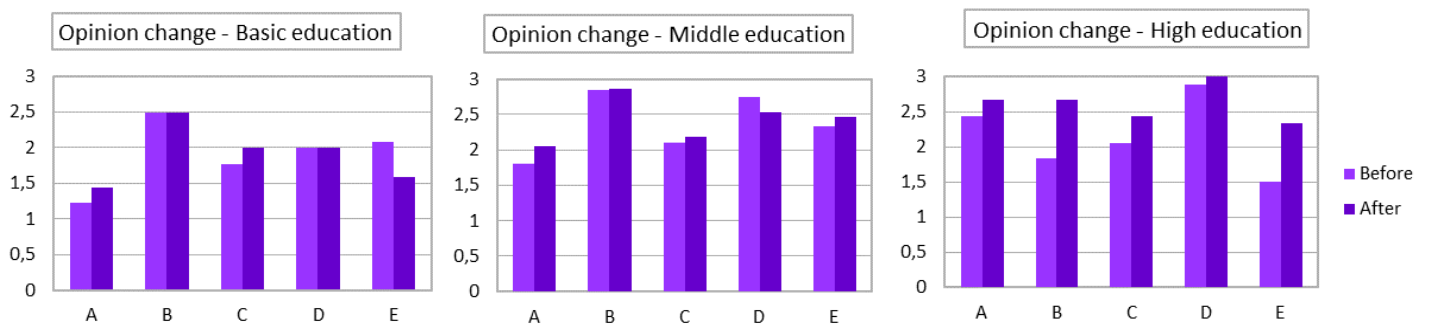


Figure 9. Opinion Change, education

Finally, by observing and comparing the pre and post answers to the single statements, it was possible to extract some additional information that contributes to understanding where the module was more, or less, efficient and helpful for the attendees. Starting from the thematic area A “Chakra and industrial agriculture”, the module seems not to have been very effective in passing the concept of the validity of traditional CKA compared to “more innovative practices”, while it has succeeded in convincing some of the more sceptical attendees on the side effects of agrochemicals. As regards to the section C “Chakra Kichwa Amazonica and food security”, the number of people convinced of the potential of CKA in sustaining food sovereignty almost doubled, and those thinking that commercial products of CKA are generally more important than the ones for self-consumption considerably decreased. Concerning thematic area D, which registered a negative change, it should be remarked that participants demonstrated, both in the pre and post sections, to have a high consideration for traditional knowledge; nevertheless, according to the questionnaire data, the module did not succeed in reinforcing it.

For the opinion section, it may be concluded that most of the attendees of the module “Chakra Kichwa y Agroecologia” were already moderately aware of most of the socio-ecological benefits of CKA and that the module contributed to reinforce their opinion or to change it positively in favour of traditional Chakra. The grade of change observed, on average, is similar for all the thematic, but not very substantial, contrary to what the participants expressed in the self-evaluation. The social categories which have been more sensitized by the module, according to the questionnaire, are men and people with a high level of education.

For the behaviour section, the Likert scales employed are different according to the type of information requested in each statement (so they are not standardized as the ones of the opinion section), as explained in the methodology chapter. The following presentation of results represents an attempt to condense data using the same methodology of the opinion section, to facilitate comparisons and to give relevance to the differences per social category. In order to not lose interesting information in this simplification, however, a

particular relevance will be given to the second part of the analysis, which takes into account the answers to the single statements.

The statements of the behaviour section (which can be consulted in the appendix A) were organized in the following thematic blocks:

- A. "Agroecological practices": cultivating biodiversity and conserving the soil
- B. "Industrial agriculture practices": agrochemical inputs usage
- C. "Food and health sovereignty": food self-sufficiency and cultivation of medicinal herbs
- D. "Traditional knowledge": interest in Chakra Kichwa ancestral knowledge

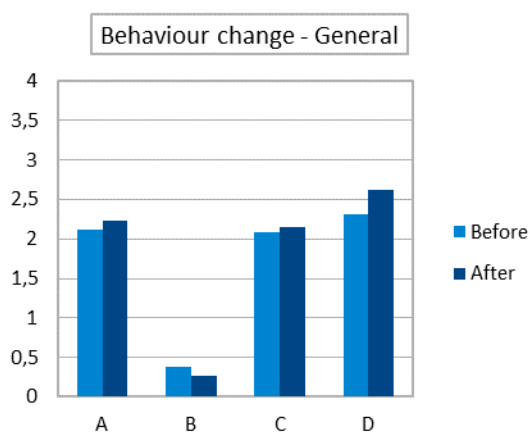


Figure 10. General Behaviour Change

The general behaviour chart (figure 10) depicts a good baseline situation and a slight positive behaviour change concerning an agroecological/traditional management of Chakra Kichwa Amazonica, resumed in the 4 thematics (A-D). For this section, desirable answers should tend to 4 for thematic blocks A, C and D, while they should tend to 0 for block B (use of agrochemicals).

The most significant change is related to the general increase in interest toward traditional knowledge (D), but the graph also describes a slight rise for agroecological (A) and food and health sovereignty (C) practices. The use of agrochemical inputs (B) seems to be slightly diminished after the module; nevertheless, the initial situation was already generally very positive in regard to this issue.

Starting from a similar baseline situation, women record a slighter positive change in CKA management practices (figure 11), as it was for the opinion change. Men, on the other

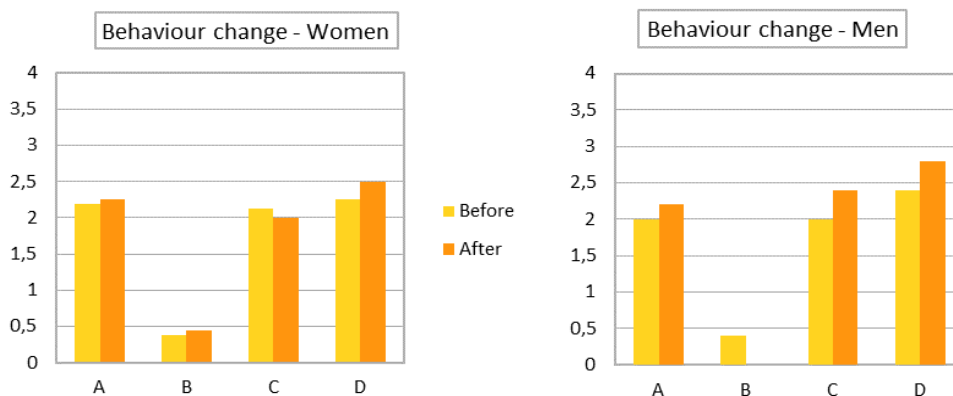


Figure 11. Behaviour Change, sex

hand, seem to have been more receptive to the course: according to the questionnaire, they slightly increased the agroecological practices, stopped using chemical inputs, enhanced traditional strategies for food and health security and their interest toward ancestral knowledge.

Age is, in the case of behaviours, a relevant factor of change (figure 12): under 30 assess to have significantly increased their interest toward traditional knowledge (D) and agroecological practices (A). Over 30, on the other hand, judge not to have substantially changed their behaviour in any of the areas, except the one related to agrochemicals, whose use they diminished. Young people, on the contrary, already seemed more sensitive to the thematic of chemical products, and, according to the questionnaire, they kept its limited use unvaried.

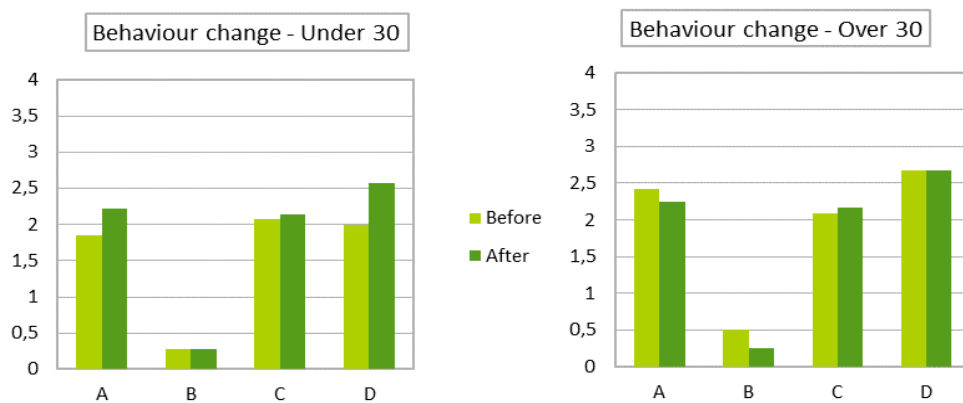


Figure 12. Behaviour Change, age

Concerning to education and the use of chemical inputs: people with higher education tend not to employ agrochemicals (figure 13). Nevertheless, attendees with higher level of education seem also less inclined to the implementation of “active” agroecological practices (cultivation of a biodiverse chakra and integration of green residues) and to food

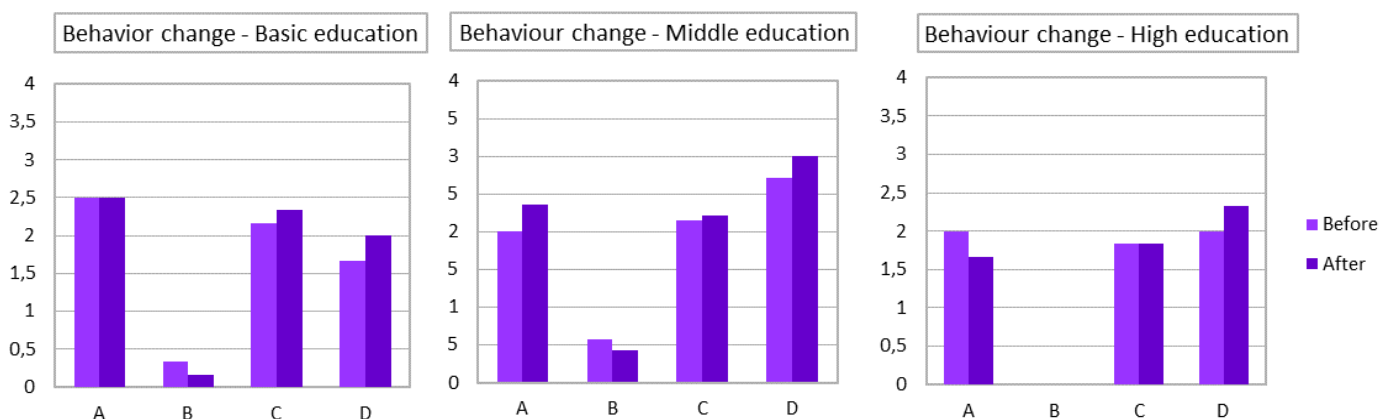


Figure 13. Behaviour Change, education

and health sovereignty (having a biodiverse chakra and cultivating medicinal plants).

As already mentioned, more detailed information can yet be extracted by observing the specific answers of each thematic block. Most relevant data were selected and presented below.

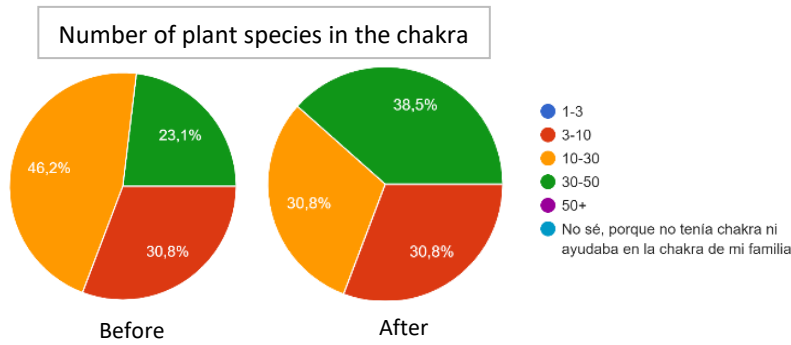


Figure 14. Number of plant species in the chakra of the attendees of the module CKyA

have between 3 and 10 species in their chakra, six people marked 10-30 and three people

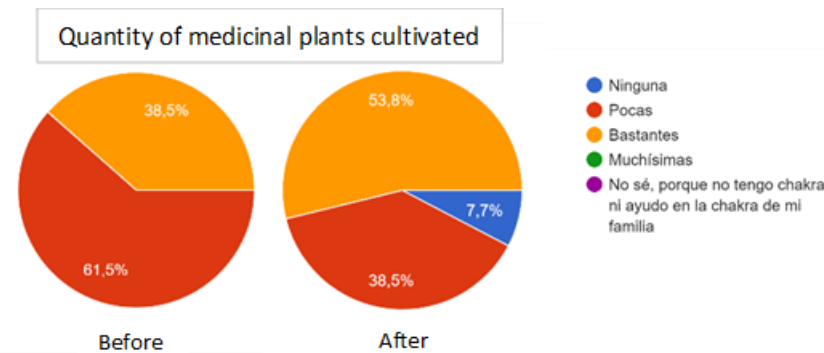


Figure 16. Quantity of medicinal plants cultivated by the attendees of the module CKyA

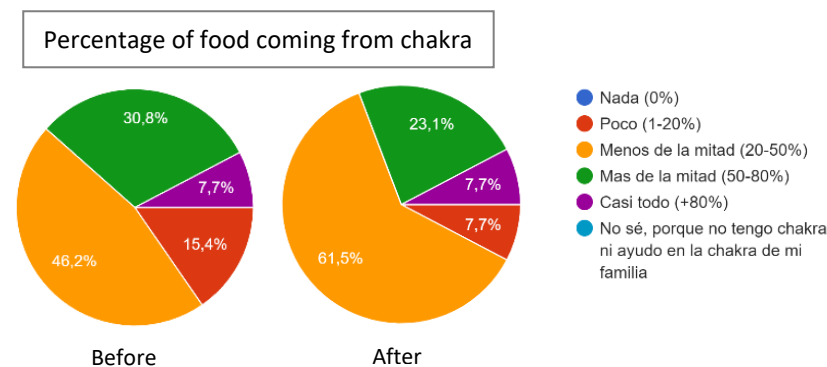


Figure 15. Percentage of food of the attendees of the module CKyA coming from their chakra

to 50% self-sufficient through CKA; five people assess to be 50 to 100% self-sufficient at the

Quantity of medicinal plants cultivated

Concerning agroecological practices (A) related to diversification of chakra, it is interesting to notice that, as initial situation, four people declared to

30-50; in the post-questionnaire, five people declared to cultivate between 30 and 50 species in their chakra, which denotes a possible slight but positive change in favour of biodiversity

(figure 14). As regards to food sovereignty (C), the pre and post situation has not experienced major variations: most of the people affirm to be 20

beginning, while just four after the module (figure 15) (the person that assessed a decrease in self-sufficiency level was interviewed and information will be contrasted below).

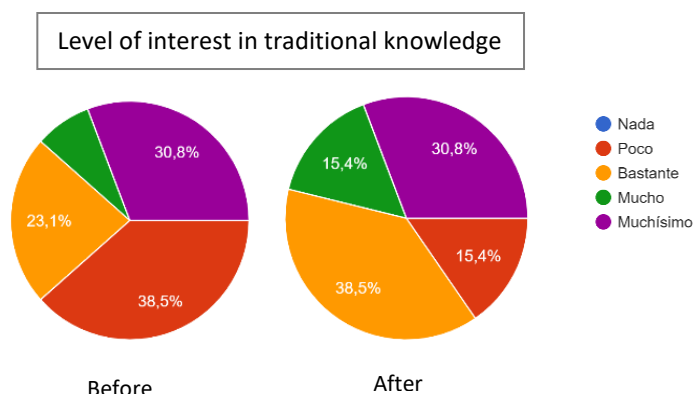


Figure 17. Level of interest of the attendees of the module CKyA in traditional knowledge

However, the module seems to have been more effective in conveying the importance of medicinal plants, since a slight increase in quantity can be observed (figure 16), and also in reinforcing the validity

of traditional knowledge (D), considering that people who are significantly interested in CKA knowledge raised from 8 to 11 (figure 17).

For the behaviour section, it may be concluded that the module “Chakra Kichwa y Agroecología” has succeeded in inducing a positive behaviour change, in particular as regards to the interest of the attendees toward traditional knowledge, and in general it may have contributed to reinforce their attitude toward an agroecological management of CKA, with a particular attention to health sovereignty. The grade of change observed, however, is not huge, contrary to what most of the participants expressed in the self-evaluation. The social categories who have been more sensitized by the module according to the questionnaire are men and under 30.

V.2.3 Outcomes of “Chakra Kichwa y Agroecología” module: opinion and behaviour change – qualitative data

Interviews complement the results of the questionnaire, helping to confirm or clarify the information and obviating some of its intrinsic limitations.

The interviewees agree that the module “Chakra Kichwa y Agroecología” contributed to empower and valorise their ancestral knowledge and values related to the CKA:

Interviewee A (women, over 30, middle education): *“nuestros padres nos enseñaron que tenemos que llevar siempre nuestra costumbre. Porque nosotros sembramos en*

la chakra todo natural, comemos todo natural, no contaminado. El curso nos ayudó bastante a valorizar nuestras costumbres”.

Interviewee B (man, under 30, high education): *“[...] por los valores de mis padres, de mis abuelos tuve que la chakra es fundamental. Y hasta ahora tengo presente en mi vida que una chakra orgánica es lo que te genera una vida saludable. Me acople con la idea de que ya tenía sobre a qué se refiere una chakra, me profundice más [...]”*

Both underline that their parents and grandparents taught them that a traditional chakra is organic, natural and “provides a healthy life”. In fact, both claim that their families never employed chemical fertilizers or pesticides:

A: *“[...] nunca hemos puesto químicos”.*

B: *“Nosotros de la parte de mi familia nunca hemos utilizado nada de químicos, somos 100% orgánico, abonos orgánicos”.*

This information supports the common tendency in refusing agrochemicals detected in the questionnaire. Interviewee B also refers that they employ organic fertilizers “abono orgánico”, while interviewee A explains that, while other Kichwa families decide to prepare the land using the slash and burn technique, her family opt for slash and mulch (which naturally fertilizes the soil), and to use part of these trees as firewood:

A: *“Algunos queman para que quede más fácil para trabajar, pero en mi familia no, dejamos los árboles podrir, y los ocupamos para la leña”.*

On the other hand, interviewee B emphasises that he employed and disseminated the natural pesticide preparation that he learned in the module among other farmers of his community:

B: *“Ah sí, por cierto, la práctica de los insecticidas naturales, lo he practicado en mi comunidad en tres ocasiones. [...] Funcionó y justamente la plaga, creo que fue factible. La gente está ejerciendo este sistema de apoyo.”*

Reintegration of organic residue was another point of the behaviour section regarding agroecological practices, and, according to the statements of the interviewees, this was already part of their habits. As regards to biodiversity in the chakra, on the other hand, both interviewees remarked that the module helped them understand the importance of diversifying plants, and that they have made changes to their chakras in this sense:

A: “[...] en la chakra nosotros anteriormente solamente sembrábamos lo que es la yuca, el plátano. Entonces en este curso que recibimos, nos enseñaron que es importante sembrar árboles maderables, las plantas medicinales, para tener cerca todo lo necesitamos. Anteriormente no se trabajaba así, solo se tenía su chakrita, la yuca el plátano y ya nada más”.

B: “Hay una chakra de monocultivos que se refiere a la comercialización: puede ser cacao que es monocultivo, maíz que es monocultivo. La chakra integral está integrada entre plátano, yuca, maní y árboles frutales y maderables.. [...] Después de la capacitación se cambió mucho porque no se manejaba un sistema integrado, con la capacitación se le puede tener una visión concreta de cómo es una chakra. Mis padres ejercen al 100% el sistema chakra, pero cuando hay posibilidad también apporto mi conocimiento, mi tiempo, mi trabajo y creo que es fundamental no solo tener el conocimiento, pero también hacer la practica en el territorio. Con el proceso de la capacitación tuve la idea de ejercer más productos, que sea más diversificada. Que la chakra tiene más productos, más plantas, más cultivos no solo los dos tres cultivos sino más productos dependiendo del espacio que uno tiene para diversificar”.

It is interesting to notice that interviewee A has memories of a traditional chakra composed mainly of plantain and mandioca, as if the integration of a plant diversity were a recent introduction. In fact, interviewee B believes that the recent initiative of his family for the realization of a “chakra integral” (traditional, diversified), is attributable to the impact of the module. He also specifies that they now cultivate 2 chakras, one for commercialization and the other one integral, with “plantain, mandioc fruit trees and timber trees”, while it seems that before they were more focused on the commercial production.

Transmitting the importance of biodiversity was certainly one of the most important aims of this module, and according to the testimonies reported, it seems it has succeeded in the intention. Interviewee A reports, more specifically, that she has expanded the space for medicinal plants in her chakra:

A: “Hemos ampliado lo de las plantas medicinales, hemos hecho un espacio dentro de la chakra para las plantas medicinales ahorita está más cerca y completa para nosotros”.

Cultivating medicinal plants contributes to health sovereignty, along with having a high variety of food plants in the chakra. Interviewee A explains that in the past her family used to sell the production surplus, while now she just cultivates for self-consumption. She believes that selling chakra products is no longer viable, in part because of the rising cost of transport.

A: Los transportes subió mucho, de 35 centavos a 50. Y es mucho, porque como subieron los transportes no subieron los productos? Por eso solamente trabajando de la finca no se puede tener dinero. Entonces se trata de salir para vender los plátanos, la yuca, fruta, pero no subió de nada el precio de estos productos. Lo que consumo es 80% de la chakra. Antes cuando mi mamita vivía, si salíamos a vender lo que es el plátano, la yuca, en temporada de chonta hacíamos chicha de chonta para salir a vender, pero ya ahora no. Solamente para la familia.

Interviewee A here self-assesses to be self-sufficient at 80%; anyway, she was the only person in the module to report a decrease after the module, from 50-80% to 20-50%.

As regards to the interest toward traditional knowledge, interviewee A reports that she had always been happy to learn from her mother and that she now enjoys transmitting her knowledge to her children:

A: Para los saberes ancestrales, gracias a dios tenia una mamita que se fue hace 10 años, ella sabía y me ha enseñado bastante. [...] yo, como estoy la última hija paso más tiempo con mi mamá, iba siempre con mi mama a trabajar en la finca. A mí me gusta ser curiosa. De lo que aprendí les converso, de lo que es bueno, me gusta hablar de las cosas que yo sé.

As final considerations, based on the interviews, it can be argued the attendees were already aware and sensible about many of the key thematics which revolve around the conservation of a chakra, but the module seems to have contributed to reinforce them.

One last impression left by the interviewee B, that enhances the utility that this module had for him:

B: “Sinceramente, me sirvió al 101% ese modulo sobre la chakra kichwa y el agroecología, porque estoy en proyecto de bioeconomía y estoy ejerciendo la parte productiva de las chakras, y entonces tengo la idea de cómo fue la capacitación, como viví este módulo. Para mí fue una capacitación muy muy muy importante y ahora estoy poniendo en práctica los conocimientos de Amupakin, de usted y de muchas personas. Ahora en la parte profesional me está sirviendo muchísimo”

A complete and detailed interpretation of the results will be realized in the discussion chapter.

V.3 Supporting the creation of participatory systems of guarantee to promote traditional agroforestry systems

V.3.1 The PSG “Sello Chakra”

“Sello Chakra” is a Participatory Guarantee System (PGS) developed in Napo region (Ecuadorian Amazon) with the aim of certifying the products of Chakra Kichwa Amazonica. It was elaborated through a participative process that involved international cooperation, Kichwa organizations of producers and local institutions, with the intent of creating an accessible alternative to third party certifications, and to valorise the ecological, social, and cultural added value of CKA production. Unfair commercialization is one of the major problems of Chakra



Figure 18. Sello Chakra

Kichwa Amazonica and it turns out to be a fundamental threat to its preservation: *Sello*

Chakra is proposed as a strategy to turn the system more economically sustainable and consequently to incentivize its preservation. The process of configuration of the seal and of its administration model is concluded; however, the accreditation and certification processes are at an embryonal stage (GIZ, 2020).

“Sello Chakra” was conceived as a Participatory Guarantee System. According to the definition of IFOAM, Participatory Guarantee Systems are “*locally focused quality assurance systems. They certify producers based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange*” (IFOAM, 2007). PGSs are generally based on the following principles, dictated by IFOAM: 1. Shared vision, 2. Participatory, 3. Transparency, 4. Trust – “integrity based approach”, 5. Learning Process, 6. Horizontality. They imply an active participation of farmers and local community, sharing a vision and trusting each other. The structure is horizontal, because no external verification organs are usually involved. Transparency is considered a fundamental condition to build and maintain trust, and it generates a communitarian learning process (IFOAM, 2007). PGSs are processes where producers and consumers can meet, dialogue, share knowledge and come to an agreement on what they want to promote and sustain. For this reason, they are adapted to the social, political, ecological, and cultural context of those who conceive them (Heifer Ecuador, 2018).

PGSs not only represent an economically advantageous and more flexible alternative to third party certifications, which are based on fixed standards dictated by large retailers and are frequently unsustainable for rural communities (Fetting, Ghia and Weissmann, 2019): they also give the farmers the possibility to certify a production which goes beyond the standards of organic agriculture (based on the model of substitution of inputs from chemical to organic), and meets the values of agroecology (Martinez, 2013). “*La propuesta agroecológica es integral, además de la producción incluye en su ámbito de acción otras esferas como la social, económica, cultural y política*”; through a Participatory Guarantee System it is possible to valorise traditional agroecological systems which are based on social values belonging to a specific cosmovision, by creating a relation of trust between the producer and consumer (Heifer Ecuador, 2018, p. 1). Indigenous communities are an example of context where their implementation is particularly recommended as a more

suitable alternative to third party certifications, according to the study book of IFOAM “Participatory Guarantee Systems: 5 Case Studies” (IFOAM, 2008).

Sello Chakra was conceived in Napo, an Amazonian region with a prevalence of Kichwa inhabitants, and seeks to “*revindicate, organize, valorise and promote*” the strategic importance of their ancestral system of production Chakra Kichwa Amazonica, which co-evolved with the Amazonian ecosystem, providing ecosystem services for the ecological balance and the livelihood of local populations (GIZ, 2020, p.53). International cooperation had a key role in the construction of this certification: it led the process through Grupo Chakra, together with some representatives of Kichwa cocoa producers, and, from the promulgation of the “Ordenanza Chakra Kichwa”, it started to involve local institutions and organizations. The configuration of the seal was determined in 2019, when international organizations such as GIZ, FAO, ENGIM and FECD organized an exchange tour to other provinces of Ecuador to get to know other experiences of PGSs.

The creation of the seal was included as a strategic objective in the local cooperation projects of the organizations involved in Grupo Chakra: FAO with “Napo-GEF”, GIZ with “Procambio II” and ENGIM with “Proyecto JUNTOS”, among others. Chakra Group gathered periodically during 2019 with the other entities involved, but the processes started to be truly participative in 2020, when representatives of other producers’ organizations, local governmental institutions and universities progressively joined the (presential and web) meetings. These entities collectively agreed on the conceptual framework of the seal proposed by Grupo Chakra, they defined the principles and rules to certify a Chakra, they elaborated an operation manual for the PGS and designated roles and responsibilities (GIZ, 2020).

Sello Chakra is structured on 3 levels: operative, technical and political. The core of the system is represented by *chakramamas* and *chakrayayas*, Kichwa farmers who manage a Chakra and are keepers of traditional knowledge. In a second subset there are the organizations of producers, which accompany their associates in the application of the seal’s principles and rules, through the figure of the overseers (technicians of the organizations who are in charge of inspecting the Chakras and realize technical reports to be assigned by the Ethical Committee). The governing body of the system is represented by

the Ethical Committee (composed by representatives of public institutions, universities, international cooperation organizations, and producers' networks), whose function is to accredit the organizations of producers and, after the inspection of chakras, issue the certification "Sello Chakra". This whole process is accompanied by the technical delegation, which is designated by the Ethical Committee with a temporary validity and supports the work of each subset of the PGS, especially the one of the overseers (to provide impartiality). Finally, there is the General Assembly, which represents, in accordance with the functioning of a PGS, the maximal authority of the seal, and exercises the function of social control and citizen participation (Grupo Chakra, 2020; figure 19).



Figure 19. Management model of SPG Sello Chakra (Source: GIZ, 2020)

To the date, 15 overseers have been trained and accredited, the Ethical Committee was formed in August 2020 with 7 representatives, and the process of accreditation of the producers' organizations (which precedes the award of the seal) was started. After the accreditation of the producers' organizations, the overseers will be responsible for the inspection and evaluation of the chakras of their associates, in accordance with the principles matrix: a technical report of those chakras which reach a minimal score of 70/100 has to be sent to the Ethical Committee, while those chakras which do not reach the minimal score have to be provided with technical support by the overseers. The Ethical Committee analyses the reports and awards the seal on the basis of trust; however, verification visits are realized to random samples by the technical delegation, in order to increase the credibility of the seal. The seal has a duration of 2 years, after which new inspections have to be performed to renew its validity (Grupo Chakra, 2020).

The sustainability of Sello Chakra strongly depends on the grade of involvement of the organizations of producers and of the associated Kichwa farmers. The initial effort of the overseers of the producers organization is a prerequisite for the success of the seal, while

the response of the market could decide on the long term involvement of the organizations. Costs are at the present moment absent, while the principles that the farmers have to meet in order to get the certification are based on the traditional Chakra Kichwa Amazonica; this means that they should easily be met by those who still manage a “chakra integral”, while they could push the other farmers to rebalance commercialization and self-consumption production and reintegrate diversity.

V.3.2 Projections on the possible impacts of the seal

The matrix of principles and the weights given to each area have a decisive role in the future management of certified chakras, and for this reason they are essential elements to be considered when making projections on the possible impacts of Sello Chakra. This information will be complemented with exploratory interviews, made to interviewees A and B, who are associated with producers’ organizations involved in Sello Chakra, besides being attendees of the 2019 edition of ELA.

Each principle was given, by those who conceived it, a different numerical weight, which together form the maximal score of 100 and determines their importance in the evaluation to obtain the certification. The 9 principles will be presented and detailed, and then organized in thematic areas, possibly aligned to the categories used for the analysis of the module CKyA outcomes, in order to facilitate comparisons, that will follow in the discussion chapter. Scores will be summed to observe which aspects of Chakra Kichwa Amazonica are given greater weight and to further make considerations on the possible impacts of the seal on the empowerment and preservation of Chakra Kichwa Amazonica.

The principles to obtain Sello Chakra and their relative numerical weight, which can be consulted in detail in Appendix C, follow:

1. “Indigenous Amazonian cosmovision”: it verifies if the Chakra is managed by a Kichwa family and/or according to the Kichwa cosmovision of harmony with the surrounding natural environment (*Sumak Kawsay*). It is given a numerical weight of 8.

2. “Natural and agroecological management”: it monitors if the management of Chakra is agroecological, free from agrochemicals and prioritizes native seeds. It is given a weight of 19.
3. “Traditional Amazonian Kichwa knowledge”: it verifies if ancestral knowledge is employed in the management of CKA and if the participation of young people is encouraged. It is given a score of 11.
4. “Communitarian and associative organization”: it evaluates the level of involvement of communitarian life and to the alignment to the initiatives of the organization. It is given a weight of 7.
5. “Diversified production for food sovereignty”: it assesses if the production of chakra sustains the livelihood of the family, prioritizing self-consumption. It is given a score of 10.
6. “Women's leadership and family integration”: it evaluates whether the chakra is managed by the family and the traditional leadership role of women is recognized. It is given a numerical weight of 11.
7. “High biodiversity and crop association”: it verifies if chakra maintains a high level of biodiversity, and includes food, medicinal, artisanal, spiritual, timber and commercial plants. It is given a weight of 8.
8. “Sustainable and diversified production oriented to special markets”: it monitors if chakra incorporates diversified commercial species with a high market value and maintains a good quality standard. It is given a score of 16.
9. “Amazonian landscape and resilience to climate change”: it assesses if chakra is managed with an attention to the conservation of the Amazonian ecosystem, to ensure resilience toward climate change. It is given a numerical weight of 10.

Many of the principles align to areas identified in the evaluation of the outcomes of the module CKyA (A-D), while others were put in a separate category, because they deal with aspects of Chakra Kichwa which were not considered in the questionnaire (since they had not been discussed during the module). In Table 1 one of the possible categorizations to facilitate comparisons with the outcomes of the module “Chakra Kichwa y Agroecologia” is proposed.

As it can be observed, in the principles is given a particular relevance to traditional Kichwa knowledge and cosmovision (principles 1 and 3); principle 6, related to the leadership role of women, “chakramamas”, was here included as it is strictly related to a traditional management of CKA. Together, this section holds the highest score. Agroecological management, free from agrochemicals and promoting biodiversity and soil conservation within the chakra, is also highly valued (principle 2 and 7), while it is given special attention to the practices which favour the conservation of the surrounding Amazonian ecosystem (principles 9). Food sovereignty was also incorporated as a condition to obtain Sello Chakra certification, “giving priority to self-consumption and diversification to sustain a balanced diet” (principle 5), which is a worthy of note for a commercial seal; nevertheless, greater numerical weight is still given to the production of commercial products (principle 8), which is here added as external category (since this area was not specifically considered in the section of ELA module). It must however be noticed that diversification of commercial products is here considered as a requirement. Finally, the active participation in the organization and communitarian initiatives (aspects which were also not considered in the questionnaire) was inevitably included in the principles, as it represents a condition for the long-term sustainability of the SPG (principle 4).

Categories	Principles	Scores
Agroecological practices (vs industrial agriculture)	2. Natural and agroecological management	27
	7. High biodiversity and crop association	
Conservation of the ecosystem	9. Amazonian landscape and resilience to climate change	10
Food sovereignty	5. Diversified production for food sovereignty	10
Traditional knowledge and Kichwa cosmovision	1. Indigenous Amazonian cosmovision	30
	3. Traditional Amazonian Kichwa knowledge	
	6. Women's leadership and family integration	
Social organization	4. Communitarian and associative organization	7
Commercialization	8. Sustainable and diversified production oriented to special markets	16

Table 1. Categorization of Sello Chakra principles

Interviewees A and B were asked their opinion on the principles and their own disposition in implementing them. They believe that they are easy to be applied because they are based on the Kichwa cosmovision, so that they “would not have to change much” in their Chakra.

B: *“Todos los principios están pensados para rescatar la cultura de acá de nosotros [...] todo está basado justamente en nuestra cosmovisión, nuestra forma de vivencia, como cultura Kichwa”.*

A: *“Yo creo que no tendríamos que cambiar muchas cosas [...]”.*

Moreover, interviewee B puts the accent on the fact that the principles were conceived “to rescue their culture”. In a further sentence, he manifests that in his opinion Sello Chakra can help to address the problem of loss of Kichwa traditions and agricultural practices:

B: [talking about Sello Chakra] *“Hoy en día, viendo la realidad estamos perdiendo nuestra cultura, nuestra tradición, nuestra forma de vivir, nuestra forma de producir la chakra y para ello debemos trabajar para rescatar esas simbologías, la identidad cultural. Creo que es fundamental para mí”.*

Interviewee B, who is part of the Kichwa producers’ association “Kallari”, also evidences that the seal could be very important for the preservation of the natural environment and the Kichwa culture, because, while the organic certification that the association handles is only meant for cocoa, Sello Chakra is applicable to every product and could encourage the establishment of “integral” chakras:

B: *“Es un momento sumamente importante porque Kallari trabaja con la certificación orgánica pero solo para un producto que en este caso que es el cacao. Pero hablando del «sello chakra» ya es una producción integral que puede rescatar los valores culturales, el cuidado del medio ambiente, el tratar de cómo cuidar nuestras chakras que sea amigable con el medio ambiente y eso es la idea fundamental de esto”.*

Both the interviewees confide that the seal could encourage the purchase of Chakra products, because consumers would be guaranteed that they are “organic and healthy”:

A: *“Lo del sello nos ayudaría bastante porque sería decir que es todo sin químicos o sea que los clientes pueden confiar porque no es fumigado, es todo con abono orgánico, todo natural, entonces nos van a comprar, no va a tener duda, como es con certificado”.*

B: *“Efectivamente, cuando hablamos de «sello chakra» estamos hablando una producción limpia, cero químicos, que mejora la calidad de la vida, un producto sano, agradable para la salud. Quien no va a querer comprar un producto proveniente de chakra que se maneja orgánicamente. Es algo interesantísimo”.*

Unfair commercialization of the products is one of the major issues related to the abandonment of CKA and loss of interest on the part of young people. According to the opinion of the interviewees, Sello Chakra could help the farmers to address this problem, and would incentive them to keep producing with the traditional system Chakra Kichwa Amazonica. A detailed interpretation of this material will be realized in the discussion chapter, where projections will be made on the possible impacts of this SPG on the empowerment of CKA.

Chapter VI. Discussion

Through the introductory part of the case study (chapter 4), Chakra Kichwa Amazonica was investigated to assess whether it can be considered a traditional agroforestry system and a sustainable agricultural practice, and if it is under threat, in order to justify the necessity of the intervention of development cooperation to empower the system and halt the loss. In the second part, two concrete examples have been presented and explored, to understand if they can be proposed as effective (and eventually replicable) empowerment actions to support Chakra Kichwa Amazonica. This chapter will discuss the findings of the case study, in order to answer the research question *“did the addressed actions of ENGIM NGO empower Chakra Kichwa Amazonica, thus contributing to the sustainable development of the Ecuadorian Amazon?”*.

As detailed in chapter 4.2, Chakra Kichwa Amazonica is a traditional agroforestry system practiced by the Kichwas of the Ecuadorian Amazon, integrated with the forest since it coevolved with the Amazonian ecosystem for many centuries. It combines edible, construction, medicinal, artisanal, ritual and ornamental plants, to sustain family livelihood and self-sufficiency. Through chapter 4.3 the characteristics that make this system sustainable have been delineated. The management practices employed by Kichwa farmers are led by the cosmovision of *Sumak Kawsay* (Buen Vivir): according to this worldview, the balance and harmony between all the living beings (including plants and animals) must be preserved in order to ensure a good life. When it comes to chakra management, this translates into strategies to preserve and regenerate natural resources, to assure the equilibrium of the Amazonian ecosystem. Moreover, Chakra can support food security and sovereignty, while its surplus can provide a side income for the families. For these reasons, traditional knowledge related to CKA can be considered ecological and environmentally sustainable, while it contributes to social and economic sustainability. Chapter 4.4, however, recognized that many of the traditional management practices related to Chakra Kichwa Amazonica are under threat, due to the permeation of conventional agriculture and global market logic, lack of awareness about the ecological and social potential of this

agroecological system, combined with a scarce economical valorisation of chakra products, and the progressive exacerbation of climate change.

Development cooperation has been very active in the region of Napo (Ecuadorian Amazon) in support of this traditional agroforestry system, with the intent of contributing to the sustainable development of the region. The experimental part of this case study focused on two specific actions, which have been implemented by the NGO ENGIM in the region of Napo, in the framework of “Proyecto JUNTOS”: the module of ELA “Chakra Kichwa y Agroecologia” and the Participatory Guarantee System “Sello Chakra”. Findings will be discussed, interpreted, and related to the information collected through the literature review, in order to assess if these actions contributed to empowering CKA, and thus to promoting sustainable development, and then proceed to discuss the possibilities of replication of these or other empowerment actions, through the conclusion chapter.

VI.1 Discussion of findings on the module “Chakra Kichwa y Agroecologia”

The investigation on the outcomes of “Chakra Kichwa y Agroecologia” has the specific intent to assess whether the module contributed to change opinions and behaviour of the attendees about the traditional agroforestry system CKA, and thus to empower it, through the analysis of the findings collected through questionnaire and interviews.

In the first section of the questionnaire, respondents were asked to express their opinion before and after the module (by realizing an abstraction in time), on different thematic related with the socio-ecological benefits Chakra Kichwa Amazonica: advantages of CKA towards industrial agriculture (A), contribution of CKA to ecosystem conservation (B), potential of CKA in sustaining food security (C) and relevance of traditional knowledge for the management of CKA (D).

Participants proved to be already averagely aware about the socio-ecological benefits of CKA before the implementation of the module, in particular as regards to the ecosystem services of Chakra (B) and traditional knowledge (D), while they appeared to be more sceptical about the advantages of chakra over conventional agriculture (A). These results align with what was reported in the literature review: while Chakra Kichwa Amazonica has

been discredited by public opinion for decades, conventional agriculture has increasingly permeated the Kichwa society and modified the approach of the farmers toward agriculture. Chakra and traditional knowledge have been recognised, only in recent years, for their potential in environmental preservation.

The module seems to have contributed to reinforcing or positively changing most of participants' opinion about CKA. However, change is always slight, perhaps due also to the difficulty for the participants of projecting themselves in the past: "pre" opinions could have been influenced by current opinions and reduced the potential variances. Because of the intrinsic limitations of the methodology, the true impacts of the module are difficult to calculate; this chapter rather aims at making assumptions on its outcomes.

Moving to the observation of the specific answers of the opinion section, it appears that the module has been particularly effective in reinforcing participants' opinion toward the potential of CKA for food security, even if some of the respondents remained convinced that commercial products are more important than those for self-consumption. On the other hand, it has been less successful in transmitting that chakra is a remarkable agricultural system and does not need to be overcome by more "innovative" techniques; however, it seems to have been more effective in making participants more aware of the side effects of agrochemicals.

Women appear less influenced by the course compared to men: one possible explanation is that their knowledge and opinions around Chakra Kichwa Amazonica are more deeply held, due the prominent role they traditionally have in managing Chakras from an early age. Their negative opinion change in terms of the consideration toward traditional knowledge could be interpreted as a consequence of the language barrier (possibly encountered during the course and in the completion of the questionnaire), added to other limitations of the research methodology employed. Nevertheless, it must also be considered that women's initial consideration of TK was very high, which reflects their leading role as holders of knowledge.

Education seems to be an important factor in regards to awareness on the socio-ecological benefits of CKA; as it was explained in the literature (chapter 4.4), lack of education and/or access to information might influence the abandonment of CKA for other agricultural

practices. However, this result could also indicate that the module (or the questionnaire) was more accessible to people with higher education.

Ultimately, according to this interpretation of the findings of the opinion section of the questionnaire, it may be concluded that the socio-ecological advantages of Chakra are not always recognised by the participants, which reflects a common tendency between Kichwa farmers, connected with the factors presented in chapter 4.4, such as the public discredit of CKA occurred in the past decades. Initiatives like the module “CKyA” can be valuable opportunities to share knowledge and to reinforce them. Even if a slight positive opinion change has been observed, the true impact of the module is not easily measurable because of the limitations of the methodology. However, further considerations can be made by observing the influence of the module on the management of chakra, which was investigated through the second part of the questionnaire.

As for this section, regarding behaviours, the aim is to determine which traditional management practices were employed by the participants before the module, which are in a process of disappearing, and how the module possibly contributed to retaining this tendency. For these considerations, interviews will be particularly relevant, integrated with data collected through the questionnaire, as well as information of the literature review.

With regard to agroecological practices (A), participants assess that, before the module, they were moderately diversifying their chakra and reintegrating organic material, and that they slightly increased these practices because of the module. Specifically, the number of species cultivated by the participants in their chakras used to be, on average, between 10 and 30, while after the module they increased at 30 to 50 for some of the respondents. However, by comparing these numbers with the literature, we can immediately note a discrepancy from a traditional chakra as described by Guitiérrez et al., sometimes welcoming up to 107 species (Guitiérrez et al., 2016), with the chakras of the attendees. These figures reflect a tendency towards simplification and biodiversity loss, which aligns with what was detailed in chapter 4.4. Nevertheless, it is important to mention that each chakra passes through various stages (*chakra-ushun-purun*), which traditionally differ in biodiversity, and that some farmers manage different chakras according to the destination of the products. This is the case of the family of interviewee B, whose parents already

managed a plot intended for commercial production, while they introduced an “integral” chakra because of the contribution of their son, which, according to his statements, was persuaded by the module on the importance of diversification. Interviewee A also claimed to have increased the number of species in her chakra after the module. Moreover, as regards to the practice of soil regeneration, interviewee A assessed that her family always reintegrated organic residues in the preparation of the agricultural plot (slash and mulch), while she also refers that other families tend to opt for slash and burn techniques; the coexistence of these two techniques is also mentioned in the literature. Finally, by observing data per social category, it can be noticed that under 30 are those who registered a more evident change in the thematic A, possibly because their agricultural habits are less rooted and consolidated, than those of over 30, who have been farmers for a longer time.

As concerns agrochemical inputs (B), the usage is in general really limited and it slightly decreased after the module, according to the questionnaire. This information corresponds to what reported by Coq-Huelva et al. (2017a): Kichwas tend to refuse “hard forms of agronomic intervention” because of cultural, ecological and economic reasons. The interviews also confirm this position: A and B and their families never employed chemicals in the management of their chakras. The module eventually contributed to reinforce this position, in particular between men and over 30. On the other hand, under 30 seemed already less inclined to the use of agrochemicals, and attendees with higher education were (and are) totally refusing its usage. It can be deduced that access to information (which tends to be more at the disposal of young people with higher education) could have contributed to developing awareness of the side effects of agrochemicals, even before the module.

With regard to food and health security (C), attendees attested to be partially self-sufficient and to cultivate a moderate quantity of medicinal plants. The module was not particularly effective in fomenting self-sufficiency, but it could be accounted as one of the drivers for the increase of cultivated medicinal plants in the participants’ chakras, assessed by comparing before and after answers. As for the first, on average, only 20 to 50% of their food comes from their chakra, with a slight decrease after the module. Traditionally, when communities were isolated, Kichwas were completely self-sufficient, and obtained all their nourishment from their chakras and the forest; the situation described by the data reflects

a progressive dependence from the market, probably caused by of the progressive substitution of self-consumption crops for commercial crops, as it was also detailed in chapter 4.4. The module seems not to have succeeded in positively impacting on the grade of self-sufficiency of the participants. However, it also must be considered that results are possibly lacking in accuracy: interviewee A, who was the only one to self-assess a decrease in self-sufficiency after the questionnaire (from 50-80% to 20-50%), in the interview declares that 80% of what she consumes comes from her chakra; this incongruence is an important indicator, that could reflect the difficulty to self-estimate the values requested. On the other hand, the quantity of medicinal plants cultivated slightly increased after the module, according to the answers of the attendees. Interviewee A confirms this data, since she attested to having expanded the space dedicated to medicinal plants in her chakra. However, this could also be influenced by the advent of the covid-19 pandemic, which fomented the use of medicinal plants between Kichwas communities (direct testimonies). Regarding food and health security, men have been more predisposed to change their behaviours after attending the module.

Finally, as regards to traditional knowledge (D), participants registered a moderate level of interest before the module, which considerably increased after the module, according to data collected. Traditional knowledge was actually given a particular relevance during the implementation of “CKyA”: the last of the 3 days was held at a Kichwa centre for the valorisation of Chakra traditional knowledge (*Amupakin*), and this experience could have influenced the participants in valuing TK transmission and preservation. Interviewee A (woman, over 30) explains that she has received the knowledge from her mother and that she has always been interested in transmitting it to her children. On the other hand, according to the general graphics, under 30 seemed to have been more impacted by the module in giving greater recognition to traditional knowledge. This data is remarkable because, as seen in chapter 4.4, traditional knowledge erosion tendentially occurs between young people; the module eventually had a positive impact on it.

Ultimately, according to the interpretation of the findings of the behaviour section of the questionnaire, it may be concluded that the traditional ecological practices of Chakra are in a process of partial erosion, which reflects a tendency under way among Kichwa farmers in general. This can be related to the causes listed in chapter 4.4, such as the advent of

conventional agriculture, the influence of the market and the processes of acculturation, among others. Empowerment actions such as the one of the module “Chakra Kichwa y Agroecología” can have concrete impacts on the preservation of traditional management practices. A slight positive behaviour change has been observed, in particular as regards to a deeper comprehension of the importance of biodiversity and the growing interest toward traditional knowledge.

More generally, interviewee A and B agree that the module helped to valorise their traditional customs and values, transmitted by their parents and grandparents, and to reinforce the idea that a traditional chakra is natural, organic, and supports a healthy life. This could be considered as one of the most important outcomes of the module: reinforcing traditional knowledge and creating a sense of pride could actually contribute to the empowerment of an agricultural system such as Chakra Kichwa Amazonica.

Moreover, the module had a ripple effect which is even more difficult to measure, because the participants were invited to realize replicas of the ELA modules in their communities. An exploratory interview, led to a further attendee of the module (man, under 30), reveals something really interesting about the potentialities of this action:

“Cuando realicé las réplicas, el de Chakra y Agroecología fue el tema que más les interesó a la comunidad, ya que la mayoría se dedican a la agricultura. Algunos de ellos desconocían la importancia de tener varios productos o varias plantas en la misma parcela, ya que solo estaban focalizados en obtener ingresos económicos mediante la venta (monocultivos de yuca, plátanos, cacao...). Una vez transferido el conocimiento a las personas, ahora tienden a aplicar este modelo de chakra sustentable, donde se pueden incluir otras variedades de cultivos, para obtener buenas cantidades de alimentos para la familia y nuevos ingresos económicos a partir de la chakra”.

According to the interviewee, in fact, his replica of the module has induced the members of his Kichwa community to favour biodiversity, with the aim of increasing food and economic security.

In conclusion, the module contributed to increasing awareness of the environmental, social and cultural benefits of Chakra Kichwa Amazonica, between the direct participants and eventually in their communities, with possible concrete impacts on the management practices of Chakra. The module might have not generated a major change in opinions and behaviours, but it could have “planted a seed” in a larger process of revalorization of traditional ecological knowledge and created an opportunity for knowledge exchange between the participants.

VI.2 Discussion of findings on the certification “Sello Chakra”

The creation of the Participatory Guarantee System “Sello Chakra”, supported by the development cooperation, was taken in consideration as another example of Chakra Kichwa Amazonica empowerment action. Since the impacts on the preservation of CKA are yet not calculable, due to the early stage of the process of certification, this section will focus on making projections about its possible implications in the future, using the principles matrix and the exploratory interviews presented in chapter 5.3.

The PGS “Sello Chakra” was conceived as an alternative to organic certifications, with the aim of recognising and preserving the characteristics that make CKA an ecologically and socially remarkable agricultural system. The conditions to obtain the certification, which are resumed in the principles matrix presented in chapter 5.3, are in fact based on a traditional chakra (an important reference was the definition of *Kallari* reported in chapter 4.2), as confirmed by interviewee B (*“todo está basado justamente en nuestra cosmovisión, nuestra forma de vivencia, como cultura Kichwa”*), so that farmers would not have to introduce unfamiliar elements or practices to their chakras (*“yo creo que no tendríamos que cambiar muchas cosas [...]”*, interviewee A). This would facilitate the obtainment of the certification.

Nevertheless, as described in chapter 4.4 and confirmed through the investigation of the module “CKyA”, there is an ongoing erosion process to the detriment of some of the fundamental elements of chakra, which would justify the intervention of international and local development cooperation in the support of the creation of this certification, together with the economic reasons. Interviewee B also acknowledges it (*“hoy en día, viendo la*

realidad, estamos perdiendo nuestra cultura, nuestra tradición, nuestra forma de vivir, nuestra forma de producir la chakra”) and he suggests that Sello Chakra could be a valuable strategy to rescue the cultural identity.

Standard organic certifications would probably not be sufficient to preserve chakra with all its socio-ecological advantages, since they are often influenced by market logics which do not valorise ecosystem services, culture preservation, maintenance of self-sufficiency and conservation of the natural balance, exclusively substituting agrochemicals for less pollutant inputs (chapter 5.3). The PSG “Sello Chakra”, on the other hand, aims at certifying that the products are cultivated using agroecological practices (principles 2 and 7), while preserving the Amazonian landscape (principle 9) and supporting food sovereignty (principle 5) and that they are produced according to traditional knowledge and cosmovision (principles 1, 3 and 6). Moreover, they also valorise active participation in communitarian and organizational life (4) and attention toward quality and diversified commercial production (8).

In particular, the weight which is given to traditional knowledge and Kichwa cosmovision is remarkable, as it represents 1/3 of the whole score to obtain the seal. This means that one of the main objectives of the certification is to preserve ancestral knowledge, as foundation of Chakra Kichwa Amazonica: the seal recognises that without the cosmovision of *Sumak Kawsay* and the ritual connection of the chakramama, chakra would probably radically differ in composition and management practices. For this reason, it might be assumed that Sello Chakra could have an important role in encouraging the preservation of chakra’s traditional knowledge.

The other category which has great influence in the score is the one of agroecological practices: reintegration of organic residues to conserve the soil and rejection of agrochemical, combined with diversification and association of plants, are necessary conditions to obtain the certification. This could have important impacts in restraining conventional agriculture practices, in particular those related to diversity reduction and simplification.

Finally, a specific relevance is also given to commercial production, which is a specific requisite to obtain the seal. As observed in chapter 5.3, this section has a greater weight in

the score as compared to the production for self-consumption. Depending on the situation in which a specific chakra is found, the seal could eventually lead to the increase of one or the other type of production, with positive or negative impacts on food security. Nevertheless, it is worth highlighting that diversification is considered as one of the prerequisites to obtain a high score in the principle related with commercialization: increasing species and varieties of commercial crops could be a strategy to enhance economic security, while sustaining the ecological balance. This would be particularly important for this specific geographical area, as most of the organizations of Napo are currently focused on the production of cocoa or coffee, with a tendency toward monocultures.

Moreover, it must be also underlined that it is not usual for a certification to include the preservation of production for self-consumption as one of the prerequisites to obtain it. “Sello Chakra” could have impacts on the future composition of chakra, and promote diversification of commercial products, while at the same time sustaining food security and sovereignty. Valorisation of self-production could be relevant, more in general, to preserve biodiversity, since diversification of the family diet and provision of material always represented the main reason for Kichwa farmers to diversify their production. The seal recognises it by including a specific principle aimed at self-consumption and food security (5). Biodiversity, which is probably the most important distinctive feature of CKA, is in fact valorised by the seal in more than one principle (5, 7 and 8).

As for the functioning, “Sello Chakra”, unlike other types of certifications, it is open to certifying all types of products. As reported by interviewee B, this represents an important novelty: the organization to whom he belongs already dealt with an organic certification, but exclusively intended for cocoa. He concludes that certifying more products could have important impacts on the reintroduction of “integral”, biodiverse chakras between the producers of the association, with positive consequences of environmental protection. At the present moment, however, Sello Chakra is mostly headed by organizations of cocoa and coffee producers, which are focusing on international and specialized markets rather than local commercialization, also because of the difficulty of economically valorising the products in the area of Napo. Development organizations could support the creation of

shorter supply chains through the construction of local awareness on the socio-ecological benefits of Chakra Kichwa.

Both the interviewees are confident that the seal could incentivize the purchase of chakra products, because consumers would have the guarantee of buying a natural and healthy product that were produced in a CKA: *“quien no va a querer comprar un producto proveniente de chakra que se maneja orgánicamente. Es algo interesantísimo”* (interviewee B). Sello Chakra has the potential to make the international sale more profitable, but it could also turn into a transformative tool for the local context.

As for the producers, the Seal should then represent an economic advantage, which would sustain their effort in meeting the principles and assure the long-term viability of the certification. In this moment, costs are absent for the farmers, because all the process is sustained by the organizations of producers and their resources. Nevertheless, development cooperation also provided important inputs, mostly in terms of human resources to delineate the structure of the Participatory Guarantee System. In order to make it truly sustainable and progressively more participatory, organizations of producers should take the lead of the seal, and become their true promoters.

In conclusion, Sello Chakra could encourage the preservation of the traditional characteristics which make Chakra Kichwa Amazonica a sustainable agricultural practice. Kichwa farmers who already manage an integral chakra will be awarded with the seal without the need of making alterations, while farmers which tend to employ conventional agriculture techniques such as monocultures, would be encouraged to recover Kichwa traditional knowledge, employ agroecological management practices and diversify the production and destination of the products, in order to support food security and sovereignty. Nevertheless, the long-term sustainability of the seal would depend on two important factors: the increase of farmers autonomy in managing the seal and the creation of local awareness on the value of chakra products, since a short supply chain represents one of the conditions to create trust, which is at the basis of the viability of a PGS like “Sello Chakra”.

VI.3 Implications of findings

The module “Chakra Kichwa y Agroecologia” and the certification “Sello Chakra” can be considered as valid empowering actions for Chakra Kichwa Amazonica because they contributed (or could contribute) to creating awareness of the socio-ecological benefits of the system and encourage the preservation of the traditional characteristics which make CKA a sustainable agricultural practice.

Specifically, according to the analysis of questionnaires and interviews, the module has contributed to transmitting the importance of recovering traditional knowledge and enhancing biodiversity, while it has created a space for knowledge exchange between the participants. The seal, on the other hand, according to the analysis of the matrix of principles and exploratory interviews, could encourage the agroecological management of chakra, the diversification of commercial and self-consumption products and the preservation of traditional ecological knowledge, while improving the economic sustainability of the system.

The aim of this case study was to answer the research question “did the addressed actions of ENGIM NGO empower Chakra Kichwa Amazonica, thus contributing to sustainable development in the Ecuadorian Amazon?”. Through the initial part of the case study, it has been concluded that CKA is a valuable traditional agroforestry practice, which can contribute to preserving ecological balance in the Ecuadorian Amazon while supporting food security, but it is under threat. Through the second part of the case study, it has been demonstrated that the two addressed actions, promoted by ENGIM NGO, have contributed (or could contribute) to empowering Chakra Kichwa Amazonica. The case study succeeded in answering this specific research question, but not without weaknesses and limitations, mainly related to the methodology employed for the module “Chakra Kichwa y Agroecologia” and to the embryonic stage of the processes of implementation for the certification “Sello Chakra”.

Nevertheless, as it was highlighted on several occasions in the body text of this research, the short-term success of a development strategy should be secondary to the approach employed and its long-term result. A participatory, bottom-up approach should be adopted

in order to support communities in their own development path, rather than imposing a top-down strategy. The two analysed actions have been proposed as examples of this participatory approach, because they promote the preservation of the traditional ecological chakra, and they still leave the farmer the choice to decide on how to manage their own plot. However, after an accurate analysis, it can be concluded that the approach of these actions is only in part participatory.

In the case of the module, in fact, contents have been elaborated based on academic material and research conducted by the development organizations, without directly involving Kichwa people, while a space for farmer-to-farmer exchange (*La Via Campesina* methodology, chapter 3.3) has been reserved only to the third day of the module, at *Amupakin* (center for Kichwa knowledge preservation). In order to make it more participatory, the contents concerning CKA should be previously discussed and validated by chakramamas, while farmer-to-farmer exchanges should be given a greater space.

As for “Sello Chakra”, the process of creation has not been participatory since the beginning, because it was proposed by the development cooperation as a top-down initiative, and progressively, in a later phase, farmers were involved. A SPG is usually a bottom-up process, starting from the intent of the producers to valorise their products and create an alternative to third party certifications. Kichwa farmers should increasingly appropriate the seal and become independent from the support of local and international organizations, which is a condition for the long-term sustainability of the seal.

In conclusion, this case study has proposed two concrete examples of empowerment actions, which may contribute to addressing part of the problems which cause the erosion of the Kichwa indigenous agroforestry system: lack of awareness of the socio-ecological benefits of CKA and limited economic sustainability. Moreover, it proved that empowering local traditional ecological knowledge is not itself sufficient to ensure a participatory approach, instead an attentive design of the activities must be done in order not to incur in top-down dynamics.

Conclusion

Amazonian indigenous agroforestry systems are sustainable agricultural practices which have been developed by the native populations through the imitation of the surrounding forest. These systems have been increasingly taken in consideration because they combine the remarkable ecological benefits of agroforestry systems, such as biodiversity preservation, soil and water protection and carbon sequestration, with the advantages of traditional agriculture, which is more resilient because it is grounded to the territory and adapted to its specific characteristics. As they are the result of the ecocentric interaction of indigenous populations with their biophysical environment, they can be classified as traditional ecological knowledge, while they also align to the principles of the agroecological movement and they can contribute to addressing several SDGs. These practices have sustained the livelihood of the Amazonian populations for centuries, providing food, medicines, construction material and other useful plants, while at the same time preserving the forest. As reported in the literature, the Amazon is in fact not a pristine space, but the result of a coevolution with its inhabitants and their agricultural systems. Nevertheless, the survival of Amazonian indigenous agroforestry systems is today threatened by the advent of conventional agricultural practices, together with other factors such as the progressive acculturation of indigenous societies and the market asymmetries.

Grasping the great potential of indigenous agroforestry systems in addressing sustainable development goals, this exploratory research aimed at proposing the empowerment of indigenous agroforestry systems as a sustainable development strategy for the Amazon Basin. While the first chapter investigated the advantages of traditional ecological knowledge and agroforestry systems and assessed the presence of indigenous agroforestry systems in the Amazon as traditional ecological knowledge under threat, the second chapter focused on questioning the approach of development cooperation toward “development” and “sustainable development” and exploring the potential of indigenous agroforestry systems in sustainable development projects.

The criticalities identified in the general approach used by the development cooperation are related to the neo-colonialist legacy toward development, which eventually results in top-down projects that tend not to take into consideration local development paths and proposals. Promoting sustainable development is not itself sufficient in bringing structural changes to the development cooperation: it is necessary to adopt a participative approach, and design projects starting from the bottom, from the worldview of the beneficiaries. This translates, among others, in the *Participatory Rural Appraisal*, a method which incorporates local people's knowledge, such as traditional agroforestry, in the planning and implementation of development projects. The introductory literature review section closes with a question: could development organizations address the ecological challenges of the Amazon Basin, and align with the participative approach, by empowering local indigenous agroforestry systems?

This question has been investigated in concrete through a case study on the Ecuadorian indigenous agroforestry system "Chakra Kichwa Amazonica". CKA has been geographical and culturally contextualized and identified as a fundamental livelihood strategy of the Amazonian Kichwa communities, in the past exclusively intended for self-consumption and today progressively integrating commercial crops. It has proven to contribute to addressing several sustainable development goals, related to the preservation of the Amazonian natural resources and the provision of food security for its inhabitants, while at the same time it transcends the boundaries of SDGs and western conception of nature, aligning with the ecocentric cosmovision of *Buen Vivir*, a local development paradigm which prioritizes ecological balance over economic growth. As well as most of the indigenous agroforestry systems of the Amazon, the preservation of Chakra Kichwa Amazonica is threatened by different factors, mainly related to the progressive permeation of conventional agriculture in the Kichwa society, which affected the public opinion on chakra and contributed to making the system less economically sustainable. International and local development cooperation have been working in support of this agricultural practice with different approaches, which might have both contributed to conservation and erosion of CKA traditional knowledge.

This research has experimentally investigated two specific actions implemented by the Italian NGO ENGIM: the creation of the new module "Chakra Kichwa y Agroecologia" (CKyA)

for the environmental leadership program *ELA* and the development of “Sello Chakra”, a certification for products cultivated in the traditional chakras. The specific question associated with the case study was: *did the addressed actions of ENGIM NGO empower Chakra Kichwa Amazonica, thus contributing to sustainable development in the Ecuadorian Amazon?*

Through a mixed methodology, the outcomes of the module CKyA have been evaluated in terms of opinion and behaviour change of the attendees in regards to Chakra Kichwa Amazonica. According with the findings, the module has moderately contributed to creating awareness on the environmental, social and cultural benefits of this agricultural practices, and slightly influenced the behaviour of the farmers who attended the course, in terms of biodiversity promotion and interest toward traditional knowledge; the reliability of the results was however limited by the methodology employed. In any case, the module could have represented an important occasion of knowledge exchange between the participants, while generating a sense of pride which could turn them into advocates of Chakra Kichwa Amazonica, as well as environmental leaders.

On the other hand, the potential impacts of the Participatory Guarantee System “Sello Chakra” have been investigated by analysing the principles matrix and the exploratory interviews conducted. If the process of certification of the producers will be accomplished, the seal could contribute to promoting an agroecological management of Chakra Kichwa Amazonica, enhance biodiversity and encourage the preservation of traditional ecological knowledge, while at the same time supporting a fair commercialization of chakra products. In particular, the PGS Sello Chakra could help the farmers to overcome the contrast between production for self-consumption and for commercialization, and to find the right balance to support a quality life.

Due to methodological limitations, the case study only partially succeeded in demonstrating that the considered actions empowered (or could empower, as for the seal) the agroforestry system CKA, and thus foster a sustainable management of the natural resources in the region, while supporting food security and sovereignty. However, this experimental research has helped to understand that an empowerment action is more effective when it answers to the specific needs and desires of the beneficiaries, is designed

considering their cultural, educational and social background, and when it is addressed to a public that is sensitive to the thematic of the project and ready to welcome it.

In order to reduce the incidence of controversial results, the participatory approach should be adopted in all the phases, from design to implementation, adapting the project to the vision and values of the beneficiaries, and accompanied by a deep analysis of the context. The two actions analysed could have increased their potential of effectiveness by involving Kichwa farmers in every stage of the process. In the case of the Participatory Guarantee System Sello Chakra, in particular, a full involvement of the producers is a sine qua non condition for its long-term sustainability.

Empowering Chakra Kichwa Amazonica has actually proven to be a valid sustainable development strategy for the Ecuadorian Amazon, since this agricultural practice contributes to addressing several SDGs and to maintaining an ecocentric and reciprocal relationship with the natural resources of the Amazonian Forest. The literature review has evidenced that indigenous agroforestry systems of the Amazon Basin tendentially share similar characteristics, which provide for the preservation of the Amazonian ecosystem, while supporting food security and sovereignty. For these reasons, the empowerment of indigenous agroforestry systems can be considered a valid participatory sustainable development strategy for the Amazon Basin in general, but only when designed through an inclusive process, which can ensure a long-term positive impact on the subsistence of the addressed agroforestry system and consequently on a sustainable management of the Amazonian natural resources.

In other words, the present research has added to the literature two concrete examples of empowerment actions, which might be replicated, considering the local specificities, in the context of other development projects aimed at promoting sustainable development in the Amazonian basin. Furthermore, it has contributed to drawing attention to the fact that supporting local practices is not itself sufficient to ensure a participatory approach, which is rather the fruit of a planned and structured inclusion of the beneficiaries.

Further case studies should be conducted in order to bring additional evidence in support of or in opposition to the hypothesis carried out by the present research. Other strategies to restrain the erosion of indigenous agroforestry systems, based on the corresponding

threats, could be investigated. Some suggestions are: the Payment for Ecosystem Services, the support of diversification through the creation of processed products with native medicinal or food plants, the promotion of strategies of climate change adaptation and mitigation using traditional and scientific knowledge, the organization of gatherings of exchange and valorisation of traditional knowledge.

In conclusion, the empowerment of indigenous agroforestry systems constitutes a significant strategy to halt the loss of millenary traditional ecological practices, which could play a key role in a context of climate change and deforestation caused by the advancement of intensive agriculture in a fragile ecosystem like that of the Amazon Forest, while supporting the food security of its inhabitants. However, it is fundamental not to incur a “strategic essentialism” (Spivak, 1988), considering indigenous people as a static entity, and relegating them to the role, not always chosen, of environmental defenders; but instead recognise their right to decide their present and future livelihood strategies. The adoption of a participatory approach to development cooperation could help avoid this misstep.

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APPENDIX A: Questionnaire

Cuestionario para participantes ELA 2019 - modulo "Chakra Kichwa y Agroecologia"

Este cuestionario es parte del trabajo de fin de master que estoy haciendo sobre la Chakra Kichwa Amazonica.

Primero habrá una sección sobre tus opiniones/actitudes hacia la Chakra antes de recibir el modulo, y luego otra sección sobre tus opiniones/actitudes ahora.

Tu respuesta sincera es fundamental para que pueda obtener resultados válidos. Nadie te va a juzgar! :)

Si algo no está claro puedes escribirme en cualquier momento.

Muchas gracias por tu tiempo!!
Silvia

*Campo obligatorio

1. Nombre: *

2. Cuánto te gustó el modulo "Chakra Kichwa y Agroecologia"? *

Contrassegna solo un ovale.

0 1 2 3 4
Nada Mucho

3. Cuánto cambió tu opinión sobre la Chakra Kichwa Amazonica? *

Contrassegna solo un ovale.

0 1 2 3 4
Nada Mucho

4. Cuánto cambió tu manera de hacer la Chakra? *

Contrassegna solo un ovale.

0 1 2 3 4
Nada Mucho

1. ANTES de recibir el módulo "Chakra Kichwa y Agroecologia" de la ELA

RECUERDA: ANTES DE RECIBIR EL MODULO CUALES ERAN TUS OPINIONES SOBRE ESTOS TEMAS?

Responde conforme las opiniones que tenias antes de recibir el modulo "Chakra Kichwa y Agroecologia"

5. a. La Chakra Kichwa Amazonica y la agricultura intensiva *

ANTES de recibir el módulo "Chakra Kichwa y Agroecologia" de la ELA creia que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
La Chakra Kichwa es un sistema atrasado, que tiene que ser superado por prácticas y tecnologías agrícolas más intensivas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los monocultivos (solo cacao, solo café, solo platano) son mejores que una chakra biodiversa (con muchas plantas diferentes), tanto a corto como a largo plazo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los fertilizantes y pesticidas químicos tienen impacto sobre la salud del hombre y de la naturaleza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. b. Los servicios ecosistémicos de la Chakra *

ANTES de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA creía que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
La Chakra Kichwa contribuye a preservar el ecosistema amazónico (animales y plantas nativas...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La Chakra Kichwa contribuye a la regeneración del suelo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La Chakra Kichwa contribuye a mejorar la calidad del aire	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La biodiversidad (muchas variedades de plantas y animales) contribuye a la buena salud de la Chakra (menor vulnerabilidad a plagas/enfermedades...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. c. La Chakra Kichwa Amazonica y la seguridad alimentaria *

ANTES de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA creía que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
La Chakra Kichwa asegura la soberanía alimentaria de la familia (seguridad alimentaria)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los productos comerciales de la Chakra Kichwa (cacao, café, vainilla...) son más importantes de los productos para el autoconsumo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tener una grande diversidad de plantas alimenticias en la chakra asegura una alimentación más saludable y rica en nutrientes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. d. La Chakra Kichwa Amazonica y los saberes ancestrales *

ANTES de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA creía que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
Los saberes ancestrales relacionados a la Chakra Kichwa son puras creencias y no merece la pena aprenderlos/transmitirlos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los saberes ancestrales facilitan el manejo de la Chakra Kichwa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los saberes ancestrales contribuyen a una mejor comprensión de la naturaleza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. e. La Chakra Kichwa Amazonica desde una perspectiva global *

ANTES de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA creía que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
La Chakra Kichwa es un sistema reconocido a nivel internacional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La Chakra Kichwa contribuye a alcanzar los objetivos de desarrollo sostenible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La Chakra Kichwa contribuye a mitigar (reducir) el cambio climático	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los conocimientos de los pueblos indígenas son considerados una buena medida para enfrentar la crisis ambiental	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

RECUERDA: ANTES DE RECIBIR EL MODULO COMO ERA TU CHAKRA?

Responde conforme como era tu Chakra antes de recibir el modulo "Chakra Kichwa y Agroecologia"

10. Ya tenías una Chakra? *

(ANTES de recibir el módulo "Chakra Kichwa y Agroecologia" de la ELA)

Contrassegna solo un ovale.

- Sí
 No

11. Ayudabas en la chakra de tu familia? *

(ANTES de recibir el módulo "Chakra Kichwa y Agroecologia" de la ELA)

Contrassegna solo un ovale.

- Sí
 No

Si no la tenías, responde recordando como era la chakra de tu familia (ANTES de recibir el módulo "Chakra Kichwa y Agroecologia" de la ELA)

A.

12. Cuántas especies de plantas (comestibles, medicinales, maderables, rituales...) tenías en tu Chakra? *

(ANTES de recibir el módulo "Chakra Kichwa y Agroecologia" de la ELA)

Contrassegna solo un ovale.

- 1-3
 3-10
 10-30
 30-50
 50+
 No sé, porque no tenía chakra ni ayudaba en la chakra de mi familia

13. Reintegrabas los residuos de podas/cosechas en el suelo (para regenerarlo)? *

(ANTES de recibir el módulo "Chakra Kichwa y Agroecologia" de la ELA)

Contrassegna solo un ovale.

- Nunca
 Casi nunca
 A veces
 Casi siempre
 Siempre
 No sé, porque no tenía chakra ni ayudaba en la chakra de mi familia

B.

14. Utilizabas abonos químicos? *

(ANTES de recibir el módulo "Chakra Kichwa y Agroecologia" de la ELA)

Contrassegna solo un ovale.

- Nunca
 Casi nunca
 A veces
 Casi siempre
 Siempre
 No sé, porque no tenía chakra ni ayudaba en la chakra de mi familia

15. Utilizabas pesticidas químicos? (para tratar plagas y enfermedades de las plantas) *

(ANTES de recibir el módulo "Chakra Kichwa y Agroecologia" de la ELA)

Contrassegna solo un ovale.

- Nunca
 Casi nunca
 A veces
 Casi siempre
 Siempre
 No sé, porque no tenía chakra ni ayudaba en la chakra de mi familia

C.

16. Cuánto de lo que comías venía de tu Chakra? *
 (ANTES de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Nada (0%)
- Poco (1-20%)
- Menos de la mitad (20-50%)
- Mas de la mitad (50-80%)
- Casi todo (+80%)
- No sé, porque no tenía chakra ni ayudaba en la chakra de mi familia

17. Cultivabas especies medicinales? *
 (ANTES de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Ninguna
- Pocas
- Bastantes
- Muchísimas
- No sé, porque no tenía chakra ni ayudaba en la chakra de mi familia

D.

18. Te interesabas a los saberes ancestrales de la Chakra? *
 (ANTES de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Nada
- Poco
- Bastante
- Mucho
- Muchísimo

2. AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la

AHORA CUALES SON TUS OPINIONES SOBRE ESTOS TEMAS?

Responde conforme las opiniones que tienes ahora

19. a. La Chakra Kichwa Amazonica y la agricultura intensiva *
 AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA creo que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
La Chakra Kichwa es un sistema atrasado, que tiene que ser superado por prácticas y tecnologías agrícolas más intensivas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los monocultivos (solo cacao, solo café, solo plátano) son mejores que una chakra biodiversa (con muchas plantas diferentes), tanto a corto como a largo plazo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los fertilizantes y pesticidas químicos tienen impacto sobre la salud del hombre y de la naturaleza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. b. Los servicios ecosistémicos de la Chakra *
 AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA creo que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
La Chakra Kichwa contribuye a preservar el ecosistema amazónico (animales y plantas nativas...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La Chakra Kichwa contribuye a la regeneración del suelo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La Chakra Kichwa contribuye a mejorar la calidad del aire	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La biodiversidad (muchas variedades de plantas y animales) contribuye a la buena salud de la Chakra (menor vulnerabilidad a plagas/enfermedades...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. c. La Chakra Kichwa Amazonica y la seguridad alimentaria *

AHOR, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA creo que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
La Chakra Kichwa asegura la soberanía alimentaria de la familia (seguridad alimentaria)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los productos comerciales de la Chakra Kichwa (cacao, café, vainilla...) son más importantes de los productos para el autoconsumo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tener una grande diversidad de plantas alimenticias en la chakra asegura una alimentación más saludable y rica en nutrientes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. d. La Chakra Kichwa Amazonica y los saberes ancestrales *

AHOR, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA creo que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
Los saberes ancestrales relacionados a la Chakra Kichwa son puras creencias y no merece la pena aprenderlos/transmitirlos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los saberes ancestrales facilitan el manejo de la Chakra Kichwa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los saberes ancestrales contribuyen a una mejor comprensión de la naturaleza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. e. La Chakra Kichwa Amazonica desde una perspectiva global *

AHOR, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA creo que:

Contrassegna solo un ovale per riga.

	Nada de acuerdo	Poco de acuerdo	Bastante de acuerdo	Completamente de acuerdo	No entiendo bien la frase
La Chakra Kichwa es un sistema reconocido a nivel internacional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La Chakra Kichwa contribuye a alcanzar los objetivos de desarrollo sostenible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La Chakra Kichwa contribuye a mitigar (reducir) el cambio climático	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Los conocimientos de los pueblos indígenas son considerados una buena medida para enfrentar la crisis ambiental	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

AHOR, CÓMO ES TU CHAKRA?

Responde conforme como es tu Chakra ahora

24. Tienes una Chakra? *

(AHOR, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Sí
 No

25. Ayudas en la chakra de tu familia? *

(AHOR, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Sí
 No

Si no la tienes, responde según como es AHOR la chakra de tu familia:

A.

26. Cuántas especies de plantas (comestibles, medicinales, maderables, rituales...) tienes en tu Chakra? *

(AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- 1-3
 3-10
 10-30
 30-50
 50+
 No sé, porque no tengo chakra ni ayudo en la chakra de mi familia

27. Reintegras los residuos de podas/cosechas en el suelo (para regenerarlo)? *

(AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Nunca
 Casi nunca
 A veces
 Casi siempre
 Siempre
 No sé, porque no tengo chakra ni ayudo en la chakra de mi familia

B.

28. Utilizas abonos químicos? *

(AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Nunca
 Casi nunca
 A veces
 Casi siempre
 Siempre
 No sé, porque no tengo chakra ni ayudo en la chakra de mi familia

29. Utilizas pesticidas químicos? (para tratar plagas y enfermedades de las plantas) *

(AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Nunca
 Casi nunca
 A veces
 Casi siempre
 Siempre
 No sé, porque no tengo chakra ni ayudo en la chakra de mi familia

C.

30. Cuánto de lo que comes viene de tu Chakra? *

(AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Nada (0%)
 Poco (1-20%)
 Menos de la mitad (20-50%)
 Mas de la mitad (50-80%)
 Casi todo (+80%)
 No sé, porque no tengo chakra ni ayudo en la chakra de mi familia

31. Cultivas especies medicinales? *

(AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrassegna solo un ovale.

- Ninguna
 Pocas
 Bastantes
 Muchísimas
 No sé, porque no tengo chakra ni ayudo en la chakra de mi familia

D.

32. Te interesas a los saberes ancestrales de la Chakra? *

(AHORA, después de recibir el módulo "Chakra Kichwa y Agroecología" de la ELA)

Contrasegna solo un ovale.

Nada

Poco

Bastante

Mucho

Muchísimo

MUCHAS GRACIAS! Silvia

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Google Moduli

APPENDIX B: Interview transcript

Section 1: Module *Chakra Kichwa y Agroecología*

1. ¿Qué piensas que te haya transmitido el módulo *Chakra Kichwa y Agroecología*?
2. La chakra tradicional era biodiversa, integrada en la foresta, no utilizaba insumos químicos y se basaba en el *Sumak Kawsay*. ¿Antes del curso pensabas que estas características eran importantes? ¿Y después?
3. Describe tu chakra. ¿Cambiaste algo después de haber recibido el curso?

Section 2: *Sello Chakra*

1. ¿Sabes lo que es el *Sello Chakra*?
2. La certificación comunica a los consumidores que el producto que están comprando ha sido cultivado con una práctica agrícola que contribuye a preservar la cultura Kichwa y la foresta amazónica. ¿Piensas que esto pueda llevar a vender mejor tus productos?

LECTURA DE LA MATRIZ DE PRINCIPIOS DEL SELLO CHAKRA. ¿Estarías dispuestos a realizar ajustes a tu chakra para garantizar este estándar? ¿Cuales?

Interviewee A (08/05/2021)

Section 1: Module Chakra Kichwa y Agroecología

1. *“Nuestros padres nos enseñaron que tenemos que llevar siempre nuestra costumbre. Porque nosotros sembrando en la chakra todo natural, comemos todo natural, no contaminado. El curso nos ayudó bastante a valorizar nuestras costumbres”.*

2. *“Si ya lo pensaba, pero en este curso aprendimos más allá de lo que nosotros ya sabíamos. Porque en la chakra nosotros anteriormente solamente sembrábamos lo que es la yuca, el plátano. Entonces en este curso que recibimos, nos enseñaron que es importante sembrar árboles maderables, las plantas medicinales, para tener cerca todo lo necesitamos. Anteriormente no se trabajaba así, solo se tenía su chakrita, la yuca el plátano y ya nada más.*

Sembramos el maíz y después de cosechar se le deja y queda como abono y ya se siembra la yuca que necesita más abono. Algunos queman para que quede más fácil para trabajar, pero en mi familia no, dejamos los árboles podrir, y los ocupamos para la leña. Los abuelos antiguos no quemaban porque ellos, esos árboles lo sacaban para hacer su leña, o sea ellos se iban con su machete, su canasto y iban a traer su leña de la chakra para prender candela.

Después del maíz y de la yuca se les planta el plátano y alrededor se les siembra las frutas, como la chonta, la guabita y el cacao blanco. Si seguimos mucho con la chakra, la tierra se cansa y pues se deja esta y se va a otro lugar y así se va a realizar para que la yuca salga más grande, el plátano. Porque si seguimos solo en este sitio la yuca se cansa”.

3. *“En nuestra chakra tenemos yuca, plátano, plantas medicinales como l'ayawaska, maria panga, para desinflamar, el churillullu, la hierba luisa, l'aji fiebre, para hacer bajar a la fiebre, y los arboles maderables, como la guadua. De frutales tenemos la chonta, de la que estamos a full, porque la chicha de chonta es excelente vitamina. Yo me recuerdo que cuando estaba embarazada comía la garabatu yuyo y mi nena tiene la sangre bastante bien. Me acuerdo que al hospital me dijeron que mi nena es buena para donar su sangre porque yo tomaba bastante chicha de chonta y garabatu yuyo es bueno para la anemia. De allí tenemos cacao blanco, el aguacate, la paparagua, las guabas.*

Sí se cambió bastante, nunca hemos puesto químicos. Hemos ampliado lo de las plantas medicinales, hemos hecho un espacio dentro de la chakra para las plantas medicinales ahorita está más cerca y completa para nosotros.

Para los saberes ancestrales, gracias a dios tenía una mamita que se fue hace 10 años, ella sabía y me ha enseñado bastante. Yo aprendí de todas mis hermanas que estudiaron en internado académico en el colegio. Entonces ellas aprendieron de la chakra solo los fines de semana en cambio yo, como estoy la última hija paso más tiempo con mi mamá, iba siempre con mi mama a trabajar en la finca. A mí me gusta ser curiosa. De lo que aprendí les converso, de lo que es bueno, me gusta hablar de las cosas que yo sé.

Ahorita por el tema de la pandemia, no puedo ir tanto en la finca como antes porque todo es por internet pero ya tenemos que ir a la finca para trabajar y sembrar el maíz. Hoy día estaba programado pero como un amigo dijo que mañana es domingo, es día de la madre vamos a preparar una comida para comer en la casa con la familia.

Aquí en mi casa en Archidona, tengo nada mas 15 plantas de yuca y mi sobrina plantó y cosechó de sus platanitos que sembró. Yo mi yuca ya cosechamos, tomamos la chicha y sembré otra vez. Tengo una pequeña chakra aquí con l'aji fiebre, el churiyullu, la hierba luisa. A la finca puedo ir cuando no tengo trabajo, o sea 3 veces a la semana.

Los trasportes subió mucho, de 35 centavos a 50. Y es mucho, porqué como subieron los trasportes no subieron los productos? Por eso solamente trabajando de la finca no se puede tener dinero. Entonces se trata de salir para vender los plátanos, la yuca, fruta, pero no subió de nada el precio de estos productos.

Lo que consumo es 80% de la chakra. Antes cuando mi mamita vivía, si salíamos a vender lo que es el plátano, la yuca, en temporada de chonta hacíamos chicha de chonta para salir a vender, pero ya ahora no. Solamente para la familia”.

Section 2: Sello Chakra

1. “No”.

2. “Yo estoy en la asociación Inti. Yo no estoy vendiendo, pero ahorita mis hermanos están vendiendo las canastas tejidas, y dentro se les pone hojas y se les pone lo que es yuca, plátano, limón, ají fiebre... los productos del Amazonia, a 20\$. Ahorita me comentaron que en la asociación están intentando sacar una sello, y que tenemos ahora que comenzar a sembrar más cosas. No tenemos que ir a la feria, nos comprarán. Seria preparar los productos y entregar directo a la asociación”.

Lo del sello nos ayudaría bastante porque sería decir que es todo sin químicos o sea que los clientes pueden confiar porque no es fumigado, es todo con abono orgánico, todo natural, entonces nos van a comprar, no va a tener duda, como es con certificado.

3. “Sí, porque nos están pidiendo muchas cosas que quizás no sabíamos. Y yo creo que no tendríamos que cambiar muchas cosas, porque nosotros en mi casa a la parta alta tenemos muchas guaduas que esta trayendo agua entonces y de allí los árboles maderables están en los costado.

Por las plantas repelente aprendimos en la ELA los preparados de plantas para repelar a las hormigas. Según lo que comentaba mi mami, antiguamente no había las plagas, pero como ahora hay mucha contaminación, hay plagas. Mi mami comentaba que el cacao estaba lindo así, sin las hojas quemadas, hongo y otras plagas. Y el clima encima está muy diferente de antes. Ya no hay como antes temporada de lluvia y temporada de sol, es más mesclado. Por ejemplo en mes de

Agosto se decían que es solo sol, en mes de Mayo solo lluvia, pero ahora no, llueve, hace sol, ha cambiado bastante.

Por la semillas, a veces uno se hace sus propias o a veces se les pregunta a los vecinos. Por ejemplo en mi familia se les tiene el plátano pequeño y en cambio otros vecinos tienen plátano grande y entonces se les dice: "yo te doy unas semillas de plátano grande y yo te doy de mi plátano pequeño. Y a veces se compra si uno tiene la necesidad, dependiendo, pero siempre semillas de otras chakras, no de empresas".

Interviewee B (11/05/2021)

"La chakra para nosotros, para la gente indígena de la provincia de Napo es un espacio dispuesto por las comunidades indígenas para cultivar.

En cuanto la chakra hay como siete pasos y cada familia lo ejerce, desde la selección del lugar del terreno donde se va a hacer la siembra y segundo es la tumba donde se tala la vegetación pequeña para liberar un espacio. Y como tercero la quema, es la parte en la cual se atraviesa directamente la mujere sobre el terreno para cultivar. Como cinco punto es el deshierbe donde la madrecitas, las productoras de chakra, vienen a desherbar el espacio cultivado; y la seis es la cosecha, es la parte más interesante donde los productos vienen cosechados para el alimento, para el sustento diario de cada una de las familias. Y también la última, que es el abandono donde el terreno finaliza su proceso de producción y tiene un espacio, un tiempo para que la tierra vuelva a fertilizar.

Pero hay que tener muy en cuenta que en las chakras, las madres, las señoras que realmente ejercen las chakras, tienen tres alternativas: una chakra en proceso de siembra, una chakra en proceso de cosecha, una chakra en proceso en proceso de recolección; y al final son tres tipos de chakras. Si una madre de familia tiene solo tiene a tener una chakra al año, es difícil que sea un recurso suficiente. Entonces las productoras, por lo general, por lo mínimo establece tres chakras al año, viendo las necesidades.

Y en la chakra se puede producir productos tubérculos como la yuca y como frutales. La chakra es algo que produce todo el alimento, como usted saben. La chakra acá es fundamental para las familias. Y hemos manejado de manera sustentable para mejorar el ambiente.

En una chakra siempre hay diversos productos, diversas plantas. Es una chakra diversificada no solo un tipo de productos. La mayoría de las chakras son diversificadas o sea: plátano, yuca, maní... diferentes productos. Y con pasar el tiempo siempre se implementan frutales que les pueden dar sombras a los productos de cultivo de ciclo corto".

Section 1: Module Chakra Kichwa y Agroecología

1. “La visita que se realizó a Amupakin, es una tradición, es una técnica que las madres saben ofrecer hasta hoy en día, por ejemplo la siembra se puede decir el poder mágico y las mamacitas ejercen con plantas medicinales que atraen lo que se acá conoce como el Paju, es una palabra kichwa, pero se puede traducir como el poder mágico que las productoras tiene este poder de que el producto sea factil, sea necesario y tiene un rendimiento al 100% y eso es una tradición, es una costumbre que siempre se hace hasta hoy en día.

Sinceramente, me sirvió al 101% ese modulo sobre la chakra kichwa y el agroecología, porque estoy en proyecto de bioeconomía y estoy ejerciendo la parte productiva de las chakras, y entonces tengo la idea de cómo fue la capacitación, como viví este módulo. Para mí fue una capacitación muy muy importante y ahora estoy poniendo en práctica los conocimientos de Amupakin, de usted y de muchas personas. Ahora en la parte profesional me está sirviendo muchísimo.

En específico, en si, de cómo es el proceso de la chakra, la siembra, en qué tiempo se siembra cada productos, los meses, entonces yo, prácticamente, no tenía la idea muy clara de cuando se siembra los productos, en que mes, pero supe de que cada uno tiene su ciclo de siembra, sus meses de siembra y sus fases lunares. Entonces para mi sumamente importante”.

2. “Justamente Kallari, me abrió las puertas, antes de inculcarme en la vida estudiantil, y también por los valores de mis padres, de mis abuelos tuve que la chakra es fundamental. Y hasta ahora tengo presente en mi vida que una chakra orgánica es lo que te genera una vida saludable. Me acople con la idea de que ya tenía sobre a qué se refiere una chakra, me profundice más, el autoconocimiento es muy importante y el aprendizaje es mucho más”.

3. “Justamente manejamos una chakra integral como se le puede decir, hoy en día como una chakra modelo, pero tradicionalmente manejamos una chakra integral donde hay diferentes productos que integran la parcela de chakra.

La chakra común de mi familia esta inmerso de dos tipos de chakras. Hay una chakra de monocultivos que se refiere a la comercialización: puede ser cacao que es monocultivo, maíz que es monocultivo. La chakra integral está integrada entre plátano, yuca, maní y árboles frutales y maderables.

Y también dentro de la chakra se puede intervenir plantas medicinales no solo frutales, también medicinales. Dentro de la yuca también se les puede aprovechar un espacio para la siembra del maní. De allí todo por ejemplo, yuca, plátano, maní, frejol. Alrededor de la chakra se les puede plantar frutales típicos de la zona que es naranja, mandarina, limón...

Después de la capacitación se cambió mucho porque no se manejaba un sistema integrado, con la capacitación se le puede tener una visión concreta de cómo es una chakra.

Mis padres ejercen al 100% el sistema chakra, pero cuando hay posibilidad también apporto mi conocimiento, mi tiempo, mi trabajo y creo que es fundamental no solo tener el conocimiento, pero también hacer la practica en el territorio.

Con el proceso de la capacitación tuve la idea de ejercer más productos que sean más diversificados, que la chakra tenga más plantas, más cultivos, y no solo los dos tres cultivos sino más productos, dependiendo la superficie de la chakra.

Nosotros de la parte de mi familia nunca hemos utilizado nada de químicos, somos 100% orgánico, abonos orgánicos. Ah sí, por cierto, la práctica de los insecticidas naturales, lo he practicado en mi comunidad. Tres ocasiones, y creo que fue factible y les gusto y también fui a una comunidad donde yo vivo y les gusto, trato de apoyarlos con eso. Funcionó y justamente la plaga, creo que fue factible. La gente está ejerciendo este sistema de apoyo. Por ejemplo, yo no tenía conocimiento de como era, pero con la practica uno aprende y se lo aplica en las comunidades. Mi conocimiento que se adquirió en la escuela de liderazgo ambiental fue adquirido en otras comunidades, fue impartido en otras personas”.

Section 2: Sello Chakra

1. *“El «Sello Chakra» se hizo con el fin de mejorar el proceso de comercialización de los productores al cual el responsable de este sistema es el gobierno provincial de Napo, que manejó este panorama del Sello Chakra.*

Justamente Kallari ya maneja este sistema de «sello chakra», ya lleva como dos años y algo más unos meses. Las organizaciones de acá de la provincia manejan este sistema de «sello chakra». Es algo de la organización, algo de la asociación, no es algo individual todavía. El «sello chakra» se hizo con el fin de fortalecer a los productores, que sea factible en la parte de la comercialización de los productos”.

2. *“Efectivamente, cuando hablamos de «sello chakra» estamos hablando una producción limpia, cero químicos, que mejora la calidad de la vida, un producto sano, agradable para la salud. Quien no va a querer comprar un producto proveniente de chakra que se maneja orgánicamente. Es algo interesantísimo.*

Es un momento sumamente importante porque Kallari trabaja con la certificación orgánica pero solo para un producto que en este caso que es el cacao. Pero hablando del «sello chakra» ya es una producción integral que puede rescatar los valores culturales, el cuidado del medio ambiente, el tratar de cómo cuidar nuestras chakras que sea amigable con el medio ambiente y eso es la idea fundamental de esto”.

3. *“Obviamente esta es la idea, todos los principios basado a rescatar la cultura propia de acá de nosotros. Creo en el principio está más claro que el agua, dice que todo debe de ser orgánico, hay*

que nuestros valores culturales, todo proveniente de la chakra. Como no aportar y no poner en práctica en mi parcela de chakra estos principios. Sería sumamente interesante ponerlos en práctica y adaptarlos con estos principios.

Creo que, en mi caso, es necesario integrar productos que sean como repelentes para que afecten las plagas a la producción. Es fundamental. Una de las cosas que se puede mejorar en la producción, en la chakra de nosotros es algo contra los insectos, para que la chakra tenga un rendimiento mayor.

Los demás justamente, todo está basado justamente en nuestra cosmovisión, nuestra forma de vivencia, como cultura Kichwa. Hoy en día, viendo la realidad, estamos perdiendo nuestra cultura, nuestra tradición, nuestra forma de vivir, nuestra forma de producir la chakra y para ello debemos trabajar para rescatar esas simbologías, la identidad cultural. Creo que es fundamental para mí.

Siempre mi papa fue a trabajar en la comunidad como un técnico de campo, viendo las necesidades, el proceso, como es el manejo de chakra y hasta ahora tengo la idea de que en algún momento pueda ejercer esa ideología y ponerla en práctica. Tuve la oportunidad de adquirir conocimientos gracias a la escuela de liderazgo ambiental y ahora, hoy en día, con este proyecto que estoy a cargo, trato de valorizar y poner en práctica y que esto no se pierda en las familias. De transmitir esos conocimientos a mis futuros hijos, que se vaya de generación en generación. De rescatar y valorizar todas las tradiciones y costumbres de acá en Napo que se está perdiendo. Tenemos que trabajar duro para rescatar estos valores”.

APPENDIX C: Matrix of principles of Sello Chakra



SISTEMA PARTICIPATIVO DE GARANTÍAS SELLO CHAKRA

**UNA INICIATIVA DE LAS ORGANIZACIONES DE PRODUCTORES, CHAKRAMAMAS Y CHAKRAYAYAS DE LA
PROVINCIA DE NAPO -ZONA BAJA**

**RESUMEN DE PRINCIPIOS DE LA CHAKRA
CON EL PESO RESPECTIVO EN UNA ESCALA DE 100 PUNTOS:**

PRINCIPIOS	REGLAS	VARIABLES	PONDERACIÓN	OBSERVACIONES
<p>1. La cosmovisión indígena amazónica conjuga la integración de zonas de conservación, producción y vida de las personas.</p> <p>El territorio amazónico tiene un espacio para el bosque, la chakra y la vida familiar y comunitaria. Espacios: Sachawa, Chakrawa y Runawa.</p>	1. La familia se auto identifica con un pueblo y nacionalidad Indígena de la Amazonia.	1. Pertenecer a una Nacionalidad Indígena Amazónica	3	Kichwa Shuar Waarani Achuar Kichwa Andino
	2. Si la persona no se autoidentifica con las etnias amazónicas, pone en práctica el modelo chakra kichwa amazónica de los pueblos y nacionalidades indígenas de la Amazonía	2. No pertenece a una Nacionalidad Indígena Amazónica, pero pone en práctica el sistema Chakra	1	Mestizo Afro Blanco
	3. Promueve y mantiene los escenarios para conservar, producir y vivir.	3. Posee áreas de conservación, Chakra y Vivienda-Bodega-Descanso-Tendal-Marquesina, claramente delimitadas.	4	Verificar las áreas delimitadas
Sub - Total			8	
<p>2. Manejo natural y agroecológico, sin presencia de contaminantes. Se gestiona los desechos orgánicos e inorgánicos.</p> <p>No se utilizan insecticidas, fungicidas y otros pesticidas sintéticos dentro o en los alrededores de la chakra.</p>	4. Promover las prácticas agroecológicas y ancestrales para el manejo del suelo, fuentes de agua y manejo integral de plagas y enfermedades. Se prohíbe el uso de productos químicos sintéticos.	4. Promueve prácticas de reincorporación de nutrientes al suelo mediante: uso de los residuos de las cosechas, podas y deshierbas, el uso de especies como las leguminosas y abonos verdes.	4	Verificar campo
		5. Maneja especies rastreras para cobertura vivas del suelo y evitar la erosión.	2	Verificar campo
		6. Cultiva y usa especies repelentes y biocidas naturales. Aplica técnicas agroecológicas y ancestrales para prevenir y controlar plagas y enfermedades	2	Verificar campo
	5. Manejar los residuos sólidos y líquidos provenientes del hogar o de la actividad productiva, evitando la contaminación de los cuerpos de agua.	7. Dispone y usa adecuadamente pozo séptico u otro sistema de tratamiento.	3	Verificación visual
	6. Utilizar materiales y empaques que permitan reutilizar o reciclar sin contaminar el medio ambiente.	8. Utiliza envases adecuados y reutilizables de preferencia producidos en la misma chakra, para el transporte, embalaje y venta	2	Verificación de ejemplos de envases
	7. Conservar, manejar y priorizar material de propagación como plántulas, esquejes, tubérculos, rizomas y otras, así como los sitios tradicionales de obtención de especies, variedades nativas y adaptadas a la zona.	9. Obtiene material de propagación principalmente de las chakras (árboles semilleros, camas semilleras u otros sitios tradicionales)	3	Verificar ejemplos de fuentes semilleras
	8. Usar semillas nativas seleccionadas y adaptadas de la región, prohibiéndose semillas transgénicas.	10. Utiliza principalmente semillas nativas en la chakra	3	Observación de parcelas y chakra
	Sub - Total			19

PRINCIPIOS	REGLAS	VARIABLES	PONDERACIÓN	OBSERVACIONES	
3. Fuente de sabiduría e interaprendizaje se fundamenta en los saberes ancestrales de los Kichwas de la amazonia , integrando, aplicando y combinando tecnologías actuales y ancestrales apropiadas.	9. Poseer y aplicar los saberes ancestrales en la planificación, establecimiento, manejo y restablecimiento de la chakra.	11. Posee y aplica saberes ancestrales claves como: Ritos e interpretaciones de la luna, sueños, dietas, tecnologías, bebidas, señales climáticas, presencia de especies de flora y fauna, ciclos de siembra, etc.	3	Preguntar a hombres y mujeres, incluyendo abuelos	
	10 Promover la participación activa de los hijos/as jóvenes y otros integrantes de la familia en las actividades de la chakra e impartir saberes ancestrales reconocidos por los pueblos a nivel intergeneracional, así mismo favorecer el intercambio y dialogo de saberes.	12. Heredó, aplica y transmite de manera cotidiana el saber ancestral		3	Preguntar a chagramamas, hombres, incluyendo jóvenes
		13. Involucra a los hijos/as jóvenes y otros integrantes de la familia en el manejo de la chakra, por ejemplo: asignando parcelas, tareas de labores culturales, días de integración, etc.		3	Completar pregunta con verificación campo
	11. Cultivar, utilizar y promover el uso de especies espirituales, medicinales preventivas y curativas	14. Dispone de especies espirituales y medicinales en lugares estratégicos de la chakra y su uso es cotidiano		2	Verificación de campo
Sub – Total			11		
4. Formas de organización comunitaria y asociativa , sustentadas en principios de solidaridad, interculturalidad, intercambio y participación.	12. Participar en eventos tales como asambleas, comisiones, reuniones, talleres de capacitación, mingas, presta manos / randi-randi, intercambio cultural de semillas y otros, organizados por las comunidades o asociaciones.	15. Participa en eventos convocados por la organización y la comunidad	4	Verificar con preguntas a dirigentes de comunidad y asociación	
	13. Cumplir con la reglamentación de las organizaciones en ámbitos sociales, productivo, conocimiento y redes de comercialización.	16. Cumple con los reglamentos y normas de las organizaciones en los temas sociales, productivos y comerciales.	3	Verificar con preguntas a dirigentes y técnicos de la asociación	
Sub – Total			7		
5. La producción diversificada de la chakra garantiza la soberanía alimentaria de las familias, priorizando el consumo responsable en la familia y conservando la producción de especies y variedades locales.	14. Producir y consumir productos básicos para la alimentación de la familia que permita una dieta equilibrada como fuente de proteínas, vitaminas y carbohidratos, revitalizando las recetas tradicionales y típicas de la familia.	17. La chakra produce especies tradicionales de la cultura indígena que poseen niveles aceptables de proteína, carbohidrato y vitaminas	3	Verificación de campo Tener listado de especies y usos	
		18. La familia consume preferentemente alimentos producidos en la chakra	4	Tener listado de especies infaltables	
	15. Producir y utilizar materiales de la chakra y bosque para actividades propias de vivienda e inherentes a la producción agrícola.	19. Las construcciones utilizan materiales y elementos biodegradables provenientes de las chakras		2	Verificación visual Tener listado de especies
	16. Incorporar la crianza de especies menores sin confinamiento.	20. Incorpora especies de cría libre como las aves de corral como parte integral de la chakra		1	Verificación de campo
Sub – Total			10		

PRINCIPIOS	REGLAS	VARIABLES	PONDERACIÓN	OBSERVACIONES
6. [La chakra] Principalmente, es liderada por la mujer , en un ambiente de integración familiar y equidad de género; su papel se concentra en la crianza y manejo obteniendo beneficios para la salud, nutrición, economía, finanzas, ecología, sabiduría, relaciones de poder e identidad de la familia.	17. Promover y emplear mayoritariamente la mano de obra familiar, con la participación equitativa de mayores, adultos, jóvenes, niñas y niños, quienes desde el punto de vista cultural actúan en procesos de enseñanza, educación y recreación familiar; la participación de niños y niñas no se considera trabajo infantil.	21. La chakra usa principalmente mano de obra familiar	3	
	18. Fomentar la toma de decisiones para la gestión de la chakra de manera paritaria e inclusiva en la familia.	22. La familia aporta en la toma de decisiones para la gestión de la chakra, y especialmente la mujer es la que lidera	4	Preguntar a hombres y mujeres, incluyendo abuelos
		23. Propicia que el uso de los ingresos se oriente a las necesidades de bienestar familiar y de reinversión de la chakra.	4	Preguntar especialmente a las mujeres
Sub - Total			11	
7. Alta biodiversidad y asociación de cultivos de acuerdo con las particularidades de los distintos ecosistemas. Promueve una diversidad de especies de flora y fauna.	19. Mantener en la chakra especies de uso alimenticio, espirituales, medicinales, artesanales, comerciales, maderables, energía natural (leña), entre otras.	24. La chakra tiene una combinación de especies de uso alimenticio, espirituales, medicinales, artesanales, comerciales, maderables, energía natural (leña), entre otras.	4	
	20. Recuperar especies nativas y semillas de uso ancestral en peligro de extinción.	25. Esta consciente y aplica prácticas para recuperar especies nativas en extinción.	2	verificar en campo
	21. Mantener prácticas ancestrales relacionadas con la caza de especies silvestres y de recolección del bosque para uso estricto de alimentación de la familia.	26. Caza, pesca y consume especies faunísticas silvestres del bosque de manera esporádica y estrictamente para alimentación familiar	1	
		27. Recolecta especies alimenticias del bosque solamente para la alimentación de la familia.	1	
Sub – Total			8	
8. Conserva e integra una producción sostenible y diversificada con especies de alto valor tradicional y cultural orientadas a mercados especiales locales, regionales, nacionales e internacionales , priorizando el abastecimiento interno.	22. Promover la incorporación de productos de alto valor comercial bajo criterios de sostenibilidad.	28. La chakra integra productos enfocados en el mercado.	4	Tener un listado de posibles especies
	23. Encadenar la producción a sistemas de redes comerciales asociativas de la organización y también a hoteles, restaurantes, hosterías, centros de turísticos comunitarios, entre otros.	29. Los productos se articulan a redes comerciales, sistemas asociativos y otras formas de comercialización directa.	4	

PRINCIPIOS	REGLAS	VARIABLES	PONDERACIÓN	OBSERVACIONES
	24. Implementar buenas prácticas enfocadas en la calidad de los productos de valor comercial según los requisitos del mercado.	30. Implementa buenas prácticas agrícolas del cultivo, cosecha y postcosecha promovidas por la asociación que aportan a la calidad de los productos, en base a las preferencias de los clientes	4	
	25. Contabilizar los ingresos de los principales productos y actividades de la chakra, con información básica que permita evaluar su trazabilidad.	31. Registra las actividades básicas de siembra, manejo y cosecha y sus costos.	2	
		32. Registra las ventas y el destino de los principales productos de la chakra.	2	
Sub – Total			16	
9. Gestión de la chakra con criterios de paisaje amazónico, conservando, manejando y protegiendo recursos y áreas estratégicas para una mejor resiliencia ante la crisis climática.	26. Conservar, manejar y adaptar los sistemas de agua (ojos de agua, riveras de esteros, ríos, riachuelos, humedales, pantanos, etc.), frente a la contaminación, la erosión y los eventos climáticos, con procesos de reforestación y restauración con especies riparias, rastreras y de protección.	33. Aplica prácticas de uso, manejo y conservación de los sistemas de agua para evitar la contaminación y afectación ante los eventos climáticos.	3	
	27. Conservar y manejar los bosques remanentes, árboles relictos y vegetación riparia.	34. Promueve la conservación de bosques remanentes, árboles relictos y vegetación riparia	3	
	28. Mantener en sitios estratégicos tecnologías ancestrales como barreras vivas, cortinas rompevientos, curvas de nivel, sistemas de drenaje, coberturas vivas, entre otras para proteger la chakra frente al cambio climático.	35. Implementa medidas y prácticas de resiliencia frente al cambio climático como: barreras vivas, cortinas rompevientos, curvas de nivel, sistemas de drenaje, coberturas vivas, entre otras.	4	
Sub – Total			10	
9	28	35	100	

RESUMEN DE PRINCIPIOS DE LA CHAKRA CON EL PESO RESPECTIVO EN UNA ESCALA DE 100 PUNTOS:

RESUMEN DE LOS PRINCIPIOS DE LA CHAKRA
1. Cosmovisión indígena amazónica (8)
2. Manejo natural y agroecológico (19)
3. Saberes ancestrales de los Kichwas de la Amazonía (11)
4. Organización comunitaria y asociativa (7)
5. Producción diversificada para la soberanía alimentaria (10)
6. Liderada por la mujer e integra a la familia (11)
7. Alta biodiversidad y asociación de cultivos (8)
8. Producción sostenible y diversificada para mercados especiales (16)
9. Paisaje amazónico y resiliente al cambio climático (10)

APPENDIX D: Photos



Chakra Kichwa Amazónica, Napo, 2019





Attendees of the module Chakra Kichwa y Agroecología of Escuela de Liderazgo Ambiental – Amupakin, Archidona, 2019



Sumak Kawsay according to the participants of ELA (interviewee A), Module CKyA – Casa Bonuchelli, Tena, 2019



Visualizing the impacts of the green revolution on the ecosystems, ELA Module CKyA – Casa Bonuchelli, Tena, 2019



Threats to the preservation of Chakra and possible solutions, ELA Module CKyA – Casa Bonuchelli, Tena, 2019



Lumupachina, ritual for the mandioca plantation, ELA Module CKyA – Amupakin, Archidona, 2019



Me and my Ecuadorian-Italian family - Casa Bonuchelli, Tena, 2020