

**The Amazonian Chakra, a traditional agroforestry system
managed by Indigenous communities
in Napo province - Ecuador**

Proposed by:

“Corporation of Associations of the Amazonian Chakra”

GIAHS/FAO site

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TABLE OF CONTENTS

LIST OF TABLES	4
LIST OF FIGURES	5
LIST OF ACRONYMS	7
CONCEPTS	8
I. SUMMARY INFORMATION TABLE	9
II. EXECUTIVE SUMMARY	12
III. SIGNIFICANCE OF THE PROPOSED SYSTEM	17
3.1. Specific values and features	17
3.2. Historical relevance	22
3.3. Contemporary relevance	24
3.4. Comparative analysis	26
IV. GIAHS SELECTION CRITERIA	30
4.1. Food and Livelihood Security	30
4.1.1. Contribution to the rural communities' food security and livelihood security	30
4.1.2. Contribution to rural livelihoods	45
4.1.3. Products and services provided by the system.....	48
4.1.4. Farming structure and management.....	55
4.1.5. Contribution to sustainability and resilience.....	55
4.1.6. Threats and challenges.....	56
4.2. Agrobiodiversity	57
4.2.1. Cultivated and harvested plants and reared animals	57
4.2.2. Ecological functions	59
4.2.3. Contribution of agrobiodiversity to the sustainability and resilience of the system	61
4.2.4. Contribution of the Amazonian <i>Chakra</i> to climate change mitigation	61
4.2.5. Threats and challenges.....	65
4.3. Local and Traditional Knowledge Systems	66
4.3.1. Agricultural practices/technologies and associated knowledge	66
4.3.2. Natural agricultural resources management.....	71
4.3.3. Contribution of local and traditional knowledge to sustainability and resilience	80
4.3.4. Threats and challenges.....	83
4.4. Cultures, Value Systems and Social Organizations	84
4.4.1. Cultural identity and agriculture.....	84
4.4.2. Social organization, management and value system.....	86
4.4.3. Social organizations to the sustainability and resilience of the system.....	94
4.4.4. Threats and challenges.....	96

4.5.	Landscape Features	97
4.5.1.	General description of the landscape	97
4.5.2.	Natural context and land uses	98
4.5.3.	Agricultural landscape	101
4.5.4.	Settlements and associated built structures.....	103
4.5.5.	Sustainability and resilience	106
4.5.6.	Threats and challenges.....	107
V.	<i>ACTION PLAN FOR DYNAMIC CONSERVATION.....</i>	108
5.1.	Executive summary of the Action Plan.....	108
5.2.	Description of the Corporation (Organization diagnosis).....	108
5.3.	Mission and vision (Strategic direction)	109
5.3.1.	Institutional policies	109
5.3.2.	Institutional Values.....	110
5.4.	Strategic map.....	110
5.5.	Amazonian <i>Chakra</i> strategies	113
5.5.1.	Empowering strategies	113
5.5.2.	Strategies to face challenges	114
5.5.3.	Protection strategies.....	114
5.5.4.	Conservaties strategies	115
5.6.	Balanced scorecard	115
VI.	<i>BIBLIOGRAPHY</i>	122

LIST OF TABLES

Table 1: Land use categories at the zone of GIAHS proposed site	18
Table 2: Indigenous population of the province of Napo (self-identification)	24
Table 3: Important hydrographic demarcations in Napo province.....	25
Table 4: Comparison between the Amazonian Chakra and the Andean Chakra	26
Table 5: Main products grown in Amazonian Chakras for self-consumption.....	31
Table 6: Production calendar for the main products of the Amazonian Chakra	32
Table 7: Main 20 products grown in Amazonian Chakra for sale and market development	45
Table 8: Results of the human, social, natural, physical and financial capitals analyzed in cocoa agroforestry producers in the Amazonian Chakra System of the proposed GIAHS site.	46
Table 9: Producer associations that begun the valuation of Amazonian Chakra system in Napo province	55
Table 10: Sample of the species cultivated in the Napo Amazonian Chakra	58
Table 11: Main tree species of high commercial value in local and national markets found in the Amazonian Chakra with agroforestry cacao (zone proposed as GIAHS).....	59
Table 12: Ecological function of the Amazonian Chakra system proposed as GIAHS.....	59
Table 13: Main useful species of fruit trees, bushes and palms that store carbon and are used for consumption in the Amazonian Chakra with cacao in the Sumaco Biosphere Reserve	61
Table 14: Main useful species of fruit trees, bushes and palms that store carbon and are used for consumption in the Amazonian Chakra with cacao in the Sumaco Biosphere Reserve	71
Table 15: Amazonian Chakra activities according to the rainy season	74
Table 16: Example of the Amazonian Chakra Management with diversity agroforestry cocoa crops.	75
Table 17: Principles and conditions of the Amazonian Chakra management.....	78
Table 18: Sustainability and resilience of the Amazonian Chakra	81
Table 19: Sumak Kausay and key images of Kichwa cosmovision	84
Table 20: Actors involved in the Chakra Group	87
Table 21: Strategies planning scorecard for the Corporation of Associations of the Amazonian Chakra... ..	116
Table 22: Participatory Guarantee System (PGS) of Amazonian Kichwa Chakra Seal	119

LIST OF FIGURES

Figure 1: Geographical location of the influence zone of the Amazonian Chakra, Napo Province, Ecuador..	10
Figure 2: Map of Ecuador, Napo province and the geographical location of the influence zone of the Amazonian Chakra GIAHS site.....	17
Figure 3: Amazonian Chakra zone proposed as GIAHS.	19
Figure 4: Panoramic view of the Amazonian Chakra, community of Atacapi, Alto Tena. Napo, Ecuador....	23
Figure 5: Training in a community nursery.....	25
Figure 6: Jatun Yaku river, Puerto Napo, Ecuador.....	26
Figure 7: Diversity of foods harvested from the Amazonian Chakra.....	30
Figure 8: Chakra products for family self - consumption: Peach palm or chonta (<i>Bactris gasipaes</i>)..	33
Figure 9: Chonta palm lying down for the South American palm weevil collection ("kuru" in Kichwa)..	33
Figure 10: Peach palm (chonta) weevil or chontakurus (<i>Rhynchophorus palmarum</i>) collected for food.....	34
Figure 11: Gastronomic preparation that combines kurus, cassava and yuyos. Photo: MCYP, 2015.....	35
Figure 12: Chakra products for family self-consumption: cassava, plantain and weeds (yuyos)..	36
Figure 13: Cassava processing for family food.....	37
Figure 14: Processing of cassava to make cassava chicha..	37
Figure 15: Casabe.	37
Figure 16: Cooking of products for family consumption: plantain, cassava and other tubers.....	38
Figure 17: Family gastronomic cooking: stewed fish and vegetables.	39
Figure 18: Maito preparation: fish with vegetables, wrapped and grilled.....	39
Figure 19: Maito: fish with vegetables, wrapped and grilled.....	40
Figure 20: Gastronomic cooking: fish plantain, cassava and rice.....	40
Figure 21: Cooking of products for family consumption.....	41
Figure 22: Elaboration of cassava chicha.....	41
Figure 23: Elaboration of cassava chicha.....	42
Figure 24: Amazon chicha.....	42
Figure 25: Amazonian light cassava wine ("Vinillu" in Kichwa language).....	43
Figure 26: Tying of guayusa leaves.....	44
Figure 27: Cocoa pods, Napo.....	49
Figure 28: White cocoa (<i>Theobroma bicolor</i>), Napo.....	49
Figure 29: Cocoa drying post-harvest process by Napo producer associations, Napo.....	50
Figure 30: Cocoa and chocolate add-value production, Tsatsayaku Association.....	50
Figure 31: Cocoa and chocolate add-value production, Kallari Association, Napo.....	51
Figure 32: Cocoa and chocolate add-value production, Wiñak Association, Napo.....	51
Figure 33: Various fresh and add-value processed products, Kallari Association, Napo.....	52
Figure 34: Local marketing space for Amazonian Chakra products.	52
Figure 35: Marketing point for Amazonian Chakra products in Quito.	53
Figure 36: Cocoa route.....	53
Figure 37: Agro-tourism in the Amazonian Chakra landscape.	54
Figure 38: The Amazonian Chakra as part of agro-tourism.	54
Figure 39: Parameters of vertical profile of Amazonian Chakra: 1) no direct light; b) receives some light from somewhere; 3) receives some light from above; 4) recives a lot light from above and 5) emerging tree, in timber, medicinal, fruit and ornamental plants in the Amazonian Chakra.	56
Figure 40: Families harvesting cassava in the Amazonian Chakra. Pumayacu community, Napo.....	57

Figure 41: Ecological attributes of the Amazonian Chakra, characterized by the presence of a diversity of trees, palms and shrubs., Napo.....	60
Figure 42: Carbon stock (in soil, litter and aboveground biomass) in Mg C/ha in the Amazonian Chakra-cacao, primary forest and cocoa monoculture in the area proposed as GIAHS.....	62
Figure 43: The 10 tree and palm species contributing to aboveground biomass carbon sequestration in the Amazonian Chakra of Kallari Association.....	63
Figure 44: The 10 tree and palm species contributing to aboveground biomass carbon sequestration in the Amazonian Chakra of Wiñak Association.....	64
Figure 45: The 10 tree and palm species contributing to aboveground biomass carbon sequestration in the Amazonian Chakra of Tsatsayaku Association.....	64
Figure 46: Amazonian Chakra adapted to the tropical ecosystem, characterized by high levels of rainfall, high temperatures and fragile soils.....	69
Figure 47: Time cycle of the Amazonian Chakra: Initial Chakra-ushun-purun-enhancement.....	72
Figure 48: Amazonian Chakra in the initial formation phase: growing cassava and plantain. Pumayacu parish.....	73
Figure 49: Cassava harvest - Napo.....	76
Figure 50: Peasants of the Chakra– Napo systems.....	78
Figure 51: Recognition of Amazonian Chakra species.....	80
Figure 52: Degree of sustainability of the Amazonian Chakra in the Kallari producers.....	81
Figure 53: Degree of sustainability of the Amazonian Chakra in the Wiñak producers.....	82
Figure 54: Degree of sustainability of the Amazonian Chakra in the Tsatsayaku association.....	83
Figure 55: Cassava Chakra harvesting using fiber basket of Amazonian forest products, Pumayacu community.....	85
Figure 56: Children’s drawings of the Chakra.....	86
Figure 57: Official promotion of organizations that make up the Corporation of Amazonian Chakra Associations: Kallari, Wiñak, Tsatsayaku, Alli guayusa and Inti.....	91
Figure 58: Logo of the Chakra seal developed in collaboration with the producers of the Corporation of Amazonian Chakra Associations and the entities of the "Chakra Group".....	95
Figure 59: Map area of influence of the Amazonian Chakra in Napo.....	98
Figure 60: Amazon landscape. Napo.....	99
Figura 61: Amazon agriculture landscape. Napo.....	101
Figure 62: Map land use of the area of influence of the Chakra with cocoa in Napo, Ecuador.....	102
Figure 63: Map land use of the area of influence of the Chakra with cocoa in Napo, Ecuador.....	103
Figure 64: Ilex guayusa Loes (Guayusa).....	104
Figure 65: Grias neuberthii J.F. Macbr. (Phyton).....	104
Figure 66: Petroglyphs of Mondayacu, located in Archidona, Napo province, Ecuador.....	104
Figure 67: Cassava harvest using fiber baskets made from Amazonian forest products, Pumayacu community.....	105
Figure 68: Community house in San Virgilio, Pastaza.....	105
Figure 69: Amazonian Chakra Corporation’s strategy map.....	112
Figure 70: Strategies of the Amazonian Chakra.....	113

LIST OF ACRONYMS

CIALCO:	Alternative Commercialization Channels
CTEA	Amazonian Territorial Constituency
EAR:	Ecuadorian Amazon Region
ETN:	National Territorial Strategy
FAO:	Food and Agriculture Organization of the United Nations
GADP:	Provincial Decentralized Autonomous Government
GHGs:	Greenhouse gases
GIAHS:	Globally Important Agricultural Heritage Systems
GIZ:	German Organization for International Cooperation
INEC:	National Institute of Statistics and Census of Ecuador
INIAP:	National Institute for Agricultural Research of Ecuador
INPC:	National Institute of Cultural <i>Heritage of Ecuador</i>
IPCC:	Intergovernmental Panel on Climate Change
ITPGRFA:	International Treaty on Plant Genetic Resources for Food and Agriculture
KALLARI:	El Comienzo (Kichwa) Agro-Artisan Association for the Production of Agricultural, Livestock, and Fish Farming Goods of Napo "Kallari"
MCYP:	Ministry of Culture and Heritage of Ecuador
MAE:	Ministry of the Environment of Ecuador
MAATE:	Ministry of the Environment, Water and Ecological Transition of Ecuador
MAG:	Ministry of Agriculture and Livestock of Ecuador
MAGAP:	Ministry of Agriculture, Livestock, Aquaculture and Fishery of Ecuador
NIAHS:	National Important Agricultural Heritage Systems
PDOT:	Development and Territorial Management Plan
PFF:	Peasant Family Farming
PKR:	Kichwa Rukuyallakta People Amazonian social Kichwa organisation
REDD:	Reducing Emissions from Deforestation and Forest Degradation
SAF:	Agroforestry System
SENADI:	National Secretariat of Intellectual Property of Ecuador
SENAGUA:	National Secretariat of Water of Ecuador
SENPLADES:	National Secretariat for Planning and Development of Ecuador
SGP:	GEF Small Grants Programme
SNAP:	National System of Protected Areas
TSATSAYAKU:	Amazon Producers Organisation of Tena and Arosemena Tola Canton
UH:	Demographic Unit
UNDP:	United Nations Development Programme
UNESCO:	United Nations Educational, Scientific and Cultural Organization
UPA:	Agricultural production Unit
WIÑAK:	Amazon Producers Organisation of Archidona and Tena Canton

CONCEPTS

Ayllu: in Kichwa language it is the community of relatives made up of human beings, members of nature and members of the wacas or deities' community. It is proposed to add the Rune concept that includes the notions of nature and deity to the western concept of man as a 'rational animal'.

Chakra: The Amazonian "*Chakra*" belonging to the Kichwa and Kijus communities of the EAR is: "a productive space located within the farm, managed by the family under an organic and biodiverse approach, valuing ancestral knowledge, where cocoa is found along with timber, fruit, medicinal, handicraft, edible and ornamental species. It is managed with a distribution that allows a balanced and sustainable production that serves for family consumption and sale, preserving the agroecological and cultural management of production processes, avoiding monoculture production".

Chakra-ushun-purun cycle: moments of crops growth and stage in the Chakra system that guide the nutrition processes, soil care and crop management.

Chakramamas: It is the self-designation for women who manage the Chakra and are wisdom bearing and recreators to keep it alive.

Chakrayayas: It is the self-designation for men who manage the Chakra.

Chicha: It is the name given to low alcohol content beverage obtained from cereals, tubers and fruits native to America, whose starches and sugars are fermented and transformed into alcohol by the action of yeast. In the case of the Amazonian Kichwa communities, this chicha is made from cassava and has a high symbolism due to its daily presence as well as its ritual and festive uses.

Deity: Supernatural being that is worshipped since it has power over a specific area of reality and over the destiny of humans.

Frosts: Atmospheric phenomenon that consists of a drop in temperature until the water freezes.

Kuru: In Kichwa language it refers to edible palm weevil collected from the peach palm.

Kichwa: It refers to the Kichwa or Quichua nationality in Spanish that represents the northern groups of the Quechua indigenous culture of what is today Peru and Bolivia.

Maito: In Kichwa language means wrapped and is one of the traditional ways of cooking fish or chicke

Minga: Solidarity meeting of friends and neighbors to do some common agricultural labor, after which they share a generous meal and beverages provided by the beneficiaries

Muyus: Fruits of large seeds, or seeds of edible fruits.

Naporuna: Kichwa way of naming the inhabitants of the Napo province.

Sacha: In Kichwa language it means forestland or jungle and it is also used to specify the wild relatives of the crops such as Sacha cassava, sachá grape.

Sinchi warmi: In Kichwa language it means strong and visionary woman.

Sumak Mikuy: In Kichwa language it means excellent food. It is the name of the peasant agro-industrial company.

Yachak: A moral authority, a wise person who has passed through a long and difficult initiation. He is a strongly structuring element who maintains the cohesion of the group, a spiritual guide, a social pillar, and healer.

Yuyos: Wild herbs used as food spice.

I. SUMMARY INFORMATION TABLE

Name/Title of the proposed GIAHS	The <i>Amazonian Chakra</i> , a traditional agroforestry system managed by Indigenous communities in Napo province, Ecuador
Requesting Organization and contact information	“Corporation of Associations of the Amazonian Chakra” Corporation is integrated by Kallari, Wiñak, Tsatsayaku, Alli guayusa and Inti associations.
Responsible Ministry and contact information	Ecuadorian Ministry of Agriculture and Livestock (MAG) Undersecretary of Peasant Family Farming. Address: Amazonas Av. and Eloy Alfaro Av. Postal Code: 170516, Quito - Ecuador
Location and geographical coordinates	Country: Ecuador Region: Amazon Province: Napo Cantons: Tena, Archidona, and Carlos Julio Arosemena Tola The area is surrounded by 6 national protected areas and the Napo river. See Figure 1 for geographical information of the GIAHS proposed.

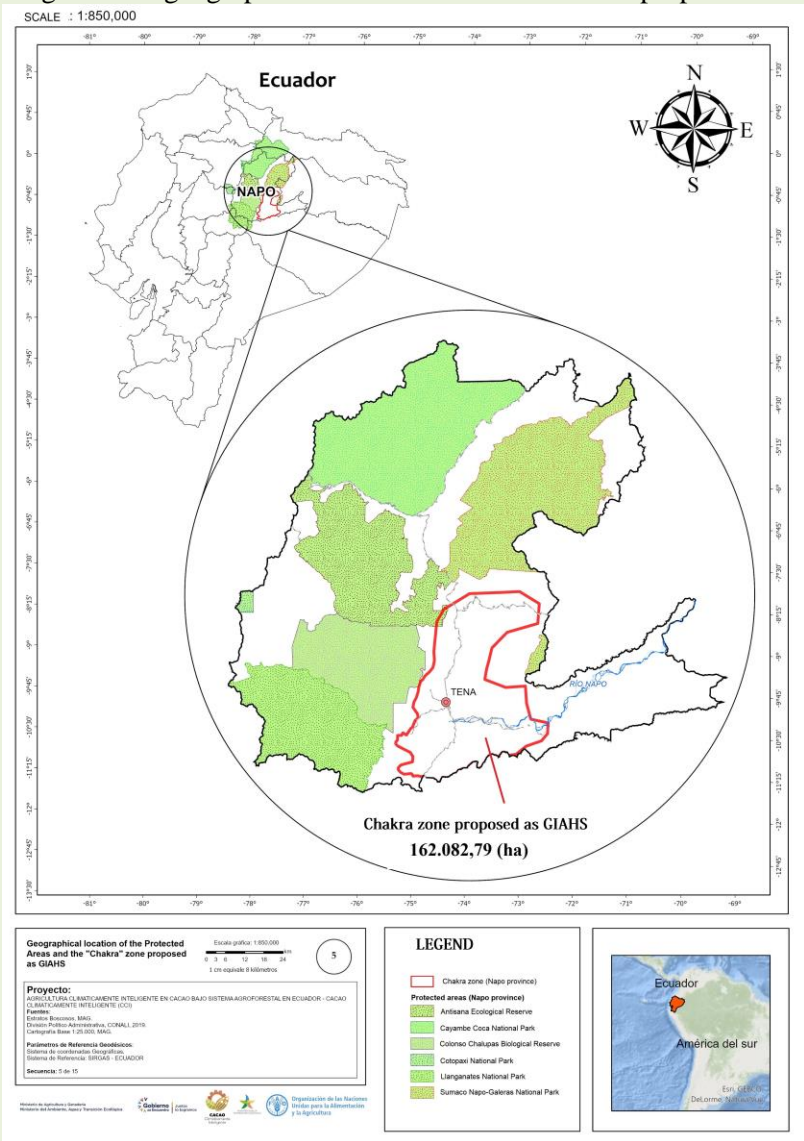


	Figure 1: Geographical location of the influence zone of the Amazonian <i>Chakra</i> , Napo Province, Ecuador. Source: Torres et al. (2022).
Transport links between the site and the capital city and other major cities	The distance from the city of Quito (capital of Ecuador) to Tena is 195.90 km, taking the E20 Baeza – Tena road as the main access route to the site. From Quito to the main nearby cities, the distances are 185 km to Archidona, 195.90 km to Tena, and 221 km to Carlos J. Arosemena Tola.
Area of coverage (Expressed as “ha”) of the system (Core Area 1) and, where necessary, buffer zone¹	<p>The total area proposed as GIAHS is 162.082,79 hectares. In this total area we can view two zones: a core zone of land use of Amazonian <i>Chakra</i> and a surrounding and embodying zone where the <i>Chakra</i> are located in the forestry Amazonian landscape.</p> <p>An area of 24,264.40 ha has been identified as land use of the Amazonian <i>Chakra</i> agroforestry system, i.e., diversified production systems, whose main commercial product is cacao (<i>Theobroma cacao</i> L.) which are combined with other market-oriented crops such, coffee (<i>Coffea canephora</i> Pierre ex A. Froehner), guayusa (<i>Ilex guayusa</i> Loes.), plantain (<i>Musa paradisiaca</i> L.), vanilla (<i>Vanilla</i> sp.), and integrates the cultivation of staple foods and medicinal plants, such as cassava (<i>Manihot esculenta</i> Crantz), peach palm (<i>Bactris gasipaes</i> Kunth), and other edible and medicinal plants that allow food, health security and sovereignty for Kichwa and Kijus people of the Ecuadorian Amazon, who have developed it over many years to sustain their livelihoods.</p> <p>However, considering that the Amazonian <i>Chakra</i> plots are part of a mega-diverse landscape mosaic, a buffer zone of direct influence has also been determined, consisting of a forested landscape whose approximate area of coverage is 162,082.79 ha, including areas of primary forests, secondary forests, degraded forests, Amazonian <i>Chakra</i>, water bodies, other lands, pastures, herbaceous shrub vegetation and anthropogenic zone (See Figure 1).</p>
Agroecological zones² for agriculture, forestry, fisheries, and aquaculture	<p>A total zone of direct influence of the Amazonian <i>Chakra</i> has also been determined in a forested landscape whose approximate area of coverage is 162,082.79 ha, including areas of primary forests, secondary forests, degraded forests, Amazonian <i>Chakra</i>, water bodies, other lands, pastures, herbaceous shrub vegetation, and anthropogenic zone (See Figure 1).</p> <p>The Amazonian <i>Chakra</i> system is developed in the lower areas (Evergreen Andean Amazon Forest), and at the start of the Amazon basin, represented by the Jatun Yaku river that becomes the great Napo river, one of the tributaries of the Amazon river.</p> <p>The average altitudes are between 300 and 800 meters above sea level, watered by a myriad of rivers and slightly dry reliefs.</p>

¹ Only the core area is designated as a GIAHS, while the buffer zone can be defined as a surrounding area that contributes to the conservation, management, and sustainability of the system. Determination of the buffer zone is not mandatory but is useful information for management of the site.

² An agroecological zone is a land resource mapping unit, defined in terms of climate, landform, soils, and/or land cover, with a specific range of potentials and constraints for land use.

Topographical features	The most representative characteristic is its location, in the Amazon basin with minimal influence from the eastern Andes Mountain Range.
Climate type	The proposed site consists of: a) Montane Andean Evergreen Forest; b) Amazonian Lowland Evergreen Forest; c) “Ceja Andina” Andean Evergreen Forest; and d) Evergreen Forest in the foothills of the Andes. The landscape is dominated by slopes in the degree of steepness. The parental material of the soils is made up of Cretaceous sediments corresponding to the Napo uplift of calcareous nature and the Hollin formation of sandstone sedimentary nature, carbonate or micaceous sandstones, which play a particular morphogenetic role. The soils are silty loam with good drainage. With average temperatures between 19 - 23 celsius degrees and average annual rainfall between 3600 to 4000 millimeters.
Approximate population	The population in proposed GIAHS site is approximately 10,000 Amazonian indigenous families (54,000 inhabitants) who are linked to community and social organizations.
Traditional communities and/or indigenous populations	56.24% of the total population of Napo Province is identified as belonging to any of the 11 of 14 indigenous nationalities in Ecuador (See Table 2). Kichwa people represent 99.4% of the indigenous population with approximately 54,000 inhabitants.
Main source of livelihood	The main economic livelihood activities are: Agriculture (56.5%), Livestock (10%), Agriculture and Livestock (30%), and Service Provision (3.5%). The natural and cultural diversity in the Napo province is recognized as an area where processes of preservation and reproduction of the <i>Chakra</i> system have been historically concentrated, thanks to the cultural roots and the daily activities that Kichwa and Kijus families carry out to ensure their livelihoods and socioeconomic development.

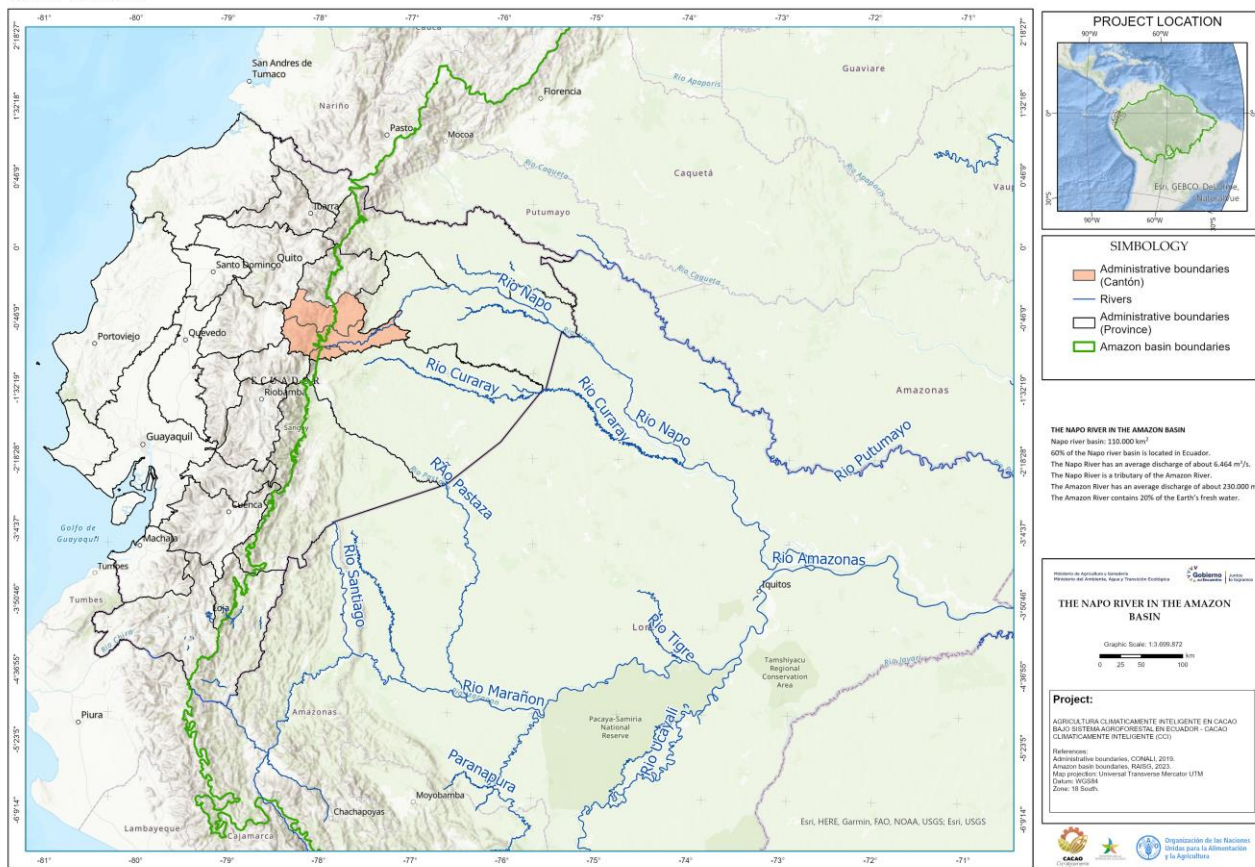
II. EXECUTIVE SUMMARY

Amazonian Chakra System: concept, ancestral knowledge, and food sovereignty

Ecuador is a democratic republic, with the first constitution in the world that legally recognizes the Rights of Nature (Global Alliance for the Rights of Nature, 2019; Constitution of Ecuador, 2008). It has a population of 17.6 million people as of 2020 (World Bank, 2022), of which around 40% live in rural areas (Global Forest Atlas 2020). Ecuador officially registers 14 indigenous nationalities and each practice their own language and culture (National Adaptation Plan, 2018), of which 11 are in the Ecuadorian Amazon Region: Achuar, Andwa, Cofan, Kichwa, Quijos, Secoya, Shiwiar, Shuar, Siona, Waorani and Zapara (Secretaría Técnica de la Circunscripción Territorial Especial Amazónica ST-CTEA,

The country is geographically located in the northwest of South America, bordering Colombia to the north, Peru to the south and east, and the Pacific Ocean to the west. It is the smallest of the Andean countries with a continental area of 256,370 km² (República del Ecuador – Oficina de Información Diplomática, 2021). It is crossed by the equator (from which it gets its name) and is crossed from north to south by the Andes Mountain Range. To the west of the Andes there are lowlands that border the Pacific Ocean. To the east there are lowlands that are part of the Amazon Plain. It has approximately 12 million hectares of native forests, approximately 50% of the total area of the country (MAAE, 2018). Of this total remnant forest, 74% is located in the Ecuadorian Amazon Region (EAR), 15% on the Coast, and the remaining 11% in the Ecuadorian Highlands (MAAE, 2018).

SCALE: 1:3.699.872



In Ecuador we find two of the ten areas characterized by an exceptional concentration of species and high levels of endemism, called biodiversity hotspots, one of them on the north coast (Western Ecuador) and the other in the entire Ecuadorian Amazonia between 500 and 1500 masl (Uplands Western Amazonia) (Myers, 1988). According to Neill & Ulloa (2011), the total number of vascular plants in Ecuador is 18,198, of which approximately 5,500 are endemic to Ecuador, and 522 being recognized as endemic to the region (León - Yáñez et al., 2011). Neill (2012) estimates that it is possible that the number of vascular plants for Ecuador in the future can rise to 25,000 species, most of which would be on the Amazonian hotspot.

The source of the Napo River is located in the Province of Napo. The Napo River is one of the tributaries of the Amazon River. The Napo River is born with the name Jatun Yaku (big river in Kichwa) and its average annual flow at the Bellavista Mazan station is 6,464 m³/s. The Napo basin covers approximately 110,000 km², of which around 60% is located in Ecuador. Thus, the Napo River is part of the Amazon River basin, which is the largest in the world, with an average of 230,000 m³ of water per second and corresponds to approximately 20% of the fresh water on the world's terrestrial surface (CEPAL, 2013). Ecuador is also the source of the Putumayo River, which serves as the natural boundary between Peru and Colombia, and flows into the Amazon River, with an average annual flow of 1,170 m³/s (CEPAL, 2013).

As an interesting fact, Francisco de Orellana followed the course of the Napo River to discover the great Amazon River in 1542 (Maldonado, 2011).

The Ecuadorian Amazon Region (EAR) has been populated since ancient times by indigenous populations who have co-evolved with the natural environment. Currently, the Amazonian Kichwas are the most notable group in demographic terms, representing more than 55% of the total indigenous populations of the EAR. According to several scientific investigations, their traditional knowledge and cultural practices have contributed to the development of sustainable land-use models. Within this scenario, we find the traditional diversified agroforestry system called “**Amazonian Chakra**” belonging to the Kichwa and Kijus communities of the EAR.

According to the definition of the KALLARI Association in 2013, the *Chakra* is: “*a productive space located within the farm, managed by the family under an organic and biodiverse approach, valuing ancestral knowledge, where cocoa is found along with timber, fruit, medicinal, handicraft, edible and ornamental species. [It is] managed with a distribution that allows a balanced and sustainable production that serves for family consumption and sale, preserving the agroecological and cultural management of production processes, avoiding monoculture production*”.

In terms of efficient management of the low fertility of Amazonian soils, the Amazonian *Chakra* system is unique, because it integrates the knowledge of forest and watershed management of its main river (Jatunyaku), where the Naporuna community performs a series of agroforestry arrangements to ensure shade and soil protection in order to produce and live, as well as the association and diversification of crops and techniques for the retention of nutrients and greater soil fertility from river flooding.

Scientific results are another important factor, which affirm that agriculture in the Amazon has been developed for at least 5,300 years, recognizing as amazing the process of domestication and use of innumerable species of the Amazon rainforest such as: chili (*Capsicum* spp.), beans (Fabaceae family), cassava (*Manihot esculenta*), sweet potato (*Ipomea* spp.), Taro or Chinese potato (*Maranta* spp.), corn (*Zea* spp.) and cacao (*Theobroma* spp.) or bush cocoa (*Herrania* spp.). These plants give an idea of the different species that have been interacting in a mixed system as the current Amazonian *Chakra*, providing a range of foods that were consumed by the ancient inhabitants, that became fundamental for human nutrition, the sustainability of ecosystems and the enrichment of nature.

In this historical context, the current Amazonian *Chakra* refers to a diversity of agroforestry systems developed by the Kichwa and Kijus communities of Napo (*Naporuna*, translated as people of Napo), who share a cultural matrix with the Kichwas of the Andean zone of Ecuador, who also manage a system called “Andean *Chakra*”, with which they present differences and idiosyncrasies, especially in their adaptation to the Amazonian ecosystem, which makes them different in their structure, forms of management, ancestral knowledge, tree component, and landscapes.

The Amazonian *Chakra*, due to its biological and cultural diversity, offers multiple services to the populations of the EAR, ranging from food security, provision of ecosystem services, maintenance of cultural values, social cohesion, and the maintenance of scenic beauty through the management of a megadiverse landscape, which together contribute to the improvement of the inhabitants’ quality of life. Here, food sovereignty is the main component of the system, characterized by the presence of species to provide food for the family, such as cassava (*Manihot esculenta* Crantz), plantain (*Musa* spp.), corn (*Zea mays*), chili (*Capsicum annuum*), peanuts (*Arachis hypogaea* L.), taro [*Colocasia esculenta* (L.) Schott], breadfruit [*Artocarpus altilis* (Parkinson) Fosberg], ice cream bean (*Inga* spp.), palm species such as peach palm (*Bactris gasipaes*), and morete (*Mauritia flexuosa* L.f.), which are combined with market-oriented crops such as cocoa (*Theobroma cacao* L.), coffee (*Coffea canephora* Pierre ex A. Froehner), guayusa (*Ilex guayusa* Loes.), and vanilla (*Vanilla* sp.) among other forest species that provide edible fruits.

Generally, the whole family participates in the establishment and management of the Amazonian *Chakra*. The woman constantly visits the site and uses the products for the family’s food and medicine. Traditional knowledge is very important in the maintenance of the *Chakra*. A person who wishes to be skillful at sowing and producing takes advantage of the presence of the *chakramama* (a woman who manages the *Chakra* and is the bearer of the wisdom for its management) to ask for this gift to be transmitted (through the *Paju* ritual). Other ways of transmitting knowledge about the management of the system are advice from the *chakramama* and through the delivery of good seeds and the realization of good practices in the *Chakra*. Thus, the Amazonian *Chakra* is a space for recreation, transmission of knowledge and cultural values, generating reciprocity and security for families, as well as establishing roles and making visible the complementarity between family members.

Amazonian *Chakra* System: linkage with the SDGs

Since they were published in 2015, the United Nations’ 2030 Agenda containing 17 Sustainable Development Goals (SDGs) and 169 targets have become planning and monitoring tools that can be used at both national and local levels to achieve prosperity, peace, justice, poverty alleviation, and equality, and to mitigate climate change, minimize environmental degradation, and manage cultural values, diversity, and heritage.

In this holistic development framework presented by the SDGs, the Amazonian *Chakra* system, managed by the Kichwa people in the EAR, especially in the province of Napo, represents a potential for the achievement of at least 12 of the 17 SDGs. In this scenario, we recognize the potential for the sustainability of the system and the livelihoods of the surrounding population, which materializes as follows. SDG 1: The *Chakra*, among its various functions, enables the self-sufficiency of food, medicinal products, and building products; it also guarantees an income for the household, where all members of the family participate. SDG 2: The *Chakra* guarantees the household’s food security and sovereignty, and has high agro-biodiversity, providing food for the local population. SDG 3: Medicinal plants used by the local population are grown in the *Chakra*. In addition, products are grown without the use of agrochemicals. SDG 4: The *Chakra* is a space for the transfer of ancestral knowledge and know-how. Education in ancestral agricultural practices for sustainable production is guaranteed in the *Chakra*. SDG 5: The *Chakra* is mainly managed by the *chakramamas* (women who

transmit knowledge from generation to generation). SDG 8: Cultivation in the Amazonian *Chakra* system with cocoa provides between 38 and 60% of the household's income. SDG 11: The *Chakra* system contributes to maintaining sustainable landscapes at a community level. SDG 12: The *Chakra* Seal (a locally and nationally endorsed certification system) embodies the principles of the *Chakra* system that guarantee sustainable production. The *Chakra* Seal ethics committee also includes consumers. SDG 13: The *Chakra* contributes to carbon sequestration in soil, aboveground biomass, litter, and roots. SDG 15: The *Chakra* ensures a diversity of flora and fauna in the system. Several studies have shown high rates of diversity in avifauna, herpetofauna, arboreal, etc. SDG 16: The cocoa *Chakra* has fostered the creation of steadily growing producer associations, oriented toward fair markets and good governance. SDG 17: The Corporation of Napo Amazonian *Chakra* Associations, which to date is made up of the following associations: Kallari, Wiñak, Tsatsayaku, Walla Kuri, Inti, and Amupakin, is promoting a local and national alliance that is also linked to the Global Alliance for Climate-Smart Agriculture (GACSA).

The Amazonian *Chakra* System: Agricultural Diversity, Special Markets, and Bioeconomy

The agricultural diversity of the Amazonian *Chakra* must be rescued, given that it is a different agricultural management strategy for facing different situations. The communities maintain a market learning process, where the collapse of prices of some products has been a learning opportunity: dependence on a single product for sale means too much fragility in the face of external events that are not controllable locally. Therefore, the agricultural diversity of the *Chakra* also applies to products destined for markets.

Producer associations have conducted internal research and consultations, and have evaluated the social, technical, environmental, and commercial feasibility of incorporating new products into their offer. In this field, cocoa production under the *Chakra* system means various endeavors compared to production under other more specialized systems. Now, some producer associations maintain commercial agreements with companies that recognize these highly biodiverse forms of management, which are socially positive and inclusive in such a way that the internal norms developed by the Corporation for Napo Amazonian *Chakra* Associations involving Kallari, Wiñak, Tsatsayaku, Walla Kuri, Inti, and Amupakin promote a form of self-regulation that contributes to maintaining special markets.

Thus, the production of fine aroma cocoa using the traditional *Chakra* system in the Ecuadorian Amazon is an example of the confluence and articulation of indigenous ancestral knowledge practiced through the concept of “Good Living” or “*Sumak Kausay*” and Western conventions. It has managed to position a product such as cocoa cultivated in the *Chakra* system in special international markets, benefiting current generations and leaving a worthy legacy for the Kichwa and mestizo population that adopt this system.

Currently, several plants grown in the Amazonian *Chakra* have the potential to be developed into bio-products, especially for the pharmaceutical, nutraceutical, and cosmetic industries, thereby constituting a positive scenario for the strengthening of this system, and promote a deforestation-free agro-productive management oriented to an ecological transition, using the ancestral knowledge of the Amazonian *Chakra* system as a potential for the Amazonian bioeconomy.

The Amazonian *Chakra* System: Landscape Diversity, Carbon, and Climate Resilience

The landscape surrounding the area of influence of the Amazonian *Chakra* comprises the lowlands of the province of Napo, specifically the cantons Carlos Julio Arosemena Tola, Archidona, and Tena. This area is part of the Sumaco Biosphere Reserve (SBR), recognized by UNESCO through the Man and the Biosphere (MAB) program in 2000. These production systems are also adjacent to Llanganates National Park, Colonso Chalupas Biological Reserve, Antisana Ecological Reserve, and Sumaco Napo-Galeras National Park (Figure

1). Being located in a megadiverse Amazonian site of global relevance in ecological terms makes the *Chakra* system a key element for the conservation of biodiversity, especially for its characteristics of creating several habitats for species of reptiles, amphibians, birds, macrofauna, microfauna, and invertebrates, as well as its potential for the integrated management of water resources and soil. Regarding the relevance of the Amazonian *Chakra* for carbon sequestration and storage in the soil, aboveground biomass and leaf litter, in one hectare of cocoa in the Amazonian *Chakra*, between 140 to 206 tons of carbon (C) per hectare is stored in the soil, and about 30 tons C/ha in the aboveground biomass of the system. This represents between 42 and 52% of the carbon contained in a primary forest in this same area. This shows that the Amazonian *Chakra* is a complementary tool not only for the conservation of natural resources, but also for the mitigation of climate change through carbon sequestration.

III. SIGNIFICANCE OF THE PROPOSED SYSTEM

PART A

3.1. Specific values and features

The area proposed as GIAHS is located in the province of Napo and is part of the "Andes-Amazon" biodiversity and endemism *hotspot* (Myers, 1988). Napo is made up of five cantons: Quijos, El Chaco, Archidona, Tena, and Carlos Julio Arosemena Tola. The *Chakra* system is developed in the lower areas of the last three cantons, in the foothill areas, and at the start of the Amazon basin. As of 2018, 67.52% of the province's territory has a legally recognized conservation category within the National System of Protected Areas (SNAP) of Ecuador (MAE, 2013), including the Sumaco Napo-Galeras National Park, Cayambe-Coca National Park, Llanganates National Park, Cotopaxi National Park, Antisana Ecological Reserve, and Chalupas Colonso Biological Reserve (Figure 2).

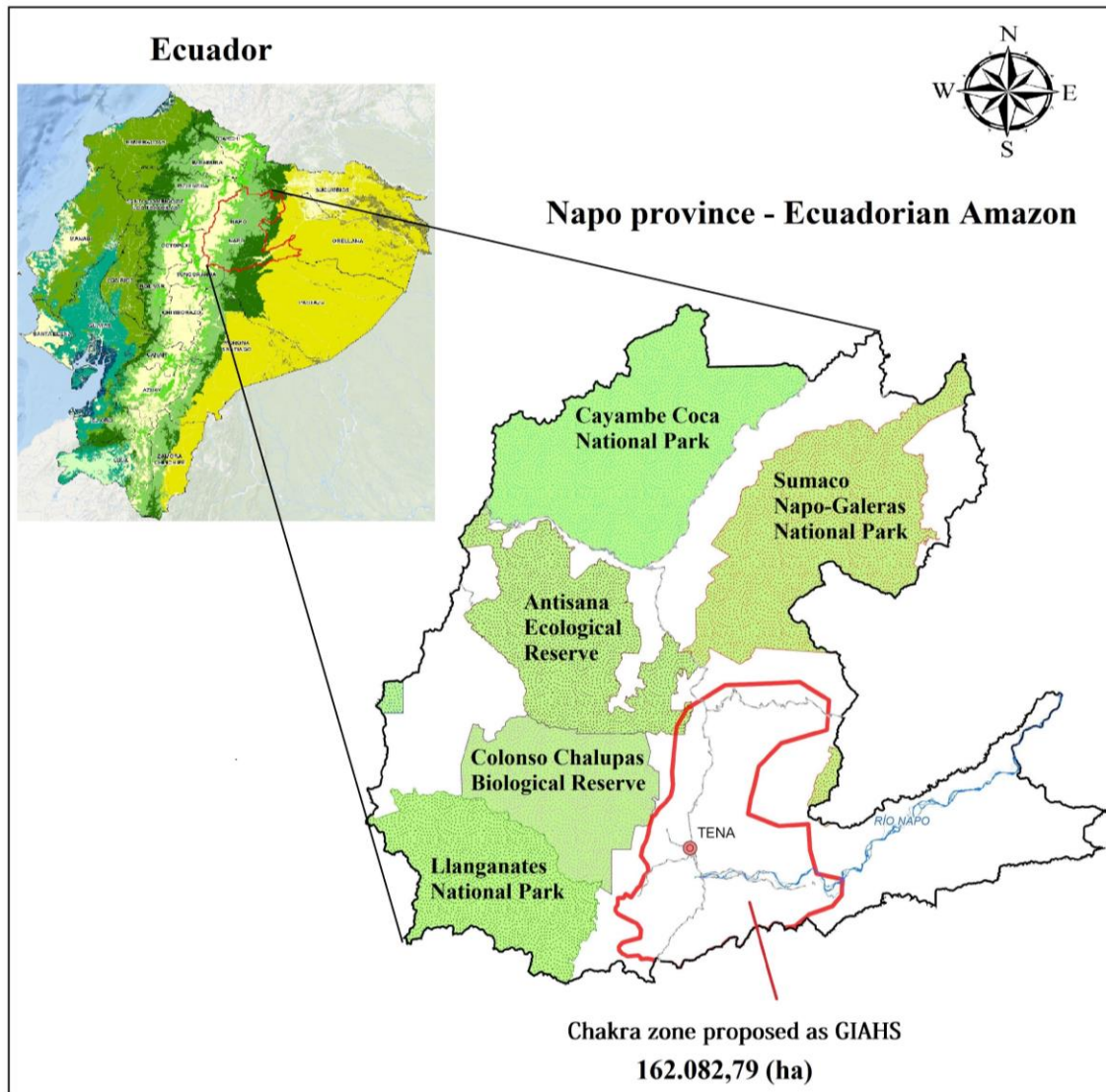


Figure 2: Map of Ecuador, Napo province and the geographical location of the influence zone of the Amazonian Chakra GIAHS site. Source: Torres et al., (2022).

Description of the zone of influence proposed as GIAHS

The total zone of influence of the Amazonian *Chakra* proposed as GIAHS corresponds to **162,082.79** ha., located in the lower areas of the three cantons: Archidona, Tena and Arosemena Tola, including areas of primary forests, secondary forests, degraded forests, *Chakra*, water bodies, other lands, pastures, herbaceous shrub vegetation, and anthropogenic zones. Of this total area, **24,264.40** ha corresponds to the Amazonian *Chakra* (See Table 1 and Figure 3). In the same table, it can be seen that about 50% of this area represents primary and secondary forests and 11.32% comprises degraded forests. The altitude varies between 300 and 4,800 meters above sea level, resulting in an ecological variety that is influenced by rainfall that exceeds 2,500 mm to 4,000 mm annually.

Table 1: Land use categories at the zone of GIAHS proposed site

Category	Symbol	Area (ha)	%
Degraded forest	DF	18,342.30	11.32
Secondary forest	SF	43,973.04	27.13
Primary forest	PF	35,829.28	22.11
<i>Amazonian Chakra</i>	CHA	24,264.40	14.97
Water body	W	3,087.40	1.90
Other lands	OL	457.40	0.28
Pasture	PS	26,859.73	16.57
Herbaceous shrub vegetation	HSV	6,339.81	3.91
Anthropic zone	AZ	2,929.43	1.81
Total (ha)		162,082.79	100.00

Source: Torres et al. (2022)

In this epicenter of megadiversity, the Amazonian *Chakra* agroforestry system is characterized by its diversified production system, whose main commercial product is cacao (*Theobroma cacao* L.) which are combined with other market-oriented crops such, coffee (*Coffea canephora* Pierre ex A. Froehner), guayusa (*Ilex guayusa* Loes.), plantain (*Musa paradisiaca* L.), vanilla (*Vanilla* sp.), and integrates the cultivation of staple foods and medicinal plants, such as cassava (*Manihot esculenta* Crantz), peach palm (*Bactris gasipaes* Kunth), and other edible and medicinal plants that allow food, health security and sovereignty for Kichwa and Kijus people of the Ecuadorian Amazon, who have developed it over many years to sustain their livelihoods. The Amazonian *Chakra* area proposed as GIAHS is influenced by the Napo River and its tributaries (Figure 3).

In terms of sustainable production, the Amazonian *Chakra* is a traditional agroforestry system of the indigenous peoples of the Ecuadorian Amazon. It combines the cultivation of staple foods, timber trees, fruit trees, and ornamental and medicinal plants, which are essential for both food security and the well-being of indigenous peoples (Coq-Huelva, 2018; Coq-Huelva, 2017; Torres et al., 2015; Perreault, 2005). These factors are essential for

understanding its adaptive character and the reproduction process of the material and symbolic life of the Kichwa and Kijus cosmovision of the Ecuadorian Amazon.

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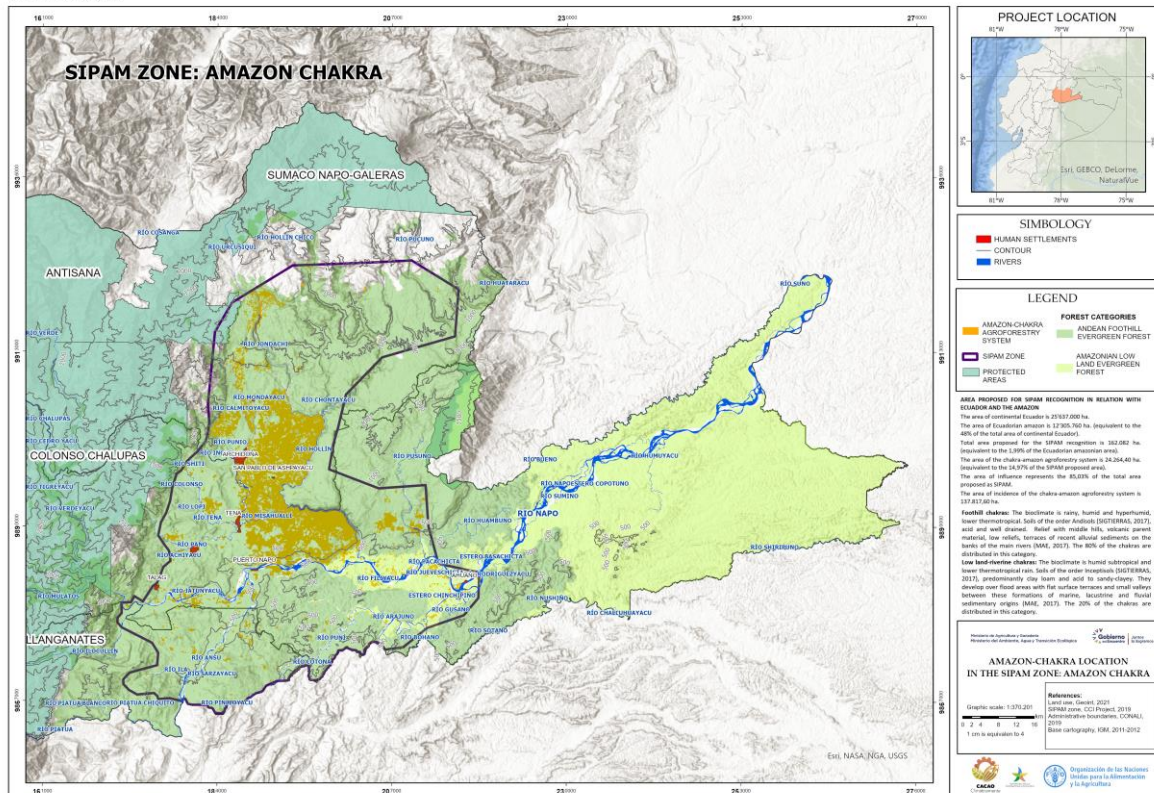


Figure 3: Amazonian Chakra zone proposed as GIAHS

The Amazonian *Chakra* can be recognized as an agricultural co-evolution in the Amazon (Coq-Huelva et al., 2018), as a spatial-temporal system, developed in forest clearings or enhancements near rivers, is deliberately conditioned to the family's need for food security, medicine, or housing (Arévalo, 2009; Lu et al., 2004; Whitten and Whitten, 2008). The *Chakra* is a productive, family or community space, maintaining patterns in its spatial design and well-defined phases in its temporal management cycle, which mimics the natural processes of succession or restoration of forests, known locally as: *Chakra-ushun-purun-realce*. The cycle starts with the opening of the forest canopy, then perennial crops are established, followed by interrelated short-cycle crops, which are rotated to manage soil fertility and avoid the presence of pests and diseases; in addition, the surplus is continuously managed with timber and fruit species. The cycle is completed with periods of rest and natural regeneration (enhancement).

These cycles or phases can have certain temporal differentiation, according to the micro-climatic conditions or ecological niches of the zones. When a *Chakra* is going to enter a resting or enhancement phase, the family foresees the adaptation of a new space to develop another *Chakra* (an itinerant aspect of the system), so that the food supply for the family is not interrupted. Amazonian agriculture through the *Chakra* can be defined as one that observes, interprets, understands, and imitates nature. There exists a structure of at least three

levels or vertical strata, which are established in agroforestry designs for the generation of cover and shade, always in similarity to the structure of the surrounding forest.

On the other hand, the system seeks to take advantage of river floods and alluvium. This relationship with the river is based on the need to continuously fertilize the soil, since the high temperature, humidity, and precipitation generate a rapid decomposition of organic matter and the loss of nutrients by leaching. This need for fertilization has been ingeniously satisfied by the proximity to the riverbeds and springs that feed the region. These are born in the eastern Andes mountains and along their course they carry and store a great wealth of minerals, nutrients, and microorganisms, which can be incorporated in the design of agricultural spaces.

This agro-production design close to the forests contributes significantly in terms of ecological connectivity, ensuring the permanence and reproduction of hundreds of plant and animal species. To contribute to this, the *Chakra* constitutes a space for selection and experimentation, in which cultivation is in permanent dialogue with wild relatives found in the jungle or “sacha” in Kichwa, since it is considered that these plants store valuable genes, which through gradual improvement through the crossing of species allow farmers to obtain photosynthetic hybrids that are increasingly more efficient. These practices of selection and experimentation have enabled the conservation and use of a wide range of biodiversity, adapting it to different needs: food, medicine, housing, and even adaptation to external events. Between 80 and 150 species and varieties of products have been identified in *Chakras*, 62% of which are assigned for food.

The *Chakra* system has shown evidence of an interesting contribution in terms of carbon sequestration and adaptation to the effects of climate change, while maintaining its status as an assurance of food security for Kichwa, Kijus, and rural families in the region.

Chakra production is fundamental not only for economic reproduction, but also for social and cultural reproduction. This representativeness is manifested in that before building a house, a Kichwa or Kijus family previously prepares the land that will serve as a *Chakra* and, once this work is completed, the first product that is planted is cassava, which is the basis of their daily diet and the preparation of “chicha”, their traditional drink (Arévalo, 2009); only then is the house built. When a *Chakra* is established for the marriage of a daughter or to ensure the family’s basic food provision, the decision to select the seeds is based on cultural aspects. The work of selecting, germinating, and transplanting seeds are steps strictly conceived and carried out by women and they transmit the knowledge from grandmother to granddaughter and/or mother to daughter. The seed work is mainly performed through rites of sacred connotation. Not all women have the power or “*paju*” to select and exchange seeds. Those who have the “*paju*” undergo strict diets whereby they do not consume certain foods, or they manage the lunar calendar, know the appropriate hours, and “*cure*” the seeds with the use of spiritually powerful plants, among other ritual acts.

As Figure 3 shown, the “Naporuna” Kichwa population in Napo usually build their houses near medium and large rivers, where they cultivate their *Chakra* in alluvial soils for subsistence and commercial crops, also because fishing on the riverbanks constitutes the

main source of protein. However, they were more dedicated to hunting than fishing in the upper zone (Irvine, 2001).

In general, the soils of the alluvial zones tend to be fertile due to the presence of the fine volcanic materials they transport, such as phosphorus, potassium, and calcium, enriching the deposits in humid areas, where the mineral elements of the soils are easily leached.

Both in the soils of the Chakras of the Amazonian foothills and in the alluvial areas, there is a strong arboreal component, where aerial biomass, carbon capture and storage, and, in addition, the falling leaves, feed the soil litter, which translates into an increase of organic matter, directly benefiting soil fertility.

In general, the following characteristics are established for the two zones:

Foothill Chakras: present in a pluvial, humid, and hyper-humid, lower thermo-tropical bioclimate. Soils of the Andisols order (SIGTIERRAS, 2017), acid and well drained. Relief in medium and low hills with parent material and volcanic soils, terraces of alluvial sediments on the banks of the main rivers (MAE, 2017). 80% of the chakras are distributed in this type of formation.

Lowland – riverside Chakras: a humid infra-tropical and lower thermos-tropical pluvial bioclimate is present. Soils of the Inceptisols order (SIGTIERRAS, 2017), predominantly clayey loam and acid to sandy - sandy-clayey develop on flooding areas, with flat and plain surface terraces, and areas of fluvial sedimentary origins (MAE, 2017). 20% of the chakras are distributed in this type of formation

The EAR is considered a salient biodiversity hotspot on Earth (Bass et al., 2010; Myers et al., 2000), with an outstanding richness of amphibians, birds, fish, reptiles, bats, and trees (Jenkins et al., 2013; Bass et al., 2010; Myers et al., 2000; Mittermeier et al., 1998; Myer, 1988). Some scientists attribute this biological mega-diversity to climatic, geographical, and volcanic factors (Balslev and Renner, 1989), which have somehow given rise to the 65 forest ecosystems out of the 91 identified in Ecuador (MAE, 2015). This Amazonian ecosystem, which represents 45% of Ecuador's national territory, is the space in which native communities have developed a cultural system for adapting to and communicating with nature. pre-Hispanic rural communities and their descendants over the centuries have developed diverse systems of production and the use of environmental resources to ensure their survival and that of generations to come. The EAR is also characterized by a diversity of cultures encompassing 11 indigenous nationalities, including two groups in voluntary isolation - the Tagaeri and Taromenane (CONAIE, 2013; Brackelaire, 2006), in addition to the migrant population that settled during the last decades of the twentieth century for agricultural activities. Alongside representing the communities' source of income and food security, the *Chakra* embodies indigenous worldviews and cultures integrated materially, socially, and spiritually into their environment.

It is worth contextualizing that, although several studies and evidence argue that in Ecuador agriculture began in the coastal region c. 2,000 BC, and later the technology spread to the inter-Andean region and the Amazon (Naranjo P., 1991: 112), new studies recognize the Amazon as the center of domestication and food use of several products long before what was believed to be their origin even in Mesoamerica (Valdez, 2013, Lanaud C., 2012). Such is the case of cocoa (*Theobroma cacao*), where scientific studies identified cocoa starch grains in ceramic vessels and in remains of pottery pieces, as well as residues of a compound from the cocoa tree and DNA from the bean, establishing three lines of evidence that demonstrate the use of cocoa for food purposes more than 5,300 years ago and establishing the Ecuadorian Amazon as the center of origin for cocoa. This process includes other products such as chili (*Capsicum* spp.), beans (Fabaceae family), cassava (*Manihot esculenta*), sweet potato (*Ipomea* spp.), Taro or Chinese potato (*Maranta* spp.), corn (*Zea* spp.) and cacao (*Theobroma* spp.) or bush cocoa (*Herrania* spp.).

From this arises the hypothesis that what is currently recognized as Amazonian primary or secondary forests may represent the regeneration of complex agroforestry systems developed by Amazonian inhabitants thousands of years ago, who domesticated the forest to create integrated agroforestry systems (Valdez (2013)).

For a long time, the Amazon was defined as an unexplored and underutilized region in terms of agriculture, due to the composition of the soils and the high levels of rainfall and temperature, presenting fragile or poor soils for conventional agriculture. However, the nomadic communities themselves, i.e., those specialized in hunting, fishing, and gathering, developed food cultivation areas in association with the forests and distributed in soils rich

in mineral sediments and organic material deposited on the riverbanks. These technologies allowed them to integrate into food production and exchange networks.

Within this context, one of the most prevalent nationalities in the Amazon region, and particularly in the province of Napo, is the self-styled Amazonian Kichwa. The Kichwa culture in the Ecuadorian Amazon is the result of an interethnic process that would find its origin in ancestral cultures: Kijus, Záparos, Omaguas, Tucanos, Shuar, Achuar, Siona, Secoya, and even Kichwa of the Sierra, and that currently expands in a process of “Kichwization” of the Amazon, fed by intermarriage relations between groups and by the migratory process. The Kichwa communities are present mainly in the province of Napo and to a lesser extent in Orellana and Pastaza. For them, the Amazonian *Chakra* system, among other dimensions, represents their source of food and a means of livelihood. The term *Chakra* in the Kichwa language, or *Chakra* in Spanish, refers to a space for planting and cultivating food, medicines, knowledge, and the very life of a Kichwa family, whereby the concept of “family” goes beyond the nuclear family and expands to the community and territory.

The Amazonian *Chakra* system integrates the understanding and management of the forest, the Jatunyaku River, and the Naporuna community, and in this sense, proposes a series of agroforestry arrangements, spatially and temporally itinerant, that guarantee shade and soil protection in order to produce and live, as well as the association and diversification of crops and techniques for the retention of nutrients and greater soil fertility from river flooding.



Figure 4: Panoramic view of the Amazonian *Chakra*, community of Atacapi, Alto Tena. Napo, Ecuador. Photo: Gabriel Grefa, 2020.

In a contemporary context, in the EAR, the particularity of the province of Napo is recognized, where processes of maintenance and reproduction of the *Chakra* system have historically been concentrated, thanks to the cultural roots and daily activities carried out by Kichwa and Kijus families in order to ensure their livelihoods and socioeconomic development. Currently, in what is now called the province of Napo, there is an approximate population of 131,360 inhabitants (INEC, 2018), of which 65.8% live in rural areas and their main activities are agriculture and livestock. The remaining 34.2% live in urban areas. Napo is inhabited mainly by self-identifying indigenous people (56.24%), distributed among 11 nationalities (Table 2), and mestizos (38.76%). 82.1% of the indigenous population inhabit rural areas, while 16.9% reside in urban areas; for the mestizo population, the occupancy trend is reversed (INEC, 2019). According to indicators of poverty by unsatisfied basic needs (UBN), 79.2% of the population live in poverty (INEC, 2019).

Table 2: Indigenous population of the province of Napo (self-identification)

Nationality	Population	Nationality	Population
Achuar	14 (0.03%)	Shiwar	8 (0.01%)
Andoa	281 (0.52%)	Shuar	137 (0.25%)
Cofán	17 (0.03%)	Waorani	112 (0.21%)
Kichwa/Kijus*	53,996 (99.41%)	Sapara	6 (0.01%)
Secoya	2 (0.00%)	Others	4,264 (7.85%)
Siona	8 (0.01%)		
Total		54,318	

Fuente: INEC, 2010. *During the census (INEC, 2010), the Kijus nationality was still not recognized, which shared inhabitants with the Kichwa population, therefore, in this document the number of inhabitants reported considers the two nationalities mentioned.



Figure 5: Training in a community nursery. Photo: FAO Ecuador - GEF, Napo, 2018.

Due to the altitudinal variation that ranges from 400 to 5,700 meters above sea level (masl), there is a wide range of climatic habitats. In the high zone, which exceeds 4,000 meters above sea level, there is a lake complex of great importance for Napo and the surrounding provinces. The perpetual snows of the Antisana and Cotopaxi volcanoes and the paramo ecosystems are the water sources that in the lowlands form the Napo River, Ecuador’s main tributary to the Amazon River. This climatic diversity has made Napo one of the most biodiverse provinces in the country, and its regional biodiversity is among the most representative globally. In a way, the awareness of this strategic importance has enabled, during the last two decades, the adoption of initiatives for preservation, conservation, and even ecological repair in some areas of the province. Together these comprise 151,846 ha of Protected Forests and 155,651 ha of State Forest Heritage. Napo occupies 62.5% of the Sumaco Biosphere Reserve, recognized as a UNESCO World Heritage Site.

A fundamental aspect in the EAR, and particularly for the Amazonian Chakra system, refers to its hydrographic system, which is defined by the presence of the Andes mountain range, which characterizes the EAR’s large rivers of Andean volcanic origin and defines the topography of the foothills (from 2,400 to 1,300 masl), the high-altitude jungle (from 1,300 to 600 masl), and the floodplains (<600 meters above sea level) of the Amazonian hills. As part of the classification of hydrographic demarcations, there are two important hydrographic units in Napo: the Quijos River and Arajuno River; however, their area coverage extends to at least three more important rivers: Curaray, Aguarico, and the Lower Napo (Table 3). The presence of river basins and sub-basins is of utmost importance for the development of life in Amazonian provinces, both as a means of transportation and because of their influence on the development of production systems and fishing for sustenance.

Table 3: Important hydrographic demarcations in Napo province

Hydrographic zone	Area	% de la EAR	Provinces
Curaray	1,659,747	14.26	Napo and Orellana
Lower Napo	1,319,219	11.33	Orellana
Arajuno (Upper Napo)	1,221,823	10.5	Napo
Aguarico	1,200,096	10.31	Napo and Orellana
Quijos	529,954	4.55	Napo

Source: Senagua, 2011.



Figure 6: Jatun Yaku river, Puerto Napo, Ecuador. Photo: Gabriela Izurieta, 2021

PART D

3.4. Comparative analysis

This section presents a comparative analysis between the Amazonian *Chakra* and the Andean *Chakra*, which are the two systems with the same name recognized in Ecuador. A comparison is also made with other *Chakra* systems in Latin America. In Ecuador, even starting from the same cultural roots, there are marked differences between the Amazonian and Andean *Chakras*. The latter is used by the Kichwa peoples of the Ecuadorian highlands, which are generally determined by the climatic zones, ecosystems, and species that grow naturally in each area, ancestral knowledge of medicinal, edible, spiritual species, etc. Some differences are shown in Table 4.

Table 4: Comparison between the Amazonian *Chakra* and the Andean *Chakra*

	Similarities of Amazonian <i>Chakra</i> with the Andean <i>Chakra</i> and other similar agricultural system in other Latin-American countries	Differences and peculiarities of Amazonian <i>Chakra</i> with the Andean <i>Chakra</i> and other similar agricultural system in other Latin-American countries
Food and livelihood security and food sovereignty	<ul style="list-style-type: none"> ● Performance of solidarity meetings of communities, friends and/or neighbors to do some common agricultural labor, after which they share a generous meal and beverages provided by the beneficiaries. ● Use of native crops and small animal used for self-consumption and the diet mainly depends on local production. ● Production of sustainable and diversified agriculture products for year round markets. 	<ul style="list-style-type: none"> ● The livelihoods and the Amazonian <i>Chakra</i> landscape of the Kichwa and Kijus indigenous people are influenced by the rivers, and the forest, which are the local communities' food sources. ● The Amazonian <i>Chakra</i> almost always contain basic and traditional food products such as cassava and plantain, which are complemented with other products for family self-consumption. ● The presence of the Amazonian <i>Chakra</i> guarantees the reproduction of the family, usually in a new marriage, first establish

	<ul style="list-style-type: none"> ● Surpluses are an income source through commercialization. Impact on access to healthy, diverse, and culturally appropriate food for the local population. ● Individual and collective decisions on their production and management systems. ● The farm provides food security and economic income from sales and/or agrotourism activities. ● Associative enterprises related to production and subsequent sale in local collection centers. 	<p>the place of the <i>Chakra</i> and then start the construction of the new house to live in.</p> <ul style="list-style-type: none"> ● The food security provided by the Amazonian <i>Chakra</i> is related to the climate, since there is no marked seasonality, which favors the provisioning services of the Chakra. Likewise, the size of the Amazonian <i>Chakra</i> plots are relatively large compared to the Andean <i>chakra</i>.
Agrobiodiversity	<ul style="list-style-type: none"> ● High intra-specific and inter-specific agricultural diversity. The association and crop rotation is part of the <i>chakra</i> management system. ● Association management and crop diversification is developed to provide greater soil fertility and protection. ● Presence of plant and animal species in interaction with the family component ● In-situ biodiversity conservation strategies, and community management of native seeds from the <i>chakra</i>. ● Firewood from trees or shrubs from the <i>chakra</i> are used as biofuel. ● Presence of various strata within the <i>chakra</i> provides the opportunity to manage shade and cover levels and allows for resilience to the effects of climate change. 	<ul style="list-style-type: none"> ● In the Amazonian Chakra, cassava as main crop that begins the productive cycles. Then other crops are added in the cyclical management of the <i>Chakra-ushun-purun</i> to guarantees the conservation of soil, forest, biodiversity and agricultural production. ● In the Amazonian <i>Chakra</i>, the biological diversity recognized as equal and important, thus, for agriculture they (river and forest) are <i>people</i> with important roles: The river (up to the smallest stream) that floods and fertilizes; The forestland or <i>Sacha</i> where mainly wild relatives of the crops are found. ● The main characteristic of the Amazonian <i>Chakra</i> is the integration of agrobiodiversity and the forests in arrangements called diversified agroforestry systems.

<p>Local and traditional knowledge system</p>	<ul style="list-style-type: none"> ● Knowledge is dynamic, not static, knowledge and wisdom are inherited between the family and the community, so the collective memory is important for the management of the <i>chakra</i>. ● Close link between the farmer, the crop and the seeds, which is reflected in their festivities, rites and social agreements in the <i>chakra</i>. ● Re-valuation of knowledge on the use and management of agroecosystems. ● Strong social organization with its own norms and cultural rituals. Traditional knowledge has made it possible to determine the taxonomy of crops. ● Management and use of agrobiodiversity, transmitted between generations. ● Agricultural activities strengthen the identity of the people, as well as support adaptation and response to biotic and abiotic factors. ● Management of water sources is key to the sustainability of the systems. 	<ul style="list-style-type: none"> ● The <i>Chakramama</i> (s) that is the woman (sometimes also the <i>Chakrayaya</i> that is the man), is the person bearer of the wisdom to cultivate a healthy and fertile <i>Chakra</i>, and to transfer knowledge. ● The Amazonian <i>Chakra</i> is based on local knowledge. The participation of local Kichwa and Kijus elders and shamans allows a sustainable production and attached to cultural values, with criteria to characterize different models, depending on the characteristics and orientation of the families. ● The coexistence is between Amazonian Kichwa and Kijus indigenous people and the three key images: <i>Amazanga</i> (spirit of the forest), <i>Nunghui</i> (spirit of the garden-<i>chakra</i> and of handicrafts) and <i>Sunghui</i> (spirit of the water). ● In the Amazon <i>Chakra</i>, families apply lunar calendars for planting, harvesting and pruning and pruning, they preferably use manual tools and do not apply agrochemicals. ● The Amazon <i>Chakra</i> efficiently uses the fertility provided by the Amazonian rivers and vegetation cover.
<p>Cultures, values systems and social organizations</p>	<ul style="list-style-type: none"> ● Social and community organizations, public institutions and nongovernmental organizations work to strengthen the productive and conservation dynamics of the <i>Chakra</i>. ● Solidarity in the community is key to the functioning of the '<i>Chakra</i>'. Community governance system. ● Customary rules for the management of agricultural systems are in force. 	<ul style="list-style-type: none"> ● The Amazonian <i>Chakra</i> is one element of a larger system and way of life, which is appreciated integrally. ● Culture, forest and river resources and <i>Chakra</i> are the three basic elements to understand the rationality and interdependence of the production systems of the Amazonian producer partners. ● The Amazonian <i>Chakra</i> constitutes a space for recreation and transmission of knowledge and cultural values, in which reciprocity and security are

	<ul style="list-style-type: none"> ● The management of the <i>Chakra</i> is family based. ● Active participation of women around the <i>Chakra</i> and associated knowledge of crops for food and medicinal use. ● The participation of men in the management of the <i>Chakra</i> is for activities that require greater physical effort. ● Valorization and visualization of the importance of the <i>Chakra</i> and the family through gastronomic, medicinal, religious and educational events, among others. ● Promotion and development of differentiated markets for products from the <i>Chakra</i> and its derivatives. 	<p>generated within and between families and communities. It establishes roles and makes visible the complementarity between family members.</p> <ul style="list-style-type: none"> ● The Corporation of Amazonian <i>Chakra</i> Associations: Kallari, Wiñak, Tsatsayaku, Alli guayusa and Inti established a union to face the common challenges that they have, to propose solutions and to foster the Amazonian <i>chakra</i> systems. ● The Amazonian <i>Chakra</i> has a strong joint mission with several producers' associations, with the with the concerted mission "<i>To promote the conservation of the ancestral Amazonian Chakra system, promoting its products and differential value at local, national and international level, promoting the sustainability of production and the quality of life of partners and producers</i>"
<p>Landscape features</p>	<ul style="list-style-type: none"> ● Landscape with a multi-colored mosaic resulting from the interaction of human, socio-economic, and political processes linked to land distribution. ● The '<i>Chakra</i>' is related to topography and the integrated management of water, soil, and agrobiodiversity. ● Ecosystem services from the <i>Chakra</i> for the benefit of humans. 	<ul style="list-style-type: none"> ● The Amazonian <i>Chakra</i> is dynamic and continuously adapting, responding to the conditions of the environment and the survival strategy of the local population. ● Nowadays, Amazonian <i>Chakra</i> is a contribution to new models of productive restoration of Amazonian landscapes, oriented to fair trade free of deforestation and other forms of certification. ● There is high biomass and carbon storage in the Amazonian <i>Chakra</i> compared to other agricultural systems.

IV. GIAHS SELECTION CRITERIA

4.1. Food and Livelihood Security

4.1.1. Contribution to the rural communities' food security and livelihood security

The Amazonian *Chakra* system has been developed in small plots within a tropical forest landscape as a traditional practice that, over the centuries, the Kichwa and Kijus people of the Ecuadorian Amazon have developed to sustain their livelihoods. The system integrates the cultivation of staple foods and medicinal plants, such as cassava (*Manihot esculenta* Crantz), plantain (*Musa paradisiaca* L.), chonta palm (*Bactris gasipaes* Kunth), and other edible and medicinal plants that allow food and health security and sovereignty for these peoples (Irvine 2000; Lu et al. 2004; Whitten and Whitten 2008). Over time, other agricultural species with commercial value have been integrated into this traditional agroforestry system, such as fine aroma cocoa (*Theobroma cacao* L.), robusta coffee (*Coffea canephora* Pierre ex A. Froehner), and in recent years guayua (*Ilex guayusa* Loes). The size of cacao cultivation plots within an Amazonian *Chakra* is in the range of 0.5-4 ha (Gizb 2011; Torres et al., 2022); these plots are generally located in areas adjacent to primary and secondary forests and fallow land, forming a productive landscape that is ecologically friendly with the biodiversity of the area, thus contributing to food security and sovereignty, and at the same time generates economic resources for rural households settled in this area.



Figure 7: Diversity of foods harvested from the Amazonian Chakra. Photo:GADP Napo, 2016

In terms of food security, it is necessary to highlight the principle of interdependence between the Amazonian Kichwa communities and their environment in dialogues and upbringing. The Amazonian environment, represented by the river, the *Chakra*, and the forest, are food sources for the communities, hence the importance of these elements at different times of the

year when these spaces offer food and other products. For example, when the rivers do not provide enough food (fish), the population resorts to the *Chakra* for different crops and in the months when the *Chakra* does not produce enough food, the forest provides fruits and meat from hunting (Llacsá, 2015). Accordingly, the native Amazonian community does not exert unnecessary pressure on these spaces when there are not sufficient conditions or supply of products in them, and they develop alternatives for the diversification, regeneration, and protection of these three spaces.

Figuratively, the meaning of the development of the Amazonian *Chakra* refers to the “cultivation of life”, which in practice is evidenced in the cultivation and provision of food and other products for the development of family and community life, such as medicine and housing. Traditionally, the diet of the Amazonian peoples has been very diverse, both for the multiplicity of products they sow and for the variety of products they gather, hunt, and fish.

These characteristics evidence that the Amazonian *Chakra* has as its main objective the food security and sovereignty of local populations, which can be seen in the list of species of agrobiodiversity described in Table 5, whose use is mainly for food (68%) and 12% for medicine (Arias, 2016). However, it is important to mention that in addition to obtaining products for food and self-consumption, the sale of products from the Amazonian *Chakra* is increasing, turning the *Chakra* into a means not only to produce food for the family, but also for the diversification of economic income (Torres et al., 2018b).

Table 5: Main products grown in Amazonian Chakras for self-consumption

Products	Products	Products
Cassava (<i>Manihot esculenta</i>)	Yurimahua (<i>Musa</i> spp.)	Peach palm (<i>Bactris gasipaes</i>)
Taro (<i>Colocasia esculenta</i>)	Sweet potato (<i>Ipomoea batatas</i>)	Lemon (<i>Citrus limon</i>)
Guayusa <i>Illex guayusa</i>)	Cane (<i>Saccharum officinarum</i>)	Avocado (<i>Persea americana</i>)
Plantain/banana (<i>Musa spp.</i>)	Pazu (<i>Gustavia macarenensis</i>)	Grapefruit (<i>Pouroma</i> spp.)
Bean (<i>Phaseolus vulgaris</i>)	Soursop (<i>Annona muricata</i>)	Rice (<i>Oryza sativa</i>)
Papaya (<i>Carica papaya</i>)	Corn (<i>Zea mays</i>)	Ayahuasca (<i>Banisteria quitensis</i>)
Breadfruit (<i>Artocarpus altilis</i>)	Orange (<i>Citrus sinensis</i>)	Ginger (<i>Zingiber officinale</i>)
Piton (<i>Grias neuberthii</i>)	Ice cream bean (<i>Inga edulis</i>)	Pineapple (<i>Ananas comosus</i>)
Peanut (<i>Arachis hypogaea</i>)	Machetona (<i>Inga</i> sp.)	Abiu (<i>Pouteria caimito</i>)

Source: Lehmann and Rodrigues (2013); Torres et al. (2022).

The aforementioned calls for a serious commitment to the development of research that contributes to the balance, sustainability, and resilience of this productive ecosystem. On the one hand, it should produce and supply food for the family and community, while at the same time generate economic income for local populations. Food production in the *Chakra* is important, given that hunting and fishing are activities that have virtually disappeared in the urban peripheries, because the size of the farms has decreased and with it the presence of

primary or secondary forests. Consequently, plants continue to be collected from the *Chakra* and it plays a very important role in the dietary diversification. In this aspect, agriculture is the basis of sustenance in the provision of food for daily consumption, as well as for market-oriented production.

Of the total production of the *Chakra*, approximately 40% is destined for consumption and 60% for sale. The crops that mainly contribute to the sale are cocoa and coffee (Arévalo, 2013). It is important to plan crops to guarantee a sufficient and permanent food supply. Table 1 below presents an example of a cultivation schedule of the main species for food and income generation of the family, corresponding to the soil capacity and timing of the *Chakra*.

Table 6: Production calendar for the main products of the Amazonian *Chakra*

Products	Scientific name	J	F	M	A	My	Jn	Jl	Au	S	O	N	D
Cocoa	<i>Theobroma cacao</i> L.		x	x	x	x	x	x					
Abio	<i>Pouteria caimito</i> Radlk.		x	x	x	x	x	x					
Ice cream bean	<i>Inga edulis</i> spp.		x	x	x	x	x	x					
Cassava	<i>Manihot esculenta</i> Crantz					x			x				x
Plantain/banana	<i>Musa</i> spp.	x	x	x	x	x	x	x	x	x	x	x	x
Orange	<i>Citrus sinensis</i>		x	x	x	x	x	x					
Grapefruit	<i>Pouroma</i> spp.	x	x										
Morete	<i>Mauritia flexuosa</i> L.f.									x	x		
Corn	<i>Zea mays</i> L.								x				x
Chonta	<i>Bactris gasipaes</i> Kunth	x	x	x	x	x							
Papaya	<i>Carica papaya</i> L.	x	x	x	x	x	x	x	x	x	x	x	x
Peanut	<i>Arachis hypogaea</i> L.					x			x				x
Pineapple	<i>Ananas comosus</i> (L.) Merr					x					x		

Source: Lehmann y Rodrigues, 2013

Wild Food Gathering³

Gathering plays a very important role in food supply for the Amazonian Kichwa population. The main plant products that are harvested are shoots or weeds, mushrooms, wild fruits, and palm hearts. The palm heart is the heart of the palm - it is extracted only from certain species, such as hungurahua (*Oenocarpus bataua*) and chonta (*Bactris gasipaes*). The amount of harvesting varies according to the purpose and conceptions that each family has regarding this activity. When they do it for self-consumption, they usually eat it as soon as they pick the fruits, although they may save some for the family. On the other hand, when they collect for the market, they do so in large quantities.

³ This section has been taken from the Food Atlas of the Amazon. Aliméntate, Ecuador Program.



Figure 8: Chakra products for family self - consumption: Peach palm or chonta (*Bactris gasipaes*).
Photo: MCYP 2014.



Figure 9: Chonta palm lying down for the South American palm weevil collection ("kuru" in Kichwa). Photo: MCYP, 2015.

Regarding the families' criteria for the quantities of products to be harvested, some of them do it in moderation, based on the teachings of the elders who emphasize that “you are not only hungry for one day”. This highlights the concept of savings in the consumption of natural resources, for which there is a sort of calendar that determines what, how, and when certain forest products can be harvested.

Among the most important animal foods collected are kuru (the South American palm weevil); they also capture frogs, snakes, and turtles (see Table 6). There are different types of kuru, some are found in the leaves of trees, others in the trunks, and some are made to grow in the stems of the palms of lying individuals.

The calendars not only govern the collection of the palm weevil but also the activities related to it, for example, the season in which the palm can be felled where the kuru will grow. Thus, in the case of the chonta kuru, the tree must be felled in the tender moon, so that the beetles lay their eggs.

There are some conceptions and practices that are carried out so that the worms grow and are consumed in abundance. Two or three months after the tree is felled, the worms are harvested.



Figure 10: Peach palm (*chonta*) weevil or *chontakurus* (*Rhynchophorus palmarum*) collected for food. Photo: MCYP, 2015.



Figure 11: Gastronomic preparation that combines kurus, cassava and yuyos. Photo: MCYP, 2015.

Poultry

Some families raise chickens. When they do so, they have between 15 and 30 units. In general, these birds are destined for family consumption. Few people sell them at a nearby market. Depending on the number of family members and the number of birds they own, they may eat from once a month to three times a week. The raising of other poultry is not relevant for people in the community. Some families have one or two cows, pigs, ducks, and guinea pigs. It is very rare that people have pack animals, such as a mule or a donkey.

Aquaculture

Some families have fish farms, generally cachama and tilapia. For the latter, they must buy processed fish food, whose costs make it a less widespread practice at the family level and in some cases is developed at the community level. In addition to the cost of the feed, the land must have the conditions to make a pond and inputs such as the geomembrane, which also restricts people's ability to make these fish hatcheries.

Finally, it is necessary to follow certain guidelines for hatchery management, such as catching fish according to age. By complying with these conditions, fish can be caught in abundance, so that farmers can not only satisfy their consumption needs but also sell them.

Food Consumption

Ordinary Food

The culinary tradition in rural and urban areas is deeply rooted, with high empowerment of their identity and pride in their culinary customs, and an explicit desire to preserve them. This is due to the exotic culinary diet, varied and very rich in nutritional content, which represents an important attraction for tourism purposes. Although hunting and fishing activities have decreased, gathering continues to be the mechanism that allows the most remote sectors of the communities to sustain a varied diet.

The yuyos (plants with tender leaves), muyus (fruits with large seeds), alas (mushrooms), and kurus (worms) provide the greatest variety. Among the products of daily consumption are cassava, plantain, palm heart, garabato yuyo, mushrooms, chicken, beef, chontakurus, chili, patas (white cocoa), tkasu, achantsu, and marachaza.



Figure 12: *Chakra products for family self-consumption: cassava, plantain and weeds (yuyos).*
Photo: GAD Napo, 2018.

In addition, rice with chicken or egg, canned sardines or beef, mashed green plantains, and some traditional dishes such as plantain stew with beef, garabato yuyo (fried, roasted, or in

malt), cassava loco soup with fish, chicken maito with palm hearts, chicken legs and pepas with chili, and achogchas are also commonly consumed.



Figure 13: Cassava processing for family food. Photo: MCYP, 2016.



Figure 14: Processing of cassava to make cassava chicha. Photo: MCYP, 2016.



Figure 15: Casabe. Photo: MCYP, 2016

The leaves used for maito are, llaki panga or bijao, and uchupanga (*Calathea lutea*). Also found as traditional dishes are plantain loco soup, ice cream bean pepa sopa or italkatu

(maede with green plantain), and mushroom or armadillo plantain stew. The seeds such as patas muyo or white cocoa (*Theobroma bicolor*) and tikasu or wild peanuts (*Plukenetia volubilis*) can be cooked or roasted for consumption. These two products can be eaten with chili, after roasting and crushing them. The Peach palm (chonta) weevil or chontakurus (*Rhynchophorus palmarum*) are cooked in maito leaves or skewered with a stick and roasted for consumption. Plantain (*Musa paradisiaca*) is eaten mashed, in stews or as “chifles” (chips). The latter can be made of plantain or green orito bananas (*Musa* spp.). Cassava (*Manihot esculenta*), besides being used to prepare the stews, is also boiled for consumption to accompany some kind of meat or made into tortillas.



Figure 16: Cooking of products for family consumption: plantain, cassava and other tubers. Photo: MCYP. 2014.



Figure 17: Family gastronomic cooking: stewed fish and vegetables. Photo: MCYP, 2014



Figure 18: Maito preparation: fish with vegetables, wrapped and grilled. Photo: MCYP, 2014



Figure 19: Maito: fish with vegetables, wrapped and grilled. Photo: MCYP, 2014



Figure 20: Gastronomic cooking: fish plantain, cassava and rice. Photo: MCYP, 2014



Figure 21: Cooking of products for family consumption. Photo: MCYP, 2014

Traditional beverages

In terms of beverages, the most widely consumed are: cassava chicha and chonta chicha. These drinks have a permanent symbolism in the family and community dynamics. This is followed by chucula, which is a non-fermented drink made from ripe, cooked, and mashed plantains. They also prepare corn chicha, peanut chicha, and guarapo made with guinea bananas.



Figure 22: Elaboration of cassava chicha. Photo: MCYP, 2013.



Figure 23: Elaboration of cassava chicha. Photo: MCYP, 2013.



Figure 24: Amazon chicha. Photo: GADP, 2018

Cassava chicha can be made with cooked cassava or roasted cassava. In the latter case, it is fermented with the powder of a fungus that is left to grow on the roots of the nettle. Another way to prepare cassava chicha is using a red fungus that comes out in the powder of the parboiled green plantain, which is mixed with the cooked cassava and kept in a basket lined with leaves. This chicha is called ipanaki. It can also be fermented with cooked or raw sweet potato. The use of sweet potato or mushrooms has replaced chewing as a fermentation mechanism.

Light cassava wine is prepared using a distillation process.



Figure 25: Amazonian light cassava wine (“Vinillu” in Kichwa language). Photo: Laura Scalvenzi, 2013

Other beverages mentioned are lemonade, juice, coffee, rice, and oatmeal coladas, and aromatic lemongrass tea, among others.

Guayusa is the leaf of a tree used to prepare aromatic tea, which is used for different purposes and in different ways. It is taken at dawn (guayusa upina time) and in the afternoon to give strength so that the person stays alert; it is also used for healing purposes (body pain) and to control the effects of hallucinogens. It also has an external use: arms and hands are washed in the tea to avoid snake bites. People perform this practice in the morning, before leaving for work.



Figure 26: Tying of guayusa leaves. Photo: MAG, 2017

The most commonly used seasonings are cilantro, sachá cilantro (jungle cilantro), red onion, white onion, Chinese onion, and achiote. Although potato, cassava, and green plantain are not seasonings, some interviewees mention them as such, because they are used in broths to give them flavor.

Surplus for sale and market development:

Once the family’s self-consumption of food has been satisfied, there is also evidence of commercialization, exchange, and inclusion in markets with the products of the *Chakra* or its derivatives. Table 7 presents the main products whose surpluses are destined for sale and therefore generate additional income for the family. In this activity of selling surpluses, mainly female heads of household are involved.

Table 7: Main 20 products grown in Amazonian Chakra for sale and market development

Products	Products	Products
Cacao (<i>Theobroma cacao</i>)	Grapefruit (<i>Pouroma</i> spp.)	Banana (<i>Musa</i> spp.)
Coffee (<i>Coffea canephora</i>)	Peanut (<i>Arachis hypogaea</i>)	Orange (<i>Citrus sinensis</i>)
Cassava (<i>Manihot esculenta</i>)	Lemon (<i>Citrus limon</i>)	Machetona (<i>Inga</i> sp.)
Guayusa (<i>Illex guayusa</i>)	Corn (<i>Zea mays</i>)	Bean (<i>Phaseolus vulgaris</i>)
Plantain (<i>Musa</i> spp.)	Pineapple (<i>Ananas comosus</i>)	Abiu (<i>Pouteria caimito</i>)
Vanilla (<i>Vanilla</i> spp.)	Morete palm (<i>Mauritia flexuosa</i>)	Pazu (<i>Gustavia macarenensis</i>)
Peach palm (<i>Bactris gasipaes</i>)	Ice cream bean (<i>Inga edulis</i>)	

Source: Lehmann and Rodrigues (2013); Torres et al. (2022)

4.1.2. Contribution to rural livelihoods

Regarding sustainable livelihoods (SL), we used the theoretical approach that integrates the concepts of development and conservation (Ellis, 2000; Ellis, 1999; Ellis 1998; Scoones, 1998), to improve rural livelihoods. With the Amazonian *Chakra*, the Kichwa and Kijus communities have managed to manage a productive diversification that is defined as the total number of different crops within the *Chakra*, where other activities include livestock rearing, hunting, and timber and non-timber forest products produced by an economic unit (*Chakra*) that is part of and managed by the household (Bottazzi et al., 2013). Over the last two decades, interest in this concept has grown, as a production option that can help smallholders potentially become more resilient to climate change, as well as economic and market changes (Torres et al., 2022).

To exemplify the contribution of the Amazonian *Chakra* to rural livelihoods, one can consider the results of the book entitled “Studies on livelihoods, sustainability and carbon sequestration in the *Chakra* agroforestry system with cocoa in communities of native peoples in the province of Napo: cases of the Kallari, Wiñak and Tsatsayaku associations, Ecuadorian

Amazon” by the authors Torres et al. (2022), who analyzed small farmers producing cocoa in the traditional Amazonian *Chakra* agroforestry system and rural livelihoods in this important area, taking as a theoretical framework the theory of capitals (Ellis, 2000; Scoones, 1998).

Table 8: Results of the human, social, natural, physical and financial capitals analyzed in cocoa agroforestry producers in the Amazonian *Chakra* System of the proposed GIAHS site.

Human capital

The Kallari, Wiñak, and Tsatsayaku producer associations have certain differences, especially within access to education and literacy levels among other relevant demographic aspects. The average age of the heads of households shows some similarity in the three associations, with ranges from 50 to 58 years of age, which indicates that the heads are of a sufficiently mature age to make sustainable decisions and transmit knowledge about the management of the Amazonian *Chakra*. As for the gender of the heads of households, in the Kallari and Tsatsayaku Associations, about 30% are women, while in the Wiñak Association 56% are women.

Social capital

In terms of social capital, the active participation of the heads of households in the associations was analyzed. Regarding livelihoods in Amazonian *Chakra* cocoa producers, the ethnicity variable plays an important role, in that the Kallari (94%) and Wiñak (98%) producer associations belong to the Kichwa nationality, while in Tsatsayaku this variable reaches 73% for Kichwa heads of households. Likewise, 85% of Kallari and 82% of Wiñak heads of households were born in the same community where they currently live, while in Tsatsayaku only 58% were born in the same community.

Natural capital

The livelihoods of many rural populations are the determinants of household well-being and prosperity. They depend on the natural capital with which households are endowed, which impacts the efficient use of land. Livelihood development becomes more important with this capital, especially in communities based on traditional agricultural systems (Torres et al., 2018a).

Under this context, of the three associations analyzed, producers in the Tsatsayaku Association have the largest farm size, with averages of 15 ha per producer, followed by producers in Kallari (6.1 ha) and Wiñak (3.4 ha). However, the size of the Amazonian *Chakra* is relatively homogeneous, with average ranges of 2.1 to 2.7 ha per farmer. Likewise, Tsatsayaku farmers also have the largest amount of primary and secondary forests, with averages of six and four hectares respectively, compared to Kallari and Wiñak farmers who are generally smallholders.

This study also considered the diversity of agricultural crops and tree diversity within the *Chakra* area as components of natural capital. Thus, the diversity of market-oriented agricultural crops had a homogeneous behavior in the three producer associations with an average of four agricultural products per household for income generation, which are managed in the *Chakra*. However, the

maximum number of agricultural products reported was seven products: cocoa, cassava, plantain, corn, guayusa, coffee, and vanilla, although several fruit trees were reported.

Regarding the diversity of trees, shrubs, and palms within the *Chakra*, an average of 37 species were found in Tsatsayaku, 27 species in Wiñak, and 38 species in Kallari (Table 2.4). These values show us the high diversity of tree species in the *Chakra* based on cocoa cultivation, like those reported by other authors (Vera et al., 2017; Vera et al., 2019; Torres et al., 2015).

Physical capital

Physical capital includes everything that corresponds to infrastructure, equipment, goods, and access to roads (Ellis, 2000). For this study, internet access was also analyzed, finding that less than 20% of the producers in the three associations have access. However, in terms of cell phone access, 78% of farmers in Tsatsayaku have access, and most farmers in Wiñak (62%) and Kallari (60%) have access. In the three associations, between 60 and 68% of the producers have a cell phone. Access to a cell phone represents an important physical capital for communication and participation in the association's events (social capital).

The highest average number of households with chainsaws is reported in the Tsatsayaku Association (40%), followed by Wiñak (23%) and Kallari (20%), which is related to natural capital, where Tsatsayaku also has the highest average number of forest hectares. However, in terms of scythes, 64% of Kallari farmers have them, followed by Tsatsayaku (49%) and Wiñak (25%). This is important because *Chakra* farmers usually do not use agricultural pesticides and the scythe facilitates the maintenance work of the *Chakra*.

To analyze the variable of "goods", in this study we considered whether the household was equipped with at least a television, refrigerator, and stove. In the three associations, no more than 33% of households have these goods, which are an additional indicator of the household's physical capital.

Financial capital

Financial capital is the most versatile of assets, as it contributes to and facilitates the attainment of other forms of capital. It is made up of access to credit, bonds, savings, as well as remittances and the different incomes that a household receives. For this analysis, the income from the Amazonian *Chakra* has been considered as additional financial capital that is of importance in relation to total income. Many poor households have limited financial capital; however, their livelihood strategies and income generation will depend to a large extent on the quantity and quality of these assets owned by the household.

The average total income in the analyzed households is considered low and differs from one association to another. Producers in the Tsatsayaku Association have the highest income, with averages of USD 3,263 per household per year, followed by producers in the Kallari Association with USD 1,871 and the Wiñak Association with USD 1,369.

Considering that this study targeted households whose main product is cocoa grown within the traditional *Chakra* agroforestry system, it was determined that the *Chakra* contributes 60% of total incomes in Kallari Association households, 55% in Wiñak producers, and 38% in Tsatsayaku producers. However, for about 30% of the producers, the economic income from the *Chakra*

constitutes 100% of their total income. This corroborates the importance of the *Chakra* system for mainly Kichwa households in the Ecuadorian Amazon (Torres et al., 2018a).

Access to credit is a very limited source of financing for small producers in this study area: for Tsatsayaku producers 22% of households have access to credit, while for Wiñak and Kallari only 9% and 7% have access to some type of bank credit respectively. The producers without access also lack credit experience, so they request credit from relatives or acquaintances. Many heads of households expressed fear of approaching a bank to apply for credit, due to their limited payment capacity, lack of land legalization documents, utilizing lands under communal deeds, or simply because of the numerous pieces of documentation required prior to a loan.

As described in the previous paragraph, for these producers, the welfare money they receive from the government is an important item, given that in both Kallari and Wiñak, 64% of the producers receive it, and 44% in Tsatsayaku. The percentage of producers benefiting from this welfare money is still low. It is also essential to note that the governmental aid welfare represents between 24 and 36% of total household income in the three associations and that they represent a low-income population oriented toward small-scale agricultural systems.

Source: Torres et al. (2022)

4.1.3. Products and services provided by the system

It is important to mention that the majority of commercialization is still concentrated on products in their natural state (raw material), although there are increasing levels of post-harvest transformation or innovation in order to face new challenges of access to local and international markets. These transformations contribute toward satisfying needs for clothing, transport, medical services, education, etc. For this reason, it is essential to strengthen enterprises associated with biodiversity and local knowledge and know-how.

Based on the processes of recognition of the agroecological value of production and the associative processes of the producers, systems of productive innovation and value addition have been developed, expanding the supply of products and services linked to production in the *Chakra*, such as cocoa paste and chocolate bars with various cocoa concentrations.

For instance, the cocoa Fine or Flavour variety grows in this traditional Amazonian *Chakra* system, which is internationally renowned for its special aroma. Part of its unique organoleptic characteristics are due to its special intercropping conditions, assimilating aromas and flavours from the agrobiodiversity of the system. For this reason, it has positioned very well in the markets, and its origin is recognised and valued by the national and international chocolate industry. The Intercropping of the system is a strategy that responds to the need for crop diversification, both to satisfy family food demands and to protect the soil; in that sense, some basic criteria for intercropping and rotation mentioned by the Kichwa communities.



Figure 27: Cocoa pods, Napo. Photo: FAO, Ecuador, Proyect GEF - Napo, 2018



Figure 28: White cocoa (*Theobroma bicolor*), Napo. Photo: Wiñak 2018



Figure 29: Cocoa drying post-harvest process by Napo producer associations, Napo. Photo: FAO Ecuador-project GEF Napo 201



Figure 30: Cocoa and chocolate add-value production, Tsatsayaku Association, Napo. Photo: FAO, Ecuador - proyect GEF - Napo, 2018.



Figure 31: Cocoa and chocolate add-value production, Kallari Association, Napo. Photo: Kallari, 2016.



Figure 32: Cocoa and chocolate add-value production, Wiñak Association, Napo. Photo: FAO Ecuador-proyect GEF Napo, 2018.

Along with cocoa, other Amazonian species such as wild peanut, guayusa, vanilla, fruit trees, tubers, and spices have also been part of innovation, processing, and commercialization processes for the gastronomy, cosmetic, and medical sectors.



Figure 33: Various fresh and add-value processed products, Kallari Association, Napo. Photo: Kallari, 2018



Figure 34: Local marketing space for Amazonian Chakra products. Photo: MAGAP, 2016



Figure 35: Marketing point for Amazonian Chakra products in Quito. Photo: GADP, 2018

Likewise, the particularity of the ecosystem and its natural and cultural attractiveness has motivated the development of tourism ventures focused on eco- and agro-tourism.

There are more than 30 family and community agro-tourism initiatives linked to the production dynamics of the *Chakra* system.



Figure 36: Cocoa route. Photo: GADP, 2018



Figure 37: Agro-tourism in the Amazonian *Chakra* landscape. Photo: FAO Ecuador, 2018



Figura 38: The Amazonian *Chakra* as part of agro-tourism. Photo: FAO Ecuador, 2018

4.1.4. Farming structure and management

Description of main association and producer supporting the proposed GIAHS

The associations that are part of the Corporation for Napo Amazonian *Chakra* Associations are currently five: Kallari, Wiñak, Tsatsayaku, Alli guayusa, Inti. These organizations have managed the recognition of the Amazonian *Chakra*. However, the three organizations that initiated this process were: Kallari, Wiñak, Tsatsayaku, therefore, most of the information collected in this report comes from these three organizations that have the longest history working with the Amazonian *Chakra* and bring together the largest number of producers (Table 9). However, these organizations also serve as an example for the other organizations that are gradually forming and becoming part of this Corporation, whose main requirement is to have their production in the Amazonian *Chakra* system.

Table 9: Producer associations that began the valuation of Amazonian *Chakra* system in Napo province

Canton	Association	Producers	Main facts
Tena	Kallari	1122	90% belong to Kichwa families. 56% are women. They produce, process, and market agricultural products from the <i>Chakra</i> such as cocoa (<i>Theobroma cacao</i> L.), vanilla (<i>Vanilla</i> spp.), and guayusa (<i>Ilex guayusa</i> Loes.).
Archidona	Wiñak	909	98% belong to the Amazonian Kichwa population. Women's participation is 65%. The main products marketed are cocoa (<i>Theobroma cacao</i> L.), guayusa (<i>Ilex guayusa</i> Loes.), plantain (<i>Musa paradisiaca</i> L.), and cassava (<i>Manihot esculenta</i> Crantz).
Carlos Julio Arosemena Tola	Tsatsayaku	179	85% are Amazonian Kichwa and 55% are women. Tsatsayaku markets cocoa paste (<i>Theobroma cacao</i> L.).

Source: Torres et al. (2022)

4.1.5. Contribution to sustainability and resilience

There is a lot of evidence that demonstrates the social, economic, environmental, and cultural importance of the Amazonian *Chakra* system; however, beyond the food security and ecosystem services provided by the *Chakra*, indigenous peoples need monetary income to, for example, send their children to school (Krause and Ness, 2017). In this sense, income from commercial *Chakra* products can be a complementary source of income for the Kichwa and Kijus people. However, to improve their income, the consumption of other species that are in the *Chakra* and have no market value should be encouraged to contribute to the economic resilience of the system and its maintenance over time.

The Amazonian *Chakra* system has great potential to contribute toward food security because of its great diversity of edible plants. Furthermore, considering all types of strata (Figure 38), the integrity and functional dynamics of the *Chakra* landscapes, the similar positive effects of this agrosystem, and the fundamentals of forest resilience, this traditional knowledge of the use of this system can benefit other tropical regions of the world.

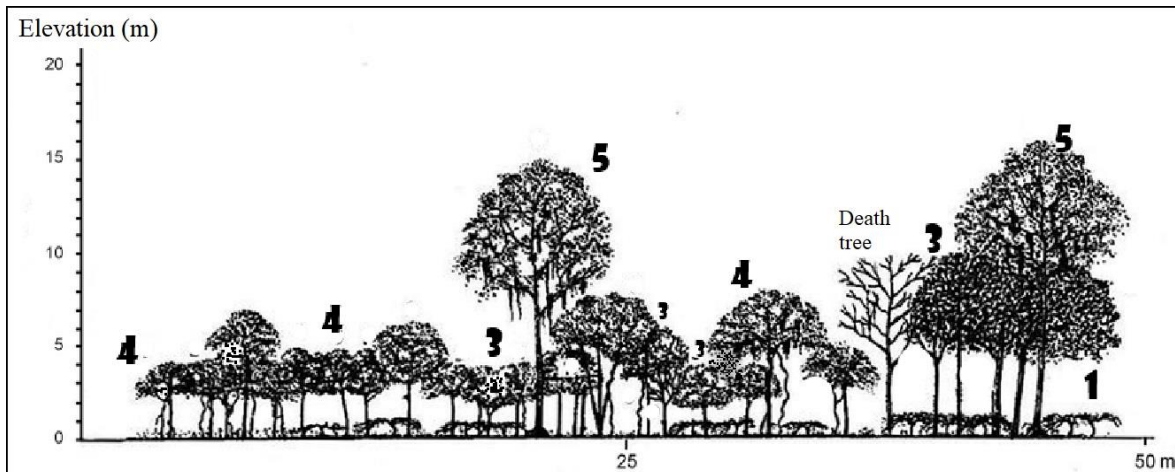


Figure 39: Parameters of vertical profile of Amazonian *Chakra*: 1) no direct light; 2) receives some light from somewhere; 3) receives some light from above; 4) receives a lot light from above and 5) emerging tree, in timber, medicinal, fruit and ornamental plants in the Amazonian *Chakra*. Source: Tanguila R. (2021).

4.1.6. Threats and challenges

- It provides low cash income for households to meet their basic needs other than food (Coq-Huelva et al., 2018), which has led many indigenous people to engage in the market economy, i.e., conventional agriculture and off-farm employment. In recent years, several species with market value - mainly cacao - have been incorporated into the *Chakras* to improve income and motivate producers to continue with this biodiversity- and culture-friendly production system (Lehmann & Rodríguez, 2013; Torres et al., 2015).
- Over the last few years, the use of third-part certifications for Amazonian *Chakra* products has been strengthened, but the challenge of meeting the costs of these types of certifications for small producers persists, which makes it difficult for them to access special markets. To face these challenges, the Corporation of Amazonian *Chakra* Associations has developed a Participatory Guarantee System (PGS), a type of certification based on a social control and collective action, to recognize the principles at economic, social, environmental and culture levels that are intrinsic to Amazonian *Chakra* System. This PGS is called Amazon *Chakra* Seal.

4.2. Agrobiodiversity

4.2.1. Cultivated and harvested plants and reared animals

The Amazonian *Chakra* is a polyculture cropping system with a high level of biodiversity present in its different elements, one of which is the existence of a high number of timber and fruit trees inside the farm and often outside the forested area (Torres et al., 2015; 2022; Vera et al., 2019; 2017; Coq-Huelva et al., 2017b). However, it is not possible to approximate their type and number because of the high biodiversity of the Amazonian forest and the fact that many tree species grow in a way that is very discontinuous from a territorial perspective.



Figure 40: Families harvesting cassava in the Amazonian *Chakra*. Pumayacu community, Napo.
Photo: MCYP 2014

There are elements in the Amazonian *Chakra* that clearly address external markets, while other crops are aimed at family consumption and altruistic exchange with friends and relatives. On the one hand, a main crop with a clear commercial purpose exists. As there are strong monetary needs in farmers' families, the *Chakra's* operation is generally governed by cocoa production. However, other crops that are primarily for family self-consumption are also present. Two crops are particularly relevant: banana and cassava. A typical farm had a mix of cocoa, banana, and cassava (Coq-Huelva et al., 2017b).

Species and varieties within the Amazonian *Chakra* system

A series of inventories and analyses of the maintenance and adaptation of species have been developed from a permanent monitoring of the state of the agrobiodiversity of the Amazonian *Chakra*, from interinstitutional spaces, based on the information provided by *Chakramamas*

and *Chakrayas*⁴ identifying more than 100 plant species (see Table 10), characterized by their use, the state of conservation, linkage to markets; and, over the last years the adaptive capacity of the same ones to the effects of the climate change.

Table 10: Sample of the species cultivated in the Napo Amazonian Chakra

Trees		Other useful plants	
Common name	Scientific name	Common name	Scientific name
Avocado	<i>Persea americana</i>	Knotweed	<i>Poligorum</i> sp.
Mahogany	<i>Switenia macrophylla</i>	Matri muyo	<i>Clavija procena</i>
Anamora	<i>Ormosia coccinea</i>	Nettle	<i>Urtica dioica</i>
Eggfruit	<i>Pouteria</i> spp.	Toquilla palm	<i>Cardulovica palmata</i>
Peru balsam	<i>Myroxilon balsamum</i>	Cassava	<i>Manihot succulenta</i>
Cabrlea	<i>Cabrlea canjerana</i>	Indian shot	<i>Canna incia</i>
Cocoa	<i>Theobroma cacao</i>	Chili	<i>Capsicum</i> sp.
Caimito muyo	<i>Micropholis chrysophyium</i>	Garlis	<i>Allim sativum</i>
Cinnamon	<i>Ocotea</i> spp.	Rice	<i>Oryza sativa</i>
Guadua	<i>Guadua angustifolia</i>	Itchgrass	<i>Rottboelia cochinchinensis</i>
Cedar	<i>Cedrela odorata</i>	Sweet potato	<i>Ipomea batatas</i>
Chambira palm	<i>Astrocaryum chambira</i>	Beans	<i>Phasecius vulgaris</i>
Piasaba	<i>Aphandra natalia</i>	Guineo	<i>Musa</i> spp.
Chonta caspi	<i>Trichilla</i> sp.	Lemon verbena	<i>cimbopogon citratus</i>
Chuncho	<i>Cedrelinga catenaeformis</i>	Ginger	<i>Zingiber officinale</i>
Coco	<i>Cocus nucifera</i>	Maize	<i>Zea mays</i>
Corcho	<i>Apeiba membranaceae</i>	Peanut	<i>Arachis hypogaea</i>
Guaba	<i>Inga</i> sp.	Baby banana	<i>Musa</i> spp.
Guabilla	<i>Inga</i> sp.	Taro	<i>Colocasia esculenta</i>
Guarango bravo	<i>Prosopis pallda</i>	Papaya	<i>Carica papaya</i>
Guayusa	<i>Illex guayusa</i>	Plantain	<i>Musa paradisiaca</i>
Laurel	<i>Cordia alliodora</i>	Pinneape	<i>Ananas comosus</i>
Mandarine	<i>Citrus reticulata</i>	Pia	<i>Aechmea strobiliacea</i>
Morete	<i>Mauritia flexuosa</i>	San Pedro	<i>Cois lacyma-jobi</i>
Orange	<i>Citrus sinesis</i>	Ayahuasca	<i>Banisteria quitentis</i>
Pal heart	<i>Euterpe preclatoria</i>	Monkey tamarind	<i>Macuna</i> spp.
Pambil	<i>Iriarteia deltoidea</i>		
Pigüe	<i>Piptocoma disccolor</i>		
Dragon's blood	<i>Croton lechleri</i>		
Tamburo	<i>Vochysia</i> spp.		
Tocota	<i>Guarea</i> sp.		
Ungurahua	<i>Oenocarpus bataua</i>		
Yuyun	<i>Terminalia oblonga</i>		

Source: Grijalva et al. (2011)

Likewise, Table 11 shows some of the tree and palm species most abundant in the Amazonian *Chakra*.

⁴ Name given to the women and men of the *Chakra* who have the necessary knowledge to growth and maintain the *Chakra*.

Table 11: Main tree species of high commercial value in local and national markets found in the Amazonian Chakra with agroforestry cacao (zone proposed as GIAHS)

Common name	Scientific name
Laurel	<i>Cordia alliodora</i> (Ruiz and Pav.) Oken
Spanish cedar, Cedro	<i>Cedrela odorata</i> L.
Seike, chuncho	<i>Cedrelinga cateniformis</i> (Ducke) Ducke
Kapok, Ceibo	<i>Ceiba samauma</i> (Mart.) K. Schum.
Balsam, Balsamo	<i>Myroxylon balsamum</i> (L.) Harms
Batea caspi	<i>Cabralea canjerana</i> (Vell.) Mart.
Capirona	<i>Capirona decorticans</i> Spruce
Guayacan negro	<i>Minuartia guianensis</i> Aubl.
Guayacán	<i>Tabebuia chrysantha</i> (Jacq.) G. Nicholson
Canelo amarillo	<i>Nectandra cissiflora</i> Nees
Cinnamon, Canelo	<i>Ocotea amazónica</i> (Meisn.) Mez
Mahogany, Caoba	<i>Swietenia macrophylla</i> King
Pungara	<i>Clusia ducuoides</i> Engl.
Tamburo	<i>Vochysia biloba</i> Ducke
Paso	<i>Gustavia macarenensis</i> Philipson
Velvet shrub, Pigüe	<i>Piptocoma discolor</i> (Kunth)
Oak, Yumbingue	<i>Terminalia Amazonia</i> (J.F.Gmel) Exell,
Sangre de Gallina	<i>Otoba parvifolia</i> (Markgr.) A.H. Gentry
Maní de árbol	<i>Caryodendron orinocense</i> H. Karst.
Intachik	<i>Chimarrhis glabriflora</i> Ducke
Gurango	<i>Piptadenia pteroclada</i> Benth
Avocado, Aguacate	<i>Persea Americana</i> Mill.
Tamburo	<i>Vochysia bracedliniae</i> Standl.
Pachaco	<i>Schizolobium parahyba</i> (Huber ex Ducke) Barneby
Pasu	<i>Gustavia macarenensis</i> Philipson
Chuco/wiruro	<i>Ormosia amazonica</i> Ducke
Chonta duro	<i>Bactris gasipaes</i> Kunth
Yunyun	<i>Terminalia oblonga</i> (Ruiz & Pav.) Steud.
Fósforo	<i>Schefflera morototoni</i> (Aubl.)
Arabisco	<i>Jacaranda copaia</i> (Aubl.) D, Don

Sources: Torres et al. (2022; 2015); Coq-Huelva et al. (2017b)

4.2.2. Ecological functions

The Amazon *Chakra* maintains ecological functions that contribute to the conservation of Amazonian biodiversity, in many cases to the conservation of endemic, vulnerable, and threatened species. Detailed information on this topic was published by Vera et al. (2017), who show in detail the indigenous agricultural practice in the western Amazon Basin known as *Chakra*. A summary of these results is shown in the Table 12.

Table 12: Ecological function of the Amazonian Chakra system proposed as GIAHS

A central aspect underlying the significance of the Amazonian *Chakra* farming is the opportunity for biodiversity conservation, particularly endemic, vulnerable, and threatened species, as well as basic ecological and genetic fingerprints. Based on our findings, the existence of two endemic

species, *Alseis lugonis* (Rubiaceae) and *Stryphnodendron porcatum* (Fabaceae) has probably been facilitated by indigenous farming practices and the forests' resilience and stability. The same can be said for endangered species, because the buffer zone includes four taxa listed in this category, which, along with other species, form part of the dominant elements of this unique floristic assemblage. These plants are also useful resources for both local indigenous people and fauna. For example, the species Cedar (*Cedrela odorata*), Mahogany (*Swietenia macrophylla*), and Chuncho or seike (*Cedrelinga cateniformis*) are valuable for timber (Porro *et al.* 2012); the Dragon's blood (*Croton lecheri*) is used for medical purposes (Jones 2003); and *P. rigida* is eaten by animals, especially spider monkeys (Suarez 2006). Nonetheless, according to the IUCN (2016), the rarity status of the vast majority (92%) of the species in this area remains to be evaluated, which is a serious knowledge gap that poses constraints in terms of proposing proactive options for species conservation. Moreover, the intrinsic dynamics of the Amazonian *Chakras* may have impacts on diverse ecological attributes associated with species turnover. It is known that Agroforestry System (AFS) and other wooded areas generate different ecosystem services, such as preventing the erosion of soils from wind and water and retaining nutrients and water table levels (FAO 2015).

Source: Vera *et al.* (2017)



Figure 41: Ecological attributes of the Amazonian Chakra, characterized by the presence of a diversity of trees, palms and shrubs., Napo. Photo: Bolier Torres, 2017.

4.2.3. Contribution of agrobiodiversity to the sustainability and resilience of the system

Table 13: Main useful species of fruit trees, bushes and palms that store carbon and are used for consumption in the Amazonian *Chakra* with cacao in the Sumaco Biosphere Reserve

Scientific name	Family	Common names		Uses					
		Kichwa	Spanish	Food	Medicine	Spiritual	Crafts	Drink	Material ⁵
<i>Bixa orellana</i> L.	Bixaceae	Puka manturu	Achiote	x	x		x		x
<i>Theobroma bicolor</i> Humb. & Bonpl.	Sterculiaceae	Patas yura	Cacao blanco	x	x				
<i>Grias neuberthii</i> J.F. Macbr	Lecythidaceae	Pitun	Pitón	x	x				x
<i>Ilex guayusa</i> Loes	Aquifoliaceae	Waysa	Guayusa		x	x		x	x
<i>Sanago racemosum</i> (Ruiz & Pav.) Barringer	Grossulariaceae	Chiri waysa	Panka grande		x	x			
<i>Gustavia macarenensis</i> Philipson.	Lecythidaceae	Pazu	Paso	x	x				x
<i>Gustavia longuifolia</i> Poepp. ex O. Berg									
<i>Pouteria caimito</i> Radlk.	Sapotaceae	Tarpu aviyu	Caimito	x	x				x
<i>Micropholis melinoniana</i> Pierre	Sapotaceae	Aviyu	Caimitillo	x	x				x
<i>Micropholis venulosa</i> Pierre									
<i>Artocarpus altilis</i> (Parkinson) Fosberg	Moraceae	Paparawa	Frutipan	x	x				x
<i>Brugmansia arborea</i> (L.) Lagerh	Solanaceae	Wantuk	Floripondio		x	x			
<i>Persea americana</i> Mill.	Lauraceae	Palta yura	Aguacate	x	x				x
<i>Bactris gasipaes</i> Kunth	Arecaceae	Chunta	Chonta duro	x	x		x	x	
<i>Mauritia flexuosa</i> L.f.	Arecaceae	Muriti	Morete	x		x	x	x	
<i>Iriartea deltoidea</i> Ruiz & Pav.	Arecaceae	Pushiwa	Pambil	x	x		x		x
<i>Inga edulis</i> Mart.	Fabaceae	Pakay	Guaba de bejuco	x	x				x
<i>Pouroma</i> spp.	Urticaceae	Pikuanka	Uva del monte	x				x	x
<i>Annona cherimola</i> Mill.	Annonaceae	Chirimoya	Chirimoya	x	x			x	x
<i>Psidium guajava</i> L.	Myrtaceae	Guayaba	Guayaba	x	x			x	x

Source: Torres et al. (2015).

4.2.4. Contribution of the Amazonian *Chakra* to climate change mitigation

The Amazonian *Chakra* can be considered as a stage in the evolution of the Amazon rainforest. In fact, the forest is still present in most of the farms that use the Amazonian *Chakra* as the main productive system, in these farms the forest represents about 40% of the total area (Vasco et al., 2018, Torres et al., 2018b). In this context, it is significant to know

⁵ Used as a material for construction, lumber, house roofing, etc.

the importance of the main tree, fruit and palm species that contribute to carbon storage in the *Chakra* system. Considering that the replacement of tree species from mature forests to agroforestry systems (AFS) can influence the carbon balance. In this scenario, the new dominant and fast growing species of the Amazonian *Chakra* AFS such as *Ochroma pyramidale*, *Piptocoma discolor*, *Cordia alliodora*, *Inga* sp., etc., can play an important role as a carbon sink during the initial stages of landscape restoration. Therefore, the Amazonian *Chakra* system can be considered as an agricultural alternative to mitigate climate change (Torres et al., 2015; Vera et al., 2019).

In a recently study conducted in the area proposed as GIAHS, it was determined the amount of carbon sequestered in the Amazonian *Chakra* system with agroforestry cocoa compared to primary forest and cocoa monoculture. The results show significant carbon stocks in aboveground biomass, soils at different depths and in soil litter, the results show significant carbon stocks in aboveground biomass, soils at different depths and in soil litter, ranging from 140.33 to 206.65 Mg C/ha in the Amazonian *Chakra* (Torres et al. 2022) (see Figure 41).

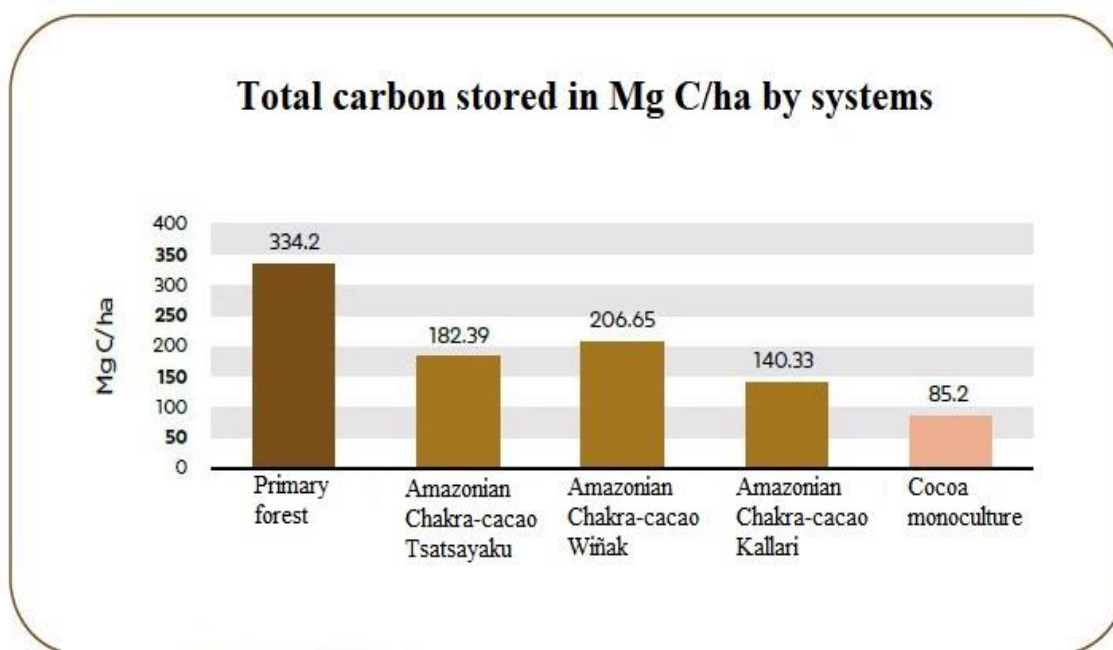


Figure 42: Carbon stock (in soil, litter and aboveground biomass) in Mg C/ha in the Amazonian *Chakra*-cacao, primary forest and cocoa monoculture in the area proposed as GIAHS. Source: Torres et al. (2022).

However, in terms of carbon stored in aboveground biomass, on average, the Amazonian *Chakra* of the Kallari Association presents the highest results with 38.67 Mg C/ha, followed by Wiñak 24.84 Mg C/ha and, finally, Tsatsayaku, with 38.67 Mg C/ha and Tsatsayaku with 24.76 Mg C/ha (Torres et al., 2022). The aforementioned authors estimated the biomass

carbon importance value index (BIV) as a function of density, basal area and aboveground biomass in percentage terms, the results showed that four forest species of high commercial value and market interest obtained the highest BIV: cedar (*Cedrela odorata*) (20.80%), followed by chuncho (*Cedrelinga cateniformis*) (20.80%), followed by chuncho (*Cedrelinga cateniformis*) (16.76%), Laurel (*Cordia alliodora*) (16.64%), and balsam (*Myroxylon balsamum*) (3.39), followed by a fruit species like the species such as guaba (*Inga spp.*) (See Figure 42).

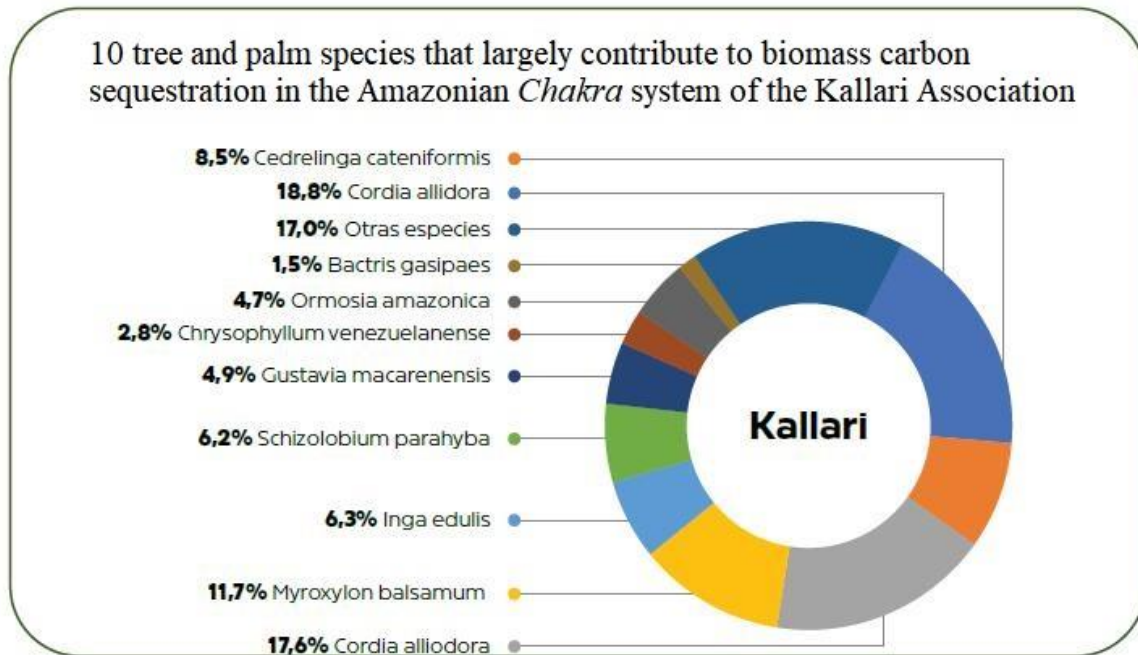


Figure 43: The 10 tree and palm species contributing to aboveground biomass carbon sequestration in the Amazonian Chakra of Kallari Association. Source: Torres et al. (2022).

It can be observed that the Amazonian *Chakra* of the producers of the Kallari Association maintain timber species of high market value, which can be attributed to the training received on tree management of the system, and to the association's attempt to improve the income of its producers.

Likewise, the aforementioned authors point out that for the Wiñak Association, the tamburo (*Vochysia brachelineiae*) is the species with the highest BIV (23.94%). followed by a fruit species such as the guaba de bejuco (*Inga edulis*) with 15.66%; followed by two timber species laurel (*Cordia alliodora*) with an index of 9.19% and guarango (*Piptadenia pteroclada*) 9.04%. Species with lower values are: peach palm (*Bactris gasipaes*), cedar (*Cedrela odorata*), avocado (*Persea americana*), pigüe (*Piptocoma discolor*), intachik (*Chimarrhis glabriflora*) and achiote de monte (*Bixa urucurana*) (see Figure 43).

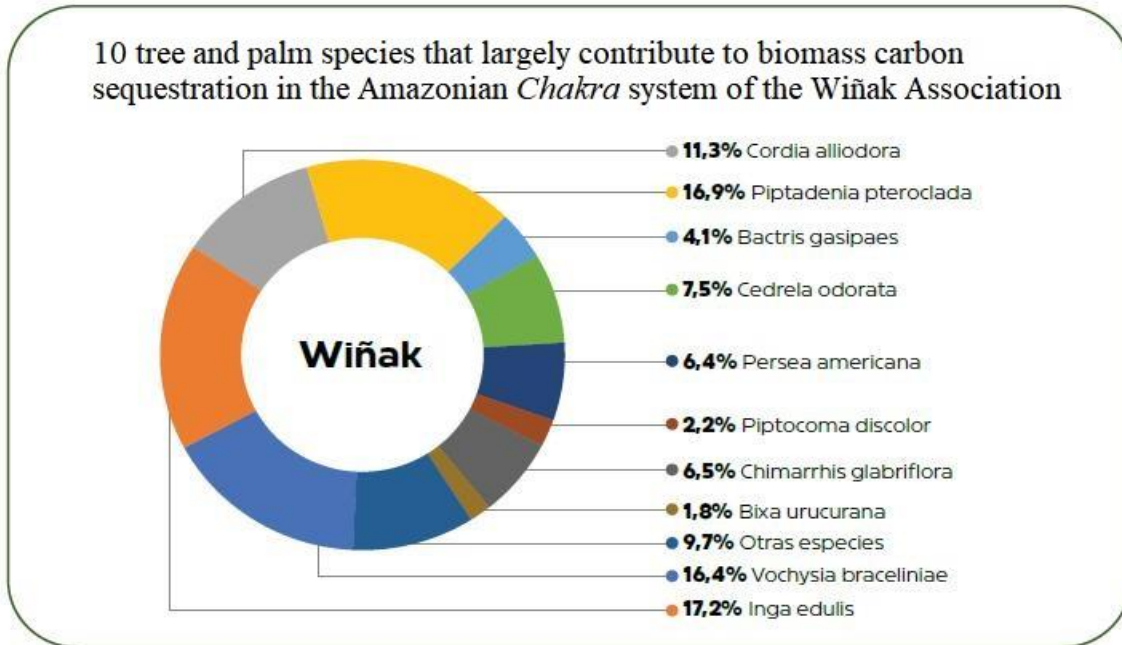


Figure 44: The 10 tree and palm species contributing to aboveground biomass carbon sequestration in the Amazonian *Chakra* of Wiñak Association. Source: Torres et al. (2022).

For the Tsatsayaku Association, the results showed that laurel (*Cordia alliodora*) is the species with the highest BIV (37.18%), followed by a fruit species such as guaba de bejuco (*Inga edulis*) with 13.96%.

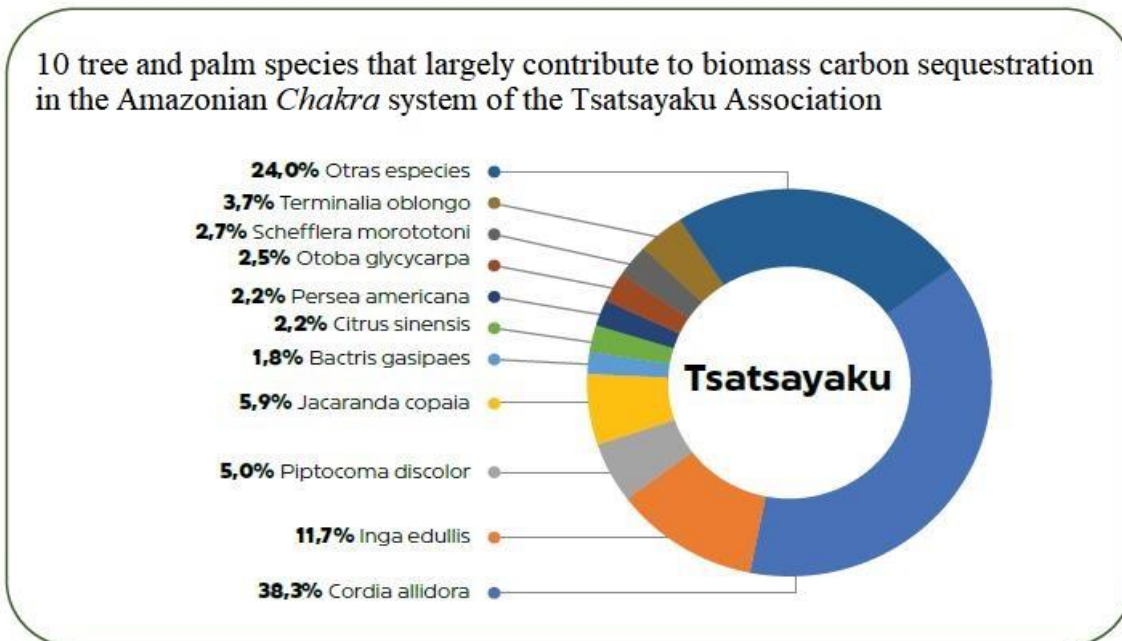


Figure 45: The 10 tree and palm species contributing to aboveground biomass carbon sequestration in the Amazonian *Chakra* of Tsatsayaku Association. Source: Torres et al. (2022).

Then with lower values are timber species such as: pigüe (*Piptocoma discolor*), Jacaranda (*Jacaranda copaia*), doncel (*Otoba glycyarpa*), fósforo (*Schefflera morototoni*), yunyun (*Terminalia oblonga*); fruit species: orange (*Citrus sinensis*) and avocado (*Persea americana*); and a palm species, peach palm (*Bactris gasipaes*) (see Figure 44).

Summarizing, in one hectare of cocoa in the Amazonian *Chakra* system, an average between 140.33 to 206.65 Mg C/ha (tons of carbon per hectare) is stored in the soil, and about 30 tons C/ha in the aboveground biomass of the system. This represents between 42 and 52% of the carbon contained in a primary forest in this same area. These results mean that, in Ecuador, the Amazonian *Chakra* is a complementary tool not only for the conservation of natural resources, but also for the mitigation of climate change through carbon sequestration. Therefore, this system is now appreciated for its management of Amazonian productive landscapes, for conservation and protection of remaining forest fragments, for increasing tree cover on farms, and for buffering and connecting protected areas. Within the *Chakra*, the diversity of species and the combination of fruit trees, agricultural crops, timber trees, palm species, and others are of special importance in the capture of carbon above and below the soil.

4.2.5. Threats and challenges

- The introduction of crops mainly oriented toward the market under monoculture systems is reducing the area dedicated to the traditional Amazonian *Chakra*, increasing families' fragility and dependence. Everything is still sown, but not in the same quantity.
- One can point out that both products and varieties are being lost (Atlas Alimentario de la Amazonia, MIES 2013), one of the factors that influence in this lost is rural-urban migration. For example one interviewee said: "*We still have everything, but the quantity is much lower because the products are no longer available as they used to be and because young people go out to study and work. We only grow cocoa and coffee for the money...*"
- There is the challenge of promoting domestic consumption for some *Chakra* products, which requires work, communication, and awareness-raising efforts at local and national levels.
- Climate change is generating changes that cause crop displacement and/or substitution. Research and action are needed on adaptation processes.
- Progress must be made along the same lines in improving efficiency in production processes.
- Market prices are a complex barrier as they do not take into account operating costs.
- The use of agrochemicals on surrounding farms to prevent pests creates difficulties in consolidating ecological management at landscape level.
- Climate change, among other consequences, is generating various pests that require specific treatments.
- Research into adaptation processes is needed.

4.3. Local and Traditional Knowledge Systems

4.3.1. Agricultural practices/technologies and associated knowledge

To characterize and describe the knowledge involved in developing Amazonian production and agro-food practices and systems, we will describe at least three main characteristics: a) Management practices relating to genetic material and conservation of the Amazonian Kichwa Culture, because of the dialogue and recreation of the pre-Hispanic Amazonian cultures; b) Agriculture adaptation to the Amazonian ecosystem: high level of rainfall, high temperatures, and fragile soils; and c) Efficient use of soil fertilization from the riverbed and reproduction of life in connection with the forest: adaptation, domestication, and diversification of forest or “sacha” species for agricultural use.

Management practices relating to genetic material, subjectivity and conservation

In keeping with what was mentioned in the introductory chapter on the cosmivision of the Amazonian Kichwa communities, this is based on a series of exchanges with other communities, both from Andean territories and from other communities in the Amazon region. Historically, the adoption of the Kichwa language was also a channel for dialogue with Andean agro-centric principles, which will be the basis for interaction with the territory and for the development of productive, economic, social, and cultural activities. In this sense, the following principles of the Amazonian Kichwa culture are highlighted

In the Kichwa world, coexistence is between people, not objects. A person is not only a human being, but also animals, plants and the elements: water, air, and earth; each one has subjectivity. In this way of understanding life, there is no separation between humanity and nature. Everything is in nature; there is no world that transcends it.

The biological differentiation process does not lead to hierarchies due to a greater physiological complexity of living beings. In the recreation of life, all are recognized as equal and important: the forest, the human community, or the deity; although with essential and specific roles for each moment. Thus, for agriculture, they are *people* with important roles: The forestland or *sacha*, where mainly wild relatives of the crops are found. The *Chakra* is the place where family and community build their relationships, where the union of the human community with nature and deities is strengthened.

The *Chakramama* is a woman, sometimes a man (*Chakrayaya*), who is the transferer of knowledge and bearer of wisdom regarding the care of a healthy and fertile *Chakra*. This is performed through rites of sacred connotation called “*paju*”.

The *Chakra* is the starting point for dialogue and interrelationship between family members, with other families, with other *Chakras*, with their environment. The *Chakra* then strengthens the bonds of the human community, and of the human community with this living world, where they all are relatives, everyone has their mother and they all live as a family, in ayllu:

The Ayllu is a community of relatives made up of human beings, members of nature and members of the waca community or deities. It is proposed to add the rune concept to the

western concept of man as a ‘rational animal’, including the notions of nature and deity into its identity. The rune is also nature and deity, and shows itself as such under specific circumstances, a presentation that is not a representation, but rather to be shown, in a form according to the circumstances (Rengifo, 1990).

All the components of Ayllu are synchronised in an annual cycle or wata; the activities within this cycle are the result of conversations and relationships between the different human rune communities, wacas community, and the natural sachas communities, in a fraternal environment of deep equivalence, but it is not an act planned from outside (Greslou, 1991).

Relations between people arise from dialogue, conversation and, depending on the circumstances, do not stem from the imposition of the human on nature. The relationships between humans, nature and deities are based on raising, they are activities of permanent regeneration of life, and this regeneration takes place in the *Chakra*. All relatives of the ayllu have *Chakra*, not only runes (humans) but also animals, plants and deities (Greslou, 1991).

The *Chakra* is understood not only as the agricultural space, but the scenario for raising and flourishing all forms of life; it is a world where everyone is a *chakra* owner. In the *Chakra* everyone talks, and this talk is a kind of ‘unveiling’, of bringing out the life contained in each one.

Traditionally, having a sufficient source of good food for the family was the main objective of cultivating and maintaining the *Chakra* in different growth periods, in places previously selected according to the fertility of the soil. The family that did not have *Chakra* was considered to be lazy. To have the *Chakra* is to have a place where day by day the *Chakramama* has the obligation of teaching and educating the children and young people. “*One day the Chakramama went to weed the Chakra together with her daughter and instead of working, the mother decided to spend the day looking for her daughter’s lice, but she was surprised by the ‘lumumama’ (cassava mother), who as a punishment turned them into ‘sicu’ (guatusas) and since that day, as a sign, the guatusa steals and hurts the cassava Chakra*”, according to legend in the area (MCYP, 2015).

This production system also has a self-regulating feature. The aim is to manage several crops intended for sale, in line with their tradition, culture and quality management, such as cocoa and vanilla; but it is also a strategy to secure food production. Overall, the way the *Chakra* is managed contributes to maintaining the culture, traditions and agrobiodiversity.

The way Kichwa *people* relate to each other is through conversation, the act of talking, communicating, and developing harmony between themselves, because as mutual conversation arises, education flows and life reproduces itself in matter and meaning. Conversation is, above all, a pedagogical activity in which the companion-teacher is an integral part of the creative act. This conversation is a continuous action. Agriculture is therefore considered an integrated process between the different subjects.

Conversation allows people to be brought up among themselves. Communicative action does not end in someone’s action to change the other, but in reciprocal upbringing, the act of

raising or being raised. Communicative action is learned in conversation with others, in listening and participating. This particular way of understanding the environment develops a sense of interdependence between all the elements of the territory.

These principles of subjectivity, dialogue, and upbringing result in a farming culture in which the center is not only the human being and her/his purpose; it is not limited to food production but to the understanding of the entire community of people (humans, animals, vegetables, minerals, and water) that inhabit the territory and even the deities, and care and reproduction of their lives. In a diverse and changing world, learning is circumstantial and implies knowing how to bring up in a way that is valid for that set of circumstances.⁶

In this place of upbringing, human beings, members of nature, and deities converse. A *Chakra* will be healthy if all other *Chakras* in the landscape are vigorous. In this way, the health of the human community is linked to the health of its *Chakras* and nature.

The *Chakra* will be in permanent dialogue with the forest. It is a dialogue between the space for reproduction and the space where species and animals live in nature.

The crops, management, and development of the *Chakras* imprint the character of knowledge of Kichwa human culture: technical skills related to farm tasks have a large repertoire; the stars are agricultural indicators; agriculture is the core of social organization; arts have a profound agricultural content; and language is rich in agricultural expressions. Deities and their rituals are related to special circumstances of agricultural life.

The location of the river determines its importance for the daily mobility of people within and outside the community, as well as its use for activities such as fishing, washing clothes, children's games, and personal hygiene.

The *Chakra* has a family and community character. The *Chakramamas* take ownership of their present and future in Napo; they tell us in their own words the testimony of their hard work for the support of their families and communities.

Agriculture adaptation to the Amazonian ecosystem

Agriculture in the Amazonian *Chakra* is a three-tier structure that replicates the surrounding rainforest in miniature. On the upper level, the treetops and the broad leaves of timber and fruit trees, palms, banana, and papaya, etc., offer, here and there, an initial barrier against the destructive action of rain and sun, while on the intermediate level, cassava, little oranges, and certain shrubs provide a relatively dense and almost uniform vegetative cover that helps protect the soil against leaching. Finally, at ground level, the tangled carpet of vegetation of taro, pumpkin, yam, and sweet potatoes unfolds in patches.

⁶ *You learn to harvest during the harvest, and it is for the harvest of that moment. If it is time for the moon to indicate that you must sow, you must sow. You cannot always reclaim land. It has to be done when the earth asks for it. Each thing must be done in a certain moment and in good spirits. The music that is sung must accompany nature; it must not disturb it. The music of sowing should be played and danced in the sowing and not in the harvest.*

This cultural imitation of natural vegetation counterbalances the destructive effects of the climate with remarkable efficiency and enables optimal use of the mediocre potential of inter-river soils. Even though it is much less dense and stratified than the rainforest, the tiered vegetation of the *Chakra* contributes to delaying the inevitable erosion of the soils, especially on hillsides.



Figure 46: Amazonian *Chakra* adapted to the tropical ecosystem, characterized by high levels of rainfall, high temperatures and fragile soils. Photo: Bolier Torres, 2015

A more sensible and, in the long run, equally productive strategy is cultivation in (family or communal) spaces within the natural forest. This strategy, practiced by most forest peoples today, seems to have been the dominant strategy throughout history (Valdez, 2014) and of which the Amazonian *Chakra* system is a current expression.

The selective and limited clearing of vegetation to gain cultivation space is the common practice in a *Chakra*. Since ancient times, people have understood the frail nature of the soil in this environment and therefore developed techniques to protect and prolong the life of the organic layer of the soil. Prolonged exposure of the soil to sunlight and direct rainfall reduces the presence of natural nutrients and consequently its productivity, so this clearing is not based on indiscriminate logging over large areas, but rather on the adequacy of cultivation space in the middle of the forest.

Due to their physicochemical characteristics, soils have a low cationic exchange capacity, and therefore, the dissociated nutrients in the soil solution run off together with the rainwater into the deeper layers.

Hence, shade from trees is necessary to maintain a natural balance in the organic layer. Many authors claim that in the Amazon, agriculture mirrors in some way what nature has established to protect itself (Valdez, 2014). This statement underpins the definition of the *Chakra* as an AFS that surpasses the definition of a family garden.

In this sense, the need to work for soil fertility and protection, and the adaptation of crops was covered by the following strategies:

- Soil is fertilized via the transfer and use of organic matter from the nearby river beds.
- Agroforestry designs include perennial species that guarantee shade and short-cycle crops or shrubs for soil coverage and protection, as well as itinerant programs for the recovery of soil fertility.

This means that the Amazonian *Chakras* are agroforestry arrangements, diversified and successive, linked to the river beds and their times of flooding and drought, which gives them an itinerant character both in terms of time and space.

Efficient soil fertilization from the riverbed

The characteristics of the Amazonian territories require the design of production systems that not only develop in soils suitable for agriculture, but also contribute to the enrichment and protection of the soil, water basins, and forests.

In this sense, *Chakras* are designed and managed as riverbed agricultural systems, closely linked to the banks of the Water Units of the Arajuno River (Upper Napo), the Lower Napo River, and their tributaries. The knowledge and reading of the moments of flooding and droughts determine the time for agricultural practices that take advantage of fertile soils around river banks or ponds.

In the dry season, when rainfall decreases in the higher areas, the rivers in the lower zone leave extensive cultivable areas on their banks. These are the terraces, flood plains, or low river banks with soils of recent alluvial origin. In many cases, artificial flood areas are used to collect large amounts of fertile material.

Fertility levels are produced from the dragging of organic matter, mainly leaves, branches, stems, roots, and fruits coming from the eastern Andes. This organic matter is deposited in spaces formed in some cases by the river islands themselves, or spaces set up by the community in the lowlands, which together with the high temperatures, accelerate the process of organic matter decay. The farmers store it for use in different crops, as well as to enrich the wild species area.

After the cycle of drought is over, the new rains flood the same area or other places along the marginal strips of the rivers.

‘The river comes and goes as it pleases, it leaves plants sown, it leaves the ground fertilized. In short, the river is in charge, it does us favors but also destroys. It has its time that the elders know well:

There is a time when the river bursts its banks (“bursting is coming,” they say), then flooding leaves the soil well fertilized; the water comes in large amounts, that is fertilizer. It leaves islands in its wake; these are very fertile. Any sowing on islands gives good results. Now, when the river forms the island, it destroys all the vegetation, trees, and branches, everything is left to rot. After a month, the island is filled with plants, everything is covered with plants. You have to wait for a while before you can clear all that, and then comes the sowing.

But there is also the time of destruction: for example, if the river has created an island, after 5 or 6 years that island disappears, and there is a new island somewhere else. Then the river gives to some people, and then it takes away to give to others”. (Dario Tunay. Canambo Community, Chontapunta Parish).

The most distant areas from the banks which are flooded again after 10 years or more, are very fertile, being ideal places to establish *Chakras* with perennial crops, fruit trees, and timber trees. These areas host the largest surface of *Chakras* including cocoa, coffee, and guayusa crops. Extension and reproduction of life in connection with the forest: adaptation, domestication, and diversification for agricultural use of wild (sacha) species.

4.3.2. Natural agricultural resources management

Traditional knowledge related with the moments of the Amazonian *Chakra* formation

The Amazonian *Chakra* is established following the process of soil enrichment, natural fertilization, designed and organized according to intercropping and diversified crops, in successive, diversified and agroforestry designs. Table 14 below summarises the sequence of steps in the process of designing and forming an Amazonian *Chakra*.

Other farm species of commercial value are added to these already formed *Chakras*, or when a *Chakra* is established in less flooded zones and when the forest canopy is opened, such as fine or flavour cocoa or coffee.

Table 14: *Main useful species of fruit trees, bushes and palms that store carbon and are used for consumption in the Amazonian Chakra with cacao in the Sumaco Biosphere Reserve*

River bed or lowland recovery	Once the rainy season is over and the water has flooded or formed an island, plants such as Pindo and Yutzo cover the land which, in turn, has been fertilized by the river that drags sand, silt, clay, minerals and leaf litter along its course and deposits it on the river bed or islands.
Clearing	The first step is to clear the land using a machete and axe for large trees.

Soil formation	A period of approximately one month is allowed when the material is considered to have been sufficiently decomposed, it is then said that new soil has been formed.
Chipping and fertilize	All the materials from clearance are chipped and deposited in the same soil as fertilizer.
Crop*	The first crop to take over the land is the cassava which is planted following certain previous processes of purification and selection. Some variants include an initial planting cycle with maize in certain lots, or intercropping of maize-peanut-cassava and plantain
Contour planting	Fruit trees such as bananas, peach palm, grapes, guaba, pineapples, limes, limes and other citrus trees should be planted immediately on the edges of the cassava <i>Chakra</i> . Often cane.
Resting and recover	After 2 to 4 cycles of sowing - harvesting, which includes dozens of crops, intercropping and rotations, the functional rest period of the soil begins, allowing the soil to recover.

Traditionally, the Amazon *Chakra* maintains a process of formation cycle. This cycle accounts for family and sometimes community work, and traditionally leaves a trace in the territory for the recognition of the limits and conservation of biodiversity with species that can be useful in obtaining biopreparations as medicine and food.

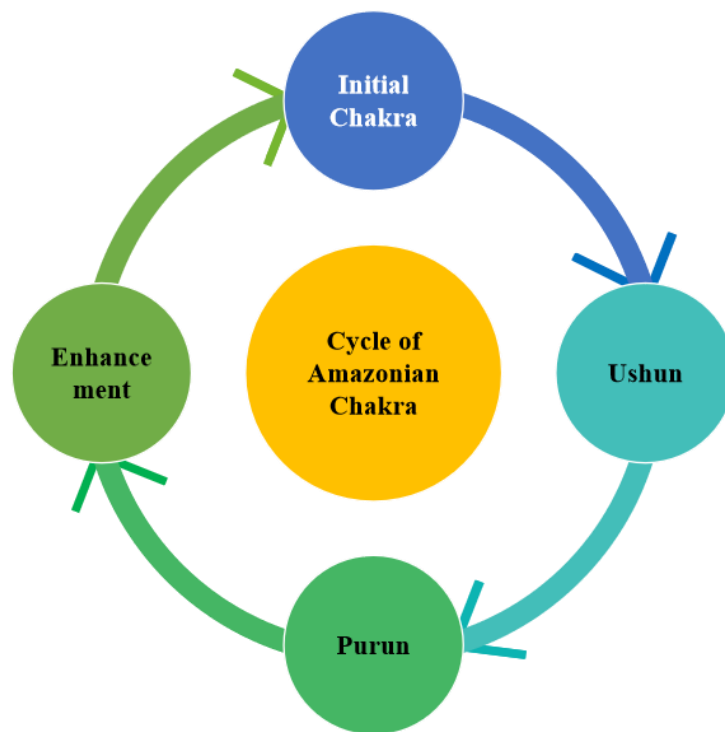


Figure 47: Time cycle of the Amazonian Chakra: Initial Chakra-ushun-purun-enhancement



Stage 1: **Initial Chakra**: it does intercropping that satisfies the annual food needs of the family, especially cassava, chili, pumpkin, papaya, bananas, pineapples and other food species; it is installed in primary or secondary forest to take advantage of the organic fertility of the soil, it is cropped for several years.



Stage 2: **Ushun**: After the first year or the first harvests, it takes the name of *ushun*, that means the replanting of cassava, other tubers, more plantains, useful palms and fruit trees. This is an initial agroforestry system.



Stage 3: **Purun**: all the traditional agroforestry system (AFS) (Amazonian *Chakra*) arrangements and strata have been established, having edible, medicinal and forest fruit species, in forest formations somewhat similar to those of the secondary forests (Landázuri, 2013).

Figure 48: Amazonian Chakra in the initial formation phase: growing cassava and plantain. Pumayacu parish. Photo: MCYP 2014

The cyclical management of the *Chakra-ushun-purun* guarantees the conservation of soil, forest and biodiversity; it involves practices of local communities with a focus on culture and

control of their own territory. The Figures 46 and 47 illustrates the main phases and describes the detail in each stage.

When the *Chakra* is already formed, the rainy or dry season also determines the activities to be carried out both in the *Chakra* and in the *Sacha* (forest), which also determines the present and future production dynamics (Table 15).

Defined as an itinerant agricultural system both temporally and spatially, the *Chakra* is a productive space that includes various spatial or temporal arrangements developed in a forest glade or enhancement forest, which is deliberately prepared so as not to interrupt the food supply, as well as to ensure the production of food for markets.

Table 15: Amazonian *Chakra* activities according to the rainy season

Season	Activities in the <i>Chakra</i>	Activities in the forestland
Light rainfall	Short season planting: soft maize, cassava, beans, plantain and regrowth.	Germination of seeds dispersed by wind and animals.
Low rainfall	Maize regrowth, perennial fruits. Peanut sowing. <i>Chakra</i> care.	Flowering of crops and trees, honeycombs, bush shoots. Time for hunting.
Heavy rainfall	Adjustment of the lowland, islet. Not suitable time for working the <i>Chakra</i> .	The forest reaches its greatest thickness and diversity. Time for collecting wood, branches, fibres, honey, medicinal plants.

Source: INIAP 2010

Since ancient times, the intensity of exploitation and soil fertility of the Amazonian *Chakra* determines the time in which they enter a resting phase called enhancement (Stage 4); for one to three years, the enhancement develops without being intervened, the formation of the secondary forest begins where the pioneer or fast-growing species appear and populate it.

In other cases, resting periods have been reduced for annual crop intensification, increasing short-term economic returns; but patterns of biodiversity, species richness, carbon sequestration and sustainability are declining.

The complex multistrata feature of the Amazonian *Chakras* comprises a dynamic system of land use, leaving the soil to rest from time to time. The rotation time depends on the *Chakra* crops which can be divided into: cocoa, cassava, maize and coffee, where the first and last species are perennial and the other species are seasonal.

In recent years, special attention has been given to cocoa crops, not only because it increases household income, but also because of the harmonious adaptation to agroforestry systems, providing alternative economic income and balancing the conservation of the traditional diversified and permaculture system (see Table 16).

The conservation and guarantee of sufficient and diverse production from the *Chakra*, requires maintenance and care practices. Various alternatives for the conservation and improvement of the system have been developed by producers' organisations with local and external technical support.

Table 16: Example of the Amazonian *Chakra* Management with diversity agroforestry cocoa crops.

System determinants	Traditional	Innovation and improvement
Type of species and main varieties	Cocoa (various types, local seed), maize, cassava	Fine or flavour cocoa, locally selected seed. species increase and diversification: cassava, fruit trees.
Management systems	Low density multi-specific shaded cocoa (250 plants/ha) without formative pruning or maintenance. <i>Chakras</i> (monocrop to AFS)	Multi-specific shaded cocoa with economic value (timber crops, legumes, native fruit trees) higher density (625 plants/ha) formative pruning and maintenance. <i>Chakras</i> to AFS improvement
Technology	Little inputs, manual	Little inputs (rehabilitation and renewal)
Production for sale	Cocoa: quantity and quality	Cocoa: higher quality and diversity
Labour	Household	Household, seasonal worker
External fertilizers	No	Yes (organic practices)
Conservation practices	Litter coverage	Litter biomass and living coverage
Pests and disease management	No	Yes, cultural and organic management practice
Weeds management	Manual clearance (annual)	Manual clearance (3 annual)

Source: (Arévalo, Vera and Grijalva, 2013)

Main intercropping and diversified crops

The Amazonian *Chakra* integrates various crops with different purposes: shade management, ground level coverage, growth guides, living barriers, use of area for income crops, pest control, and others.

“To maintain and preserve product quality, it is important to combine the diversity of plant species to harmonise the ecosystem’s balance”. Pedro Domingo Andy Vargas, Coordinator of the Provincial Technical Team of Napo Bilingual Office - GIZ

The vegetable components of the *Chakra* show a high agro-biodiversity represented by multiple use species that are located in different strata and use categories, highlighting those of edible use such as: cassava, plantain, maize, rice, beans, peanuts, taro, among others; which are associated with cocoa or coffee along with fruit and timber trees for domestic use

and sale. For these reasons, the *Chakra* represents a local strategy for *in-situ* conservation of biodiversity (Grijalva et al., 2011; Arévalo et al., 2013).

Cassava, the mother of the *Chakra*: the cassava marks the rhythms and signs (indicator) in the Amazon *Chakra*. It can be sown in several periods and, according to the variety, is harvested between 6 and 8 months. It can be sown alone or in intercropping, and is generally the first plant to be cropped after the riverbed and clearance.



Figure 49: Cassava harvest - Napo. Photo MCYP, 2014

Tusilla maize (sara), an Amazonian adaptation: it has been designed for extreme humid conditions, it is a fast growth early variety. Its sowing system is very unique

Cocoa: the *Fine or Flavour* variety grows in this traditional system. Part of its unique organoleptic characteristics are due to its special intercropping conditions, assimilating aromas and flavours from the agrobiodiversity of the system. For this reason, it has positioned very well in the markets, and its origin is recognised and valued by the national and international chocolate industry.

Intercropping and rotation:

Intercropping is a strategy that responds to the need for crop diversification, both to satisfy family food demands and to protect the soil; in that sense, some basic criteria for intercropping and rotation mentioned by the Kichwa communities (MCYP, 2015) are:

- Peanut is a legume that provides nitrogen, a source of vegetable protein, and, because of its structure, it gives permanent coverage.

- Cassava, is the main crop and source of carbohydrate, due to its type of root and tuberosity, fragments the soil.
- Maize, in an intermediate layer, is used for human consumption and for animal feed depending on whether it is harvested tender or ripe.
- Plantain, in the upper stratum, efficiently captures sunlight and gives shade and soil coverage, in addition to providing abundant litter for nutrient replenishment.
- Fruit and timber trees in the upper tier, to regulate light and the influence of rain, provide food, shelter for wildlife and housing materials.
- The cassava-plantain-peanut-maize intercropping, should be planted in a separate lot
- Cassava can be planted in 3 or even 4 cycles, just like bananas. Sometimes cassava is planted alone, but also with other species, according to the criteria and needs of the *Chakramama*.
- In the companion planting cassava-plantain-peanut-maize, the harvesting times are considered.
 - Peanut: 3 months
 - Maize: 4 - 5 months
 - Cassava: 6 - 8 months
 - Plantain: 1 year
- No coffee or cocoa is planted with cassava
- Coffee can be planted with limes, guabas and other shaders.

Maintenance of the system from Peasant Family Farming

One of the characteristics of the Amazonian *Chakras* is the crop diversity, both within the *Chakra* and between *Chakras*. Although there are patterns of setting-up, management and composition, the *Chakra* have characteristics that differentiate or complement them to provide family goods. This is due to the ecological diversity (ecological niches) that provide a variety of soils, microclimates and plants in small areas, but also to the adaptation and recreation of the human community's upbringing. Every farmer raises plants differently in different *Chakra*. Hence, peasants do not reproduce knowledge, but - as we said - they recreate knowledge by adapting it to their specific circumstances. Under this approach, 'homogeneous production zones' make little sense.

One of the first characteristics to be recognized is the family nature of *Chakra*' management; hence, the main objective family livelihoods and development. The average number of Household members in Napo province is 6 to 8 people. The household usually has half a hectare, although they can maintain 2 or even 3 *Chakra* simultaneously, but always within a framework of proximity to the family house and an everyday nature spirit.

The care of the *Chakra* requires a daily presence of both men and women, with the difference that men generally take care of cleaning, clearing and coffee and cocoa crops; instead, women take care of cassava, plantains, medicinal herbs and all the enormous diversity of crops.



Figure 50: Peasants of the *Chakra–Napo* systems. Photo: MCYP 2015 and FAO Ecuador GEF Napo.

From the definition of basic principles for a Amazonian *Chakra*, some conditions for the fulfilment of these principles and related practices have been identified and characterised. Table 17 below presents an outline that summarises these conditions and management practices implemented by *Kichwa and Kijus* families in their *Chakra* in a case study of Kallari Asociation:

Table 17: Principles and conditions of the Amazonian *Chakra* management

Principle	Condition	Practical example
The <i>Chakra</i> combines the goal of household food with opportunities for income generation	The <i>Chakra</i> provides household food	The Amazonian <i>Chakra</i> must always contain at least one traditional basic food product (cassava, plantain), which is complemented by other products for family consumption (taro, guaba, beans, papaya, paparagua, python, silk, peanuts, maize, pineapple, yurimahua, sweet potato, cane, pazu, soursop, cherimoya, orange, guaba, machetonas, abiu, hilta, pujin, peach palm, lemon, avocado, grapefruit, caimito, grape, rice, ayahuasca, ginger, tobacco).
	The <i>Chakra</i> also supplies income	Cocoa crop in the <i>Chakra</i> , together with other products (cassava, vanilla, banana, orange, grape, moriche palm, maize, abiu, peach palm, bean, guineo, cane, peanut, custard apple, lemon, pineapple, guaba, vanilla), provide a surplus production for sale.
	The size of the <i>Chakra</i> is appropriate to the concept and predominant use of family labour	For a family of four to five people, a <i>Chakra</i> with cocoa or another income crop should not be larger than 3 hectares.
<i>Chakra</i> management is natural and based on the ancestral practice of the	The <i>Chakra</i> is managed according to ancestral knowledge and prioritizing natural management.	<p><i>Chakra</i> formation is based on moments of drought or flood.</p> <p>Households apply the lunar calendars for sowing, harvesting and pruning.</p>

Amazonian Kichwas		Families prefer to use hand tools <i>Chakra</i> inputs are used. No agrochemicals are applied.
	The <i>Chakra</i> is managed according to technical recommendations, for the Amazon ecosystem.	The <i>Chakra</i> is a space for the exchange of ancestral knowledge. Soil conservation practices are carried out according to the slope of the land: level curves, living barriers, etc. In the boundaries and slope spaces of the Chakras, legumes as guaba and high value forest species such as chuncho, cedar, aguano, intachi and others are sown. Water sources on the banks of slopes, streams and rivers are protected with jutzos, guabillas, guadua cane, etc.
The <i>Chakra</i> is a family space of knowledge reproduction	All family members participate in cultural work related to the <i>Chakra</i> and have access to the products from it.	The family works in all cycles of the <i>Chakra</i> according to an internal and traditional division of labour.
	Condition: The <i>Chakra</i> is a space for the exchange of ancestral knowledge	In the regular work and special tasks (family mingas, exchanges, parties), the intergenerational learning is encouraged (mothers/fathers to daughters/sons) and the conservation and reproduction of knowledge (recreation of legends and rites).
The <i>Chakra</i> maintains a high biodiversity	The <i>Chakra</i> maintains native products for various uses in addition to food, which are part of the structure of the <i>Chakra</i>	During the development and stabilization of the <i>Chakra</i> , at least 20 medicinal and artisanal wood species are maintained in addition to food crops.
	The cocoa is managed with distances that allow a balanced and sustainable production, allowing the coexistence with the other species	Families regularly participate in plant, food and seed exchange fairs. The planting density of cocoa within a <i>Chakra</i> should not exceed 625 plants per hectare.

Source: Lehmann and Rodrigues, 2013.

According to *Chakra* management time, more than 30% of the working time was devoted to the cultivation of cocoa, followed by cassava (23%), maize (17%), rice (14%), plantains (9%), fruit trees (3%) and 2% of the time was devoted to planting the trees. A 90% of the time was devoted to weeding the total area, and not to a particular component. 10% of the time was devoted to cocoa crop maintenance and 1% of that time has been devoted to pruning. During harvest, more than 50% of the time was spent on the cocoa and the rest on cassava, plantains, fruit trees, rice, maize and trees (Arévalo et al., 2013).

In terms of gender, both men and women fulfil their role in the *Chakra*, according to the data observed, both spend almost the same amount of time working on the implementation of their production system. Maintenance is an activity that is more related to men (60%); while harvesting is the opposite, 60% of the work is done by women as they harvest the products of the *Chakra* for family food. It should be noted that in the system's crops, families have devoted their time mainly to implementation and harvesting, and comprehensive maintenance. The trees require less work time of the families.

On the other hand, the Amazonian *Chakra* production systems have various attributes that contribute to mitigating negative environmental impacts and increasing synergies between

the agricultural system and its surrounding environment, such as high species diversity with strong environmental adaptability (Zhang et al., 2011) and resistance to pests and diseases (Flores-Delgadillo et al., 2011). They can act as instruments for resilience, mitigation, and adaptation to climate change (McCord et al., 2015; Torres et al., 2015, 2022; Tesfaye and Tirivayi, 2020). Such systems can help manage risk and decrease rural poverty and food insecurity (Michler and Josephson, 2017) by providing income from local markets (Bellon et al., 2020) and providing nutrition and child health in impoverished rural households due to the great diversity of edible and commercial crop species (Perreault, 2005).



Figure 51: Recognition of Amazonian *Chakra* species. Photo: FAO Ecuador. GEF Napo, 2018.

4.3.3. Contribution of local and traditional knowledge to sustainability and resilience

To illustrate how the Amazonian *Chakra* system uses traditional knowledge and practices to contribute to the sustainability and resilience of the system, the following paragraphs show the results of a study conducted by Torres et al. (2022), analyzing the sustainability and resilience of the Amazonian *Chakra* at a household level, using as a framework the FAO's SAFA methodology (SAFA, 2012), and focusing on farmers from the Kallari, Wiñak, and Tsatsayaku associations who employ the Amazonian *Chakra* system based on cocoa production as a main cash income source (Table 18).

Table 18: Sustainability and resilience of the Amazonian Chakra

Amazonian Chakra Sustainability - Kallari Association

Considering the sustainability and resilience of the Amazonian *Chakra* system, the Kallari association has the best sustainability in the following dimensions: Environmental Integrity and Social Welfare, both with 3.2. Meanwhile, Economic Resilience had an intermediate score (3) and the dimension with the lowest score was Good Governance with a value of 2.6. The degree of sustainability is Moderate (Figure 51) and according to FAO’s SAFA methodology, it is Good/Moderate.

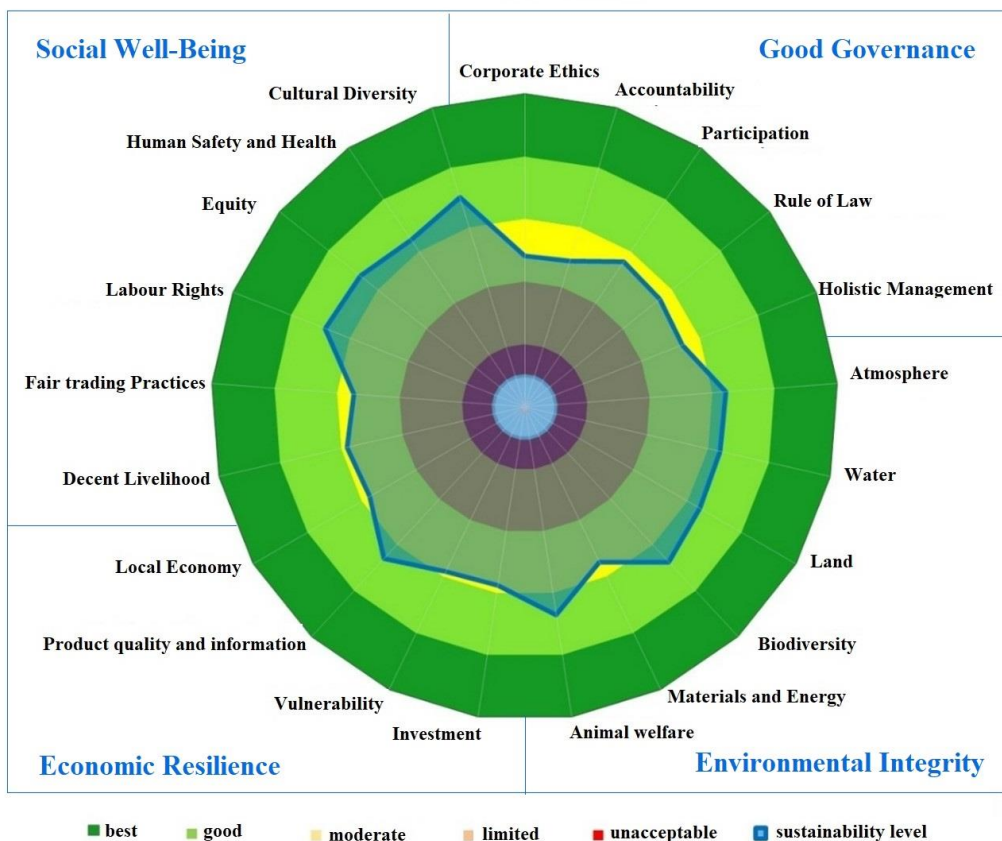


Figure 52: Degree of sustainability of the Amazonian Chakra in the Kallari producers.

Amazonian Chakra Sustainability - Wiñak Association

In the Wiñak partnership, the sustainability score in the highest scoring dimension was Social Welfare with a score of 2.3; Environmental Integrity had an intermediate score of 2.1; and two dimensions both scored 1.8: Economic Resilience and Good Governance. The degree of sustainability is Limited (Figure 52) and by considering both sustainability and resilience, the degree is Limited/Moderate.

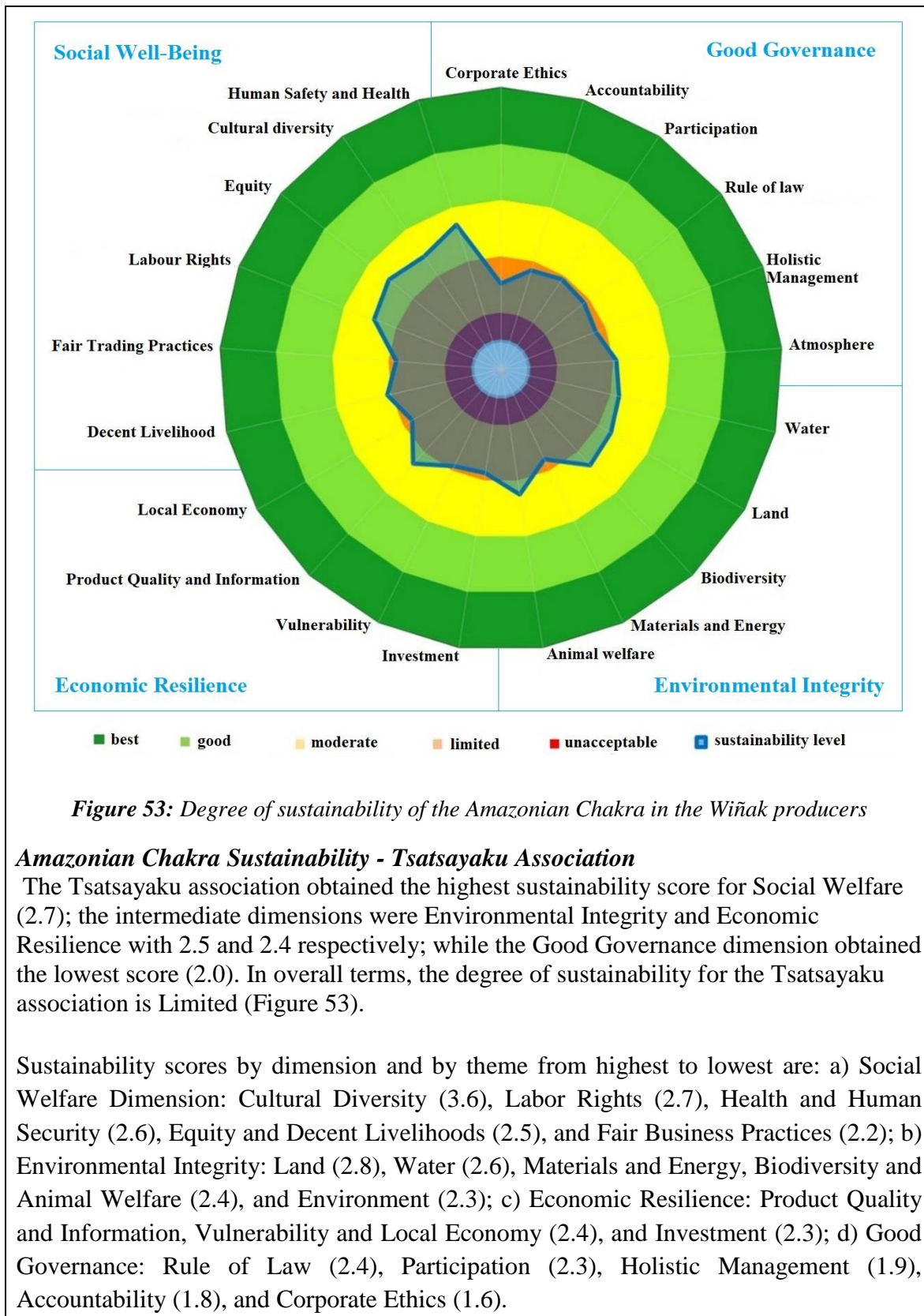
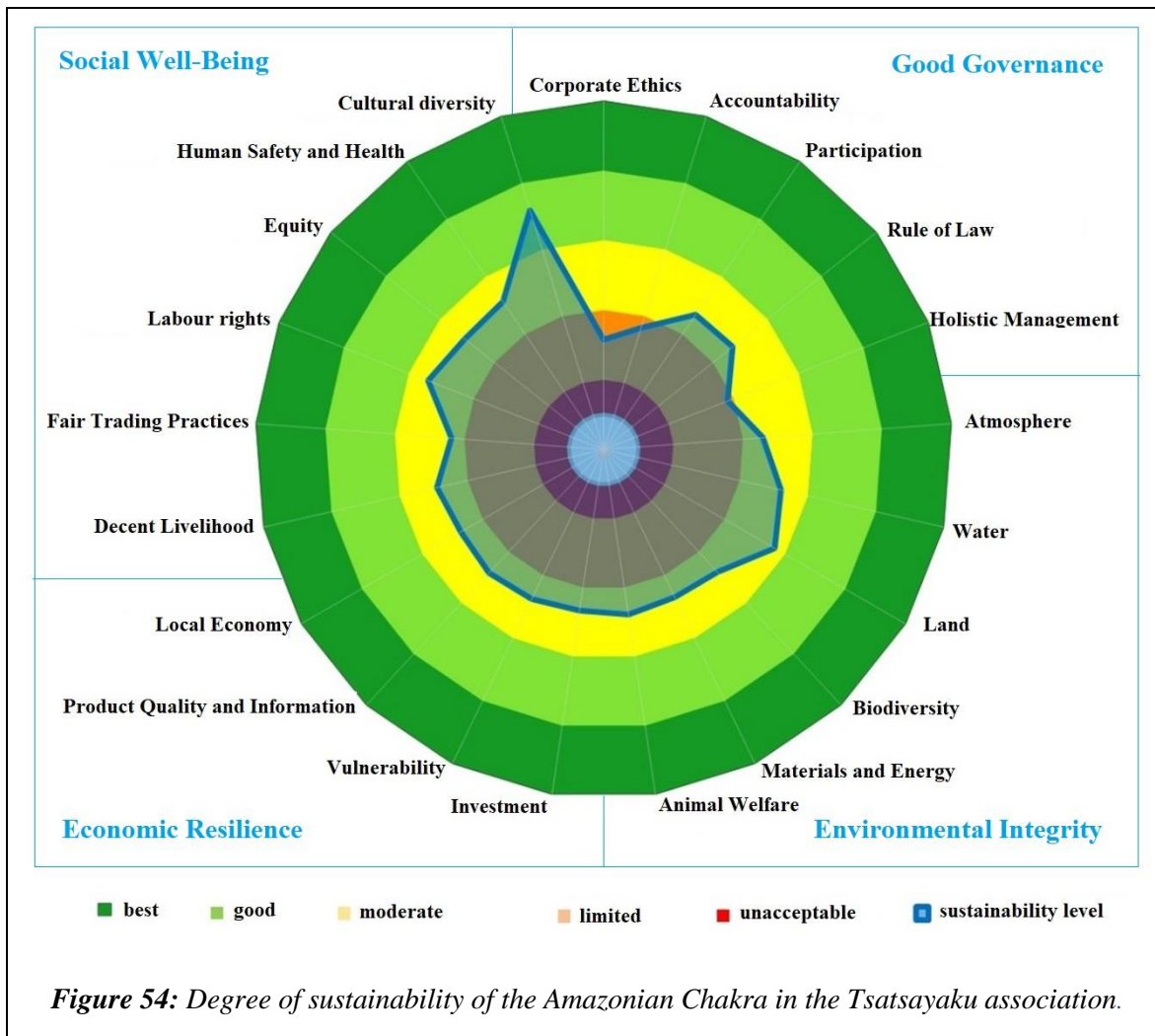


Figure 53: Degree of sustainability of the Amazonian Chakra in the Wiñak producers

Amazonian Chakra Sustainability - Tsatsayaku Association

The Tsatsayaku association obtained the highest sustainability score for Social Welfare (2.7); the intermediate dimensions were Environmental Integrity and Economic Resilience with 2.5 and 2.4 respectively; while the Good Governance dimension obtained the lowest score (2.0). In overall terms, the degree of sustainability for the Tsatsayaku association is Limited (Figure 53).

Sustainability scores by dimension and by theme from highest to lowest are: a) Social Welfare Dimension: Cultural Diversity (3.6), Labor Rights (2.7), Health and Human Security (2.6), Equity and Decent Livelihoods (2.5), and Fair Business Practices (2.2); b) Environmental Integrity: Land (2.8), Water (2.6), Materials and Energy, Biodiversity and Animal Welfare (2.4), and Environment (2.3); c) Economic Resilience: Product Quality and Information, Vulnerability and Local Economy (2.4), and Investment (2.3); d) Good Governance: Rule of Law (2.4), Participation (2.3), Holistic Management (1.9), Accountability (1.8), and Corporate Ethics (1.6).



Source: Torres et al. (2022).

4.3.4. Threats and challenges

- The main threat to the Amazonian *Chakra* system is the migration rural – urban and generational replacement. Young people lose interest in maintaining traditional ways of life, living on farms, and using the farm as a form of self-employment.
- It is necessary to raise awareness regarding the results of sustainability analyzed by Torres et al. (2022) in the four dimensions include good governance (GG), environmental integrity (EI), economic resilience (ER), and social well-being (WB), using the most general level in the SAFA structure (Food Agriculture Organization, 2014). The awareness-raising should be geared toward the key actors of the Amazonian *Chakra*, especially the associations of directly involved producers and decision-makers in order to form field schools and improve sustainability scores in the medium and long term.

- The Amazonian *Chakra* system can contribute to the implementation of the Agenda for Productive Transformation in the Amazon in the Ecuadorian Amazon, concerning its objective of moving toward more sustainable production systems (MAGAP, 2014). In this respect, it should also encourage the rescue of traditional systems that have been in use for millennia by the indigenous Kichwa groups.

4.4. Cultures, Value Systems and Social Organizations

4.4.1. Cultural identity and agriculture

A scientific article published by Coq-Huelva et al. (2017a) analyzed the cultural value of cocoa production in traditional agroforestry systems (Amazonian *Chakra*) in Napo. These authors show in a masterful and detailed manner the importance of cocoa production in the *Chakra* for several reasons. a) It serves as an example of quality production in Latin America. b) It represents a rare case of production directed to national and international markets. c) It forms part of the highly structured commodity chains of cocoa and chocolate. d) This agrarian production occurs in traditional agroforestry systems (*Chakras*) characterized by high levels of biodiversity and polyculture with other crops, such as banana and cassava (Perrault, 2005; Torres et al., 2015). Therefore, it is strongly oriented to self-consumption and constitutes an essential element of the local construction of food sovereignty, which is an essential aspect of recent indigenous involvement in broader Ecuadorian socio-political transformations (Peña, 2016). e) The *Chakra* is a main alternative to other models of Amazonian land use, such as extensive livestock systems (Torres et al., 2021; Lerner et al. 2014; MAGAP 2014). f) It involves quality production supported by indigenous rationalities and forms of coordination that can be approached through the concept of good living or *Sumak Kausay* (SK) in Kichwa. It is emphasized that Amazonian *Chakras* can be considered an embodiment of the Kichwa worldview and a sign of worth. (For more approaches to the cultural value of the Kichwa worldview and the Amazonian *Chakra* (see Table 19).

Table 19: *Sumak Kausay and key images of Kichwa cosmovision*

“In a first approach, *Sumak Kausay* (SK) can be considered a specific Kichwa worldview (Macas 2010; Durán 2010). In a seminal work on Kichwa Amazonian Communities in Canelos, Whitten (1978) showed that the equatorial rainforest was understood as a living entity populated by souls and spirits clustered around three key images: *Amasanga*, *Nunghui*, and *Sunghui*. These interrelated images support relationships between “plants, animals, insects, fish, humans, souls and spirits of the forest, air, soil and water” (Whitten 1978, p. 840). *Amasanga* is the spirit of the forest and acts as energy that flows through an extended perception of the ecosystem. Thus, it is essential for understanding interconnections between different sets of elements (social, natural, and spiritual) that affect life in these communities. *Amasanga*’s different forms cannot be eliminated because they provide food to families and communities. *Nunghui* is the spirit of the garden and handicrafts. *Nunghui* has an evident aesthetical element, as it is associated with conditions of equilibrium and stability. Finally, *Sunghui*, understood as the final source of life, is the spirit of water (Whitten 1978). Such cosmological elements, which can be considered as

the expression of SK as a worldview, play an important role in the molding of agent behaviors. Thus, the inclusion of magical and spiritual elements as expressions of a sacred ecology is related to personal and collective obligations (Uzendovsky and Calapucha-Tapuy, 2012). For instance, respect for *Amasanga* as a flowing type of energy that provides food is very important. As we will see in the next section, the operation of *chakras* can be understood as an embodiment of SK”.

Source: Coq-Huelva et al. (2018)

Moreover, the *Kichwa Naporuna* recognize a traditional and community ownership of the territory, in a first level for the community or *muntun* (extended family and system of kinship relations and alliances). The community recognizes that each *ayllu* (linear family) is a space of use in which they settle their houses, *Chakras* (intercropping), and “*purinas*” (hunting and fishing grounds where they stay for some of the year). The product of the work belongs to the family; if community land is available, it is assigned to the members who need and request it (young people who form a family, relatives, or related persons who return or enter the community).



Figure 55: *Cassava Chakra* harvesting using fiber basket of Amazonian forest products, *Pumayacu* community. Photo: MCYP 2014.

The location of the river determines its importance for the daily mobility of the inhabitants inside and outside the community. In addition, water in the life of the community has several meanings: sacredness, cleanliness, production, rest, and encounter.

As a representation of the culture, the following figure shows some of the children's drawings of the *Chakra*, as well as the farming environment of the family who lives in the house and their diverse crops (basically for food).



Figure 56: Children's drawings of the *Chakra*

4.4.2. Social organization, management and value system


There is an interesting network of stakeholders from both public and private organizations for whom the revaluation and revitalization of the system has become a strategic objective; however, the social appropriation of the families and organizations themselves is relevant as a mechanism for its conservation. It is estimated that around 1,500 Kichwa families still maintain and seek the conservation of this system. For all of them, the Amazonian Chakra constitutes a living concept that is in constant modification and adaptation, with a strong link to the Kichwa worldview of the Naporuna, based on the fact that all activity in the world has a sense of subjectivity, of dialogue and upbringing of the people of the world. The Chakra is the place of upbringing and where the creative abilities of the Runa are shown.







The role of women embodied in the Chakramamas is essential for the development and transmission of the knowledge and principles of the Chakra. The cultural manifestations linked to the space of the Chakra are extremely broad both in the ritual, festive, food and medicinal spheres.

Over the last two decades, the sustainable management of fine and flavored cocoa under the Chakra system has been growing in an organized manner. In this way, some social and productive organisations have developed around the conservation, use and projection of the Amazonian *Chakra* system (see Table 20). It should be noted that, although the core element of these organisations is not only the *Chakra*, this system appears with great relevance in the discourse and practice, as part of specific plans and projects, as it is a central element of the *Kichwas* communities identity, in terms of self-determination, autonomy and food sovereignty.





Following there is a summary of the main Amazonian organisations members of the Chakra Group, which propose, promote and maintain themselves in the protection and revaluation of the Amazonian *Chakra* as a central element of their identity and good living.

Tabla 20: Actors involved in the Chakra Group

Stakeholders	Logo
Social stakeholders (Farmers' associations)	
Kallari: Agro-Artisan Association for the Production of Agricultural, Livestock, and Fish Farming Goods of Napo "Kallari"	
Wiñak: Amazon Producers Organisation of Archidona and Tena canton	
Tsatsayaku: Amazon Producers Organisation of Tena and Arosemena Tola canton	
Inti: Amazon Producers Organisation of Archidona canton.	

Alli Guayusa; Amazon Producers Organisation of Loreto canton.	
PKR: Kichwa people of Rukullakta	
AMUPAKIN: Asociación de Mujeres Parteras Kichwa del Alto Napo	
Centro de Turismo Comunitario Santa Rita	
Asociación de Mujeres Productoras Agropecuarias de San Pedro de Chimbiyaku	
Centro Comunitario Kichwa Tamia Yura	
REDTURCON: Red de Turismo Comunitario de Napo	
FOIN: Federación de Organizaciones Indígenas de Napo	
Public stakeholders	

<p>MAG: Ecuadorian Ministry of Agriculture and Livestock</p>	<p>Ministerio de Agricultura y Ganadería</p> 
<p>MATTE: Ministry of Environment Water and Ecological Transition</p>	<p>Ministerio del Ambiente, Agua y Transición Ecológica</p> 
<p>GADPN: Autonomous and Decentralized Provincial Government of Napo</p>	
<p>IKIAM: University of the Amazon Region</p> <p>Scientific research on cultural and biological issues related to the Amazonian <i>Chakra</i> system.</p>	
<p>UEA: Amazon State University</p> <p>Scientific research on the livelihoods, agronomic performance, soil and carbon sequestration of the Amazonian <i>Chakra</i> system.</p>	
<p>INIAP: National Institute of Agricultural Research</p> <p>Scientific research on agronomic issues, soils, cadmium concentration, among other topics in the Amazonian <i>Chakra</i> system.</p>	
<p>NGO's private sector and International Cooperation</p>	
<p>Corporation of Associations of the Amazonian Chakra: Responsible for coordinating the process of strengthening production chains, quality, volumes, export processes and local, national and international marketing.</p>	
<p>FAO: Food and Agriculture Organization of the United Nations.</p> <p>Project: Forest and Farm Facility - FFF/FAO</p>	
<p>GIZ: German Agency for International Cooperation</p> <p>Project: Sustainable Valorization of Biodiversity – BioValor</p>	

<p>Maquita: Organization working with the social and solidarity economy that works in associativity, sustainable production, fair trade and responsible consumption.</p>	
<p>ENGIM: Contribute to protect and safeguard the human and natural heritage of the Northern Ecuadorian Amazon, promoting the paradigm of Integral Ecology.</p>	
<p>FECD: The Ecuadorian Fund for Development Cooperation. Non-profit institution that focuses its work on strengthening the sectors with fewer opportunities in Ecuador.</p>	
<p>COPADE: It is an NGO that aims to promote and develop Fair Trade, Responsible Consumption and the preservation of the Environment.</p>	

In 2017, the provincial government of Napo, coordinator of the *Chakra* Group, following the request of several organizations, enacted a provincial regulation that recognizes the legal existence of the Amazonian Kichwa *Chakra*. This instrument proposes a framework to guide conceptual aspects, technical management, ancestral knowledge, best managements practices, marketing, processing, research, sustainability monitoring, incentives and participatory governance mechanisms.

The provincial regulation takes as basis the definition of the KALLARI Association, thus officially defining the Amazonian *Chakra* in the province of Napo as “*a productive space located within the farm, managed by the family under an organic and biodiverse approach, valuing ancestral knowledge, where is found timber, fruit, medicinal, handicraft, edible and ornamental species. [It is] managed with a distribution that allows a balanced and sustainable production that serves for family consumption and sale, preserving the agroecological and cultural management of production processes, avoiding monoculture production*” (GADPN, 2017).

In the northern Ecuadorian Amazon, with the support of several national and international cooperation agencies, associativity has been promoted in cocoa producers in the *Chakra* system and in multi-actor dialogue platforms. In 2014, 41 actors from the public, private, and social sectors participated and 16 producer associations were registered as actively participating in the so-called “Mesa del Cacao” (Torres et al., 2015), representing 12,000 producers (Torres et al., 2014), 75% of whom are indigenous and more than 80% are women. Currently, there are five organizations that make up the Corporation of Amazonian *Chakra* Associations: Kallari, Wiñak, Tsatsayaku, Alli guayusa and Inti (Figure 56).



Figure 57: Official promotion of organizations that make up the Corporation of Amazonian Chakra Associations: Kallari, Wiñak, Tsatsayaku, Alli guayusa and Inti.

Within this group of the five organizations that today form part of the Corporation of Amazonian *Chakra*, three are the organizations that started this process and consequently have the highest number of producers (Kallari, Wiñak, and Tsatsayaku) are located in Napo province. It is important to know the context of these three cocoa producer associations in the Amazonian *Chakra* system, which over the last 20 years have been developing actions to rescue the Amazonian *Chakra* and promote the use of the system and the creation of other producer associations with the same criteria for the Amazonian *Chakra*.

Context: Kallari Association⁷

The Kallari Association began its operations in the period 1997 – 2002, with an organizational model based on concepts such as the value chain of the *Chakra* products offered by the member households of the association (Hernández and Zambrano, 2019), while its legal constitution was obtained in 2003. This association is located in the canton of Tena. It currently has producers in 21 communities: APPAI, Diez de Agosto, Campo Cocha, Colonia Bolivar, Ñukanchi Kawsay, Rio Blanco, Rumi Yaku, Puni Bocana, Mirador, Santa Barbara, Sumak Samay, Shandia, Serena, Ila Yaku, Jatun Yacu, Mushuk Kawsay, Bajo Talag, Nueva Jerusalén, Centro Talag, Suyu Kawsay, and Guinea Chimbana.

Kallari currently has 322 members and is made up of 1,122 producers, 90% of whom belong to Kichwa families from the communities mentioned above. It is important to note that 56% are women. The families produce, process, and market agricultural products from the

⁷ <https://www.kallari.com.ec/>

Chakra, such as cacao (*Theobroma cacao* L.), vanilla (*Vanilla* spp.), guayusa (*Ilex guayusa* Loes.), and chocolate bars, the first two being the most relevant products managed in a sustainable manner, improving the livelihoods of the members and conserving natural and cultural biodiversity.

For the Kallari association, the word “kallari” has three principles: a) Past: related to defending the territory and cultural identity, as well as recognizing parents’ sacrifices; b) Present: understanding and defending nature, production in harmony with nature; and c) Future: linked to special markets for the benefit of new generations and leaving a worthy legacy for future families.

Context: Wiñak Association⁸

This association is the result of work initiated in 2005, driven by the need to improve the marketing conditions of cultivated products on the basis of indigenous principles and cosmovision, and to improve the living conditions of the farmers. The Wiñak Agro-artisanal Association was legally set up in 2010 thanks to the efforts of small farmers in the area, as a result of their struggle for territories and to support the principles of Kichwa cosmovision.

Wiñak is located in the Archidona canton and supports producers from the communities Kinti Urku, 5 de octubre, Nueva Esperanza, Mondayaku, Wamak Urku, Rumiñahui, Sociedad Libre, Pushi Wayaku, Papanku, San Gregorio, Machangara, Barrio Lindo, Santa Elena, Santa Rita, Wambula, San Vicente, Bajo Shicama, San Juan, Batancocha, Alto Shicama, San Bartolo, Kashayaku, Kuri Muyu, San Diego, Chakarumi, Nuevo Venturoso, San Rafael, San Clemente, Chaupishungo, Ayapata, Libertad, Inchillaqui, Rukullacta, Rumipamba, Caimitu Yaku, San José, San Martín, San Bernardo, Santo Domingo, San Luis, Centro Kichwa, Para Yaku, Mariposa, Centro Mamallacta, San Pablo, Awayaku, Tambayaku, Itakivilina, Nueva Estrella, Poroto Yaku, Nukuno, Alto Poroto, Lusianta, Casa Blanca, Villano, Ardilla Urku, 10 de Agosto, Wawa Sumaco, Ichu Urku, Calvario, and Twinza.

The Association provides training, technical assistance, and production microcredit to its members and other local small producers. In addition, female Kichwa producers of fine aroma cocoa under the Amazonian *Chakra* system are the most active participators and they preserve the food security of their communities. Currently, there are 263 members and a total of 909 producers, 100% of whom belong to the Amazonian Kichwa population, and 65% of whom are women. The main products marketed are cacao (*Theobroma cacao* L.), guayusa (*Ilex guayusa* Loes.), plantain (*Musa paradisiaca* L.), cassava (*Manihot esculenta* Crantz), chocolate bars, and ground guayusa, the first three being the most important products for the association. In addition, this association directly links more than 600 commercial producers

⁸ <https://www.winak.org/>

(commercial partners), who supply raw materials to the association and live in 91 communities in the provinces of Napo, Orellana, and Pastaza.

Context: Tsatsayaku Association⁹

The Association of cocoa producers "Tsatsayaku", located in the canton Carlos Julio Arosemena Tola, is registered with the Superintendence of Popular and Solidarity Economy since 2013, is composed of Kichwa and mestizo/settler producers belonging to 13 associated communities: Tzawata, Ila Alta, Ila Bajo, San Francisco de Chucapi, Flor del Bosque, San Clemente de Chucapi, Misi Urku, Luz de América, Puni Cotona, Puni Ishpingo, Nueva Esperanza, Santa Rosa, Arosemena Tola.

Currently, 179 producers are part of the association and it has 51 members, with an estimated 500 families as indirect beneficiaries (producers from other organizations, transportation, suppliers, restaurants and hotels related to the cocoa route). Approximately 85% of the producers are Amazonian Kichwa and 55% are women.

Tsatsayaku markets cocoa paste (*Theobroma cacao* L.), chocolate, and chocolate nibs, the first two being the most important products. Since its creation, the Tsatsayaku Association has generated interinstitutional management spaces, positioning itself in territorial governance spaces such as the Cacao Roundtable, currently the *Chakra* Group, and others.

Collective value system, customs, and rules

Describing the collective value system, customs, and rules, a particularity of this Amazonian system is that the *Chakra* is socially recognized as a space of female production, where traditional knowledge alongside ritual and symbolic elements, part of the indigenous cosmovision, are expressed. Women or *Chakramamas* are responsible and in charge of planting, caring for, and marketing the crops, while men's work is complementary and temporary, i.e., it is carried out at harvest time, planting, and in specific activities. Similarly, the *Chakra* is a place of learning, where not only ancestral knowledge about agricultural and gastronomic production is discussed, but also where the resources and principles of ancestral medicine and the ritual and even mythical elements of the Kichwa and Kijus culture are based.

Besides being a space for family production and planting, the Amazonian *Chakra* is also a fundamental part of social and community organization and participation. Currently, around 1,500 Kichwa and Kijus families are associated with the Kallari, Wiñak, Tsasayaku, Wailla Kuri, Inti, and other enterprises, which promote the recognition and promotion of the Amazonian *Chakra* system as a strategy that has allowed them to value the quality of the

⁹ <https://www.tsatsayaku.com/>

fresh or processed products they sell in local, national, and international markets due to the special characteristics of the agroecological system where they are produced.

4.4.3. Social organizations to the sustainability and resilience of the system

As part of the process to increase the productive sustainability and resilience of the Amazonian *Chakra* system over time, the Autonomous Decentralized Provincial Government of Napo (GADPN) works with traditional social organizations of indigenous peoples, associative enterprises, public and private entities, universities, NGOs, and international cooperation agencies to provide incentive programs, technical advice, capacity building, infrastructure development, marketing, and strategic territorial planning to ensure the revaluation, conservation, and promotion of the *Chakra*. In the area of public policy generation and inter-institutional relations, one of the most important advances is the issuance of the Provincial Ordinance by the GADPN that declares the Amazonian *Chakra* as a sustainable system that promotes the production, research, and commercialization of agroecological food in Napo. This legal document approaches the formal definition of the *Chakra*, establishes principles that identify the Amazonian *Chakra* model, and proposes the creation of an Amazonian *Chakra* seal for its formal recognition and promotion. Based on this ordinance, the Corporation of Associations of the Napo Amazonian *Chakra* and the institutions that make up the “*Chakra* Group” have been developing the process of structuring a Participatory Guarantee System (PGS) for the awarding of the *Chakra* seal (see Figure 57), which includes the definition of production standards and guidelines, This includes the definition of production, processing, and marketing standards and guidelines, aligned with the principles of the Amazonian *Chakra* system, and the establishment of a functional organic structure (ethics committee, technical committee, and group of overseers) to verify compliance and award the *Chakra* seal to the producer organizations that apply the system.



Figure 58: Logo of the Chakra seal developed in collaboration with the producers of the Corporation of Amazonian Chakra Associations and the entities of the "Chakra Group"

Both in the provincial ordinance and in the PGS for the *Chakra* seal, nine principles have been identified and managed to support the conservation and promotion of the system. In this way, the organizations that manage the *Chakra* have Amazonian landscape criteria that conserve, manage, and protect resources and strategic areas for better resilience to the climate crisis, which are described as follows.

- The Amazonian indigenous cosmovision combines the integration of conservation, production, and people's life zones. The Amazonian territory has a space for the forest, the *Chakra*, and family and community life (Sachawa, Chakrawa, and Runawa).
- Natural and agroecological management is in place, without the presence of pollutants. Organic and inorganic waste is managed. No insecticides, fungicides, or other synthetic pesticides are used in or around the *Chakra*.
- A source of wisdom and mutual learning, the *Chakra* is based on the ancestral knowledge of the Kichwa and Kijus of the Amazon, integrating, applying, and combining appropriate current and ancestral technologies.
- Forms of community and associative organization are employed, based on principles of solidarity, interculturality, exchange, and participation.

- The diversified production of the *Chakra* guarantees families' food sovereignty, prioritizing responsible consumption in the family and preserving the production of local species and varieties.
- The *Chakra* is mainly led by women in an environment of family integration and gender equity; their role is focused on plant propagation and management, obtaining benefits for health, nutrition, economy, finances, ecology, wisdom, power relations, and family identity.
- A high biodiversity and crop association is maintained, according to the particularities of the different ecosystems. It has a diversity of species of flora and fauna.
- Conservation and integration of a sustainable and diversified production with species of high traditional and cultural value oriented to special local, regional, national and international markets, prioritizing domestic supply.
- Management of the *Chakra* with criteria of Amazon landscape, conserving, managing and protecting resources and strategic areas for a better resilience to the climate crisis.

Currently, the certification process at the producer farm level has been completed, certifying 1,185 chakras with the Chakra Seal in the three representative associations of the territory: Kallari, Wiñak and Tsatsayaku.

The work in the chakra is mainly conducted by the family, where we can highlight the knowledge and wisdom of women and the participation of the other members of the household. In total, the 1,185 chakras with the Chakra Seal are directly related to an approximate population of 3,555 active producers.

4.4.4. Threats and challenges

- One of the threats to the Amazonian *Chakra* system is the migration rural – urban because this can bring new ways of life, new customs, new ways/source of foods some of which would not be in accordance with the indigenous cosmovisions.
- One of the main challenges is to preserve and integrate a sustainable and diversified production with species of high traditional and cultural value aimed at special local, regional, national, and international markets, prioritizing domestic supply.
- Differentiated markets for *Chakra* production are promoted and developed, enabling valuation and retribution of sustainability, identity, and solidarity. The development of local and regional economic circuits is discussed, based on social fabric and institutional support.
- To promote the chakra products in national and international exhibitions, as well as to promote new chakra bioproducts with added value to increase the income of the producers.

4.5. Landscape Features

4.5.1. General description of the landscape

The area proposed as GIAHS is part of a Amazonian Territorial Constituency (CTEA, for its acronym in Spanish), that has achieved a special regime to work in sustainable development, the “Organic law for the integral planning of the special amazon special territorial circumscription”. Article 1. Object. *“The purpose of the present law is to regulate the Integral Planning of the CTEA and its territorial organization, observing social, economic, cultural and environmental aspects; to establish policies, guidelines and special regulations to guarantee human development, respect for the rights of nature, the conservation of its ecosystems and biodiversity, its sustainable development, the right to education at all levels, its cultural heritage, social memory, interculturality and plurinationality; and, to promote a sustainable socioeconomic, cultural and environmental model, based on the principles of Sumak Kausay, which compensates for existing inequalities and promotes equitable promote equitable development in the District”*.

The area proposed as GIAHS is part of the area where one of the main contributing watersheds of the great Amazon River basin and its biological and hydric diversity is born.

The total area proposed as GIAHS is also part of the buffer and transition zones of the Sumaco Biosphere Reserve (SBR), where around one million hectares of tropical forest were established as a biosphere reserve by UNESCO’s Man and Biosphere program (MAB) in 2000.

The Amazonian *Chakra* meets conservation and development, for that reason it has been used remote sensing techniques were used to identify the Amazonian *Chakra* areas proposed for GIAHS and its area of influence. In this way, a digital thematic map was generated from a set of satellite images obtained from the Sentinel satellite of the European Union’s Copernicus program through remote sensing, classification, and comparison of the relationship of the spectral classes of the *Chakra* formation.

As a result, the Amazonian *Chakra*’s landscape has an area of influence in the lowlands of Napo province, corresponding to the cantons of Carlos Julio Arosemena Tola, Archidona, and Tena. This area is surrounded by several areas of the country’s SNAP¹⁰ (Figure 58), with denoted biological and cultural importance.

¹⁰ National System of Protected Areas (for its Spanish acronym)

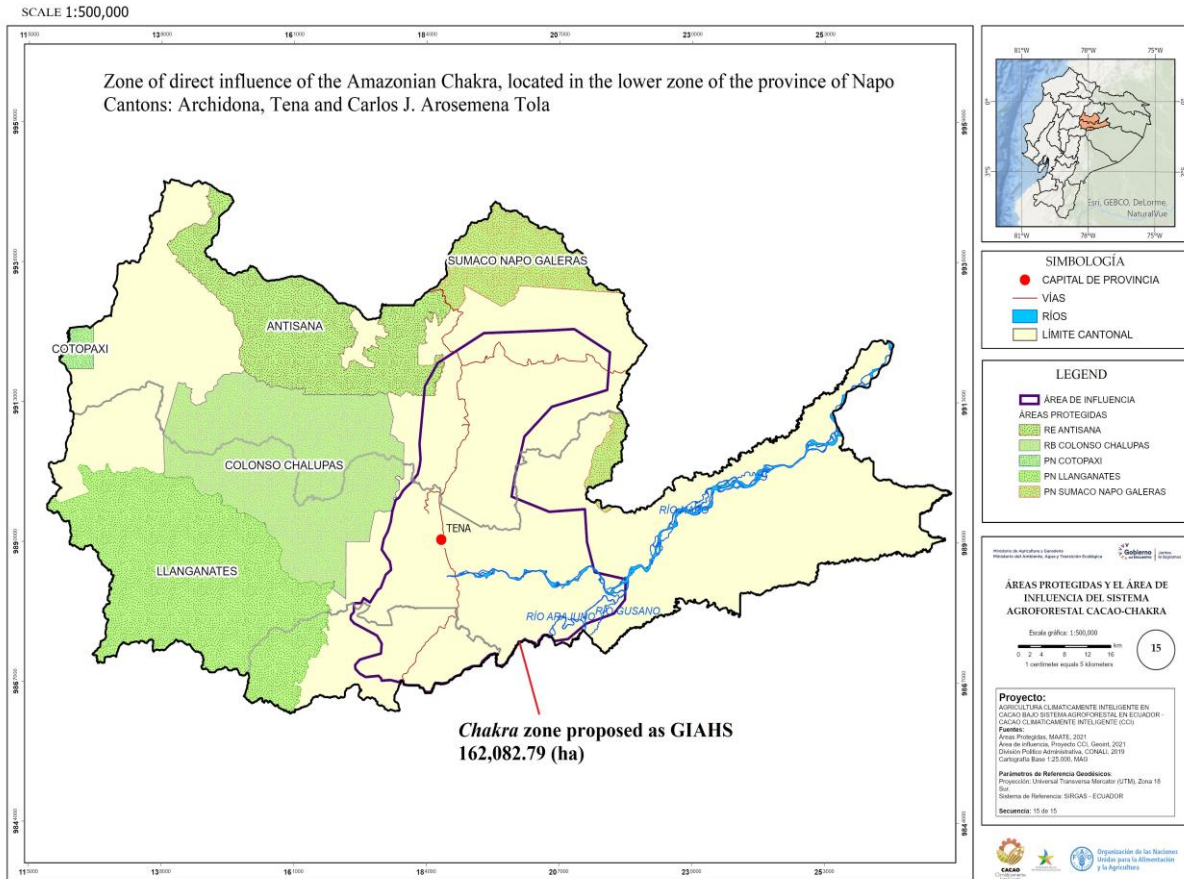


Figure 59: Map area of influence of the Amazonian Chakra in Napo

4.5.2. Natural context and land uses

The proposed GIAHS system covers the cantons of Archidona, Tena, and Carlos Julio Arosemena Tola in addition to the cocoa producer organizations in the production system: Wiñak, Kallari, and Tsatsayaku. It is composed of primary, secondary, and degraded rainforests, as well as scrubland, herbaceous vegetation, and a variety of crops typical of the area: corn, cassava, fruit trees, coffee, cocoa, native crops (taro, naranjilla, and arazá), exotic, and promising crops typical of the forest, such as vanilla.

In the Amazon region, there are rainforests or jungles that are “untouched, unoccupied, virgin, abundant and lush,” where human intervention is minimal and is the result of management (FAO, 2002)¹¹ that has been given for millennia by the indigenous populations, in this case mainly of the Kichwa and Kijus nationality who maintain the Amazonian *Chakra* system. In current terms, the good conservation status is the product of a symbolic framework

¹¹ FAO. Terms and definitions. Working Paper No. 1. Rome. 1998. FRA 2000, Global Forest Resources Assessment 2000 - Main Report

and traditional practices that ensure care for the environment and the maintenance of the tree cover, without causing major transformations. The following paragraphs show the main land uses.



Figure 60: Amazon landscape. Napo. Photo: FAO Ecuador – GEF Napo 2018.

Primary forest

For the purposes of this report, different categories have been established (CATIE, 2016)¹², such as primary forest, where the forested area preserves its natural characteristics unaltered due to the absence of human beings, who deplete resources, expand the agricultural frontier, and replace native vegetation with commercial or agro-industrial crops. These formations present an intact, unfragmented forest landscape that is free of visible human impact.

In terms of characterization, we considered any forest formation with a closed structure, made up of woody and non-woody species, trees, shrubs, herbaceous, and others, forming a group of diverse species that coexist in a certain space. In special cases, a primary forest may have lost 10% of its structure due to natural causes such as landslides, falling trees, strong winds, and any other natural occurrence.

¹² CATIE, solutions for environment and development, definition of secondary and degraded forests in Central America, Working Papers. CATIE, 2016

Secondary forest

These forests can be homogeneous and mixed. More than 60% of their cover (in some cases a variation between 25% and 75% can be considered) has been altered and interfered with by human action and other causes.

Degraded forest

These are defined as formations remaining from “over-harvesting” (exploitation levels can exceed 80% of the forest), in which most or all of the commercial timber has been eliminated through conventional logging processes or the sale of trees (“pata”) without applying extraction principles so that the felling of trees exceeds the natural growth capacity of the species. Generally, harvesting and processing are carried out in the field, and because of the difficult conditions for removing the wood from the extraction sites, it is transformed into planks using chainsaws with very little efficiency.

Deforestation in these cantons, as in the entire Ecuadorian Amazon region, presents results that should be taken into account in any program or action aimed at reducing the advance of the agricultural frontier.

Amazonian soils are an intrinsic and problematic factor, as they have difficulty in maintaining altered vegetation cover of pristine forests, are sensitive to erosion problems, have shallow soils and varied textures, and are not very favorable for the development of crops, pastures, and the maintenance of natural vegetation cover.

Agriculture is one of the main activities developed in the study area. The neglect of ancestral production systems typical of Amazonian territories has led to the expansion of crops in fragile areas that lack sustainable and sustainable management, which is aggravated by the lack of training and technical advice.



Figura 61: Amazon agriculture landscape. Napo. Photo: GADP Napo 2018.

4.5.3. Agricultural landscape

Agricultural landscape dominated by the Amazonian *Chakra* multiplies life and Amazonian culture is recognised as agrocentric because no member of the human community is conceived as having no *Chakra* (Greslou et al., 1991). ‘*Chakra* making’ is for the Kichwa culture a central ritual that expresses human commitment to the recreation of life. Knowledge revolves around agriculture, and its most genuine expression is the *Chakra* as a place to raise plants, animals, soils, water, climate and landscape.

This concept provides rural families with a permanent innovative and recreational way of doing things. Despite the apparent ‘immobility’ that external observations may have on peasant farming, a constant recreation is evident. This is precisely what encourages heterogeneity, because it is not only the recreation of what is one’s own, but is also raising what belongs to others.

The maintenance of the *Chakras* in the amazonian landscape is sustained by a broad system of knowledge, which, as aforementioned, arises from the conversations and exchanges between people; in this sense, knowledge is not only the result of the intellectual processes

of a differentiated subject and distant from the world, but rather, it is the result of the empathy that those who live together in the raising spaces manage to develop among themselves.

Knowledge is dynamic, not static, that is why inherited knowledge and know-how are essential. Collective memory is important, but it does not encompass all the wisdom. The Kichwa world is recognised as a living world that is constantly changing, which is why in order to develop knowledge one must live (Rengifo, 2000), not just be informed or study. The one who knows best is not the one who is best informed, but the one who lives the most, that is, those who exercise in a concrete, constant and intense way the capacity to raise and let themselves be raised.

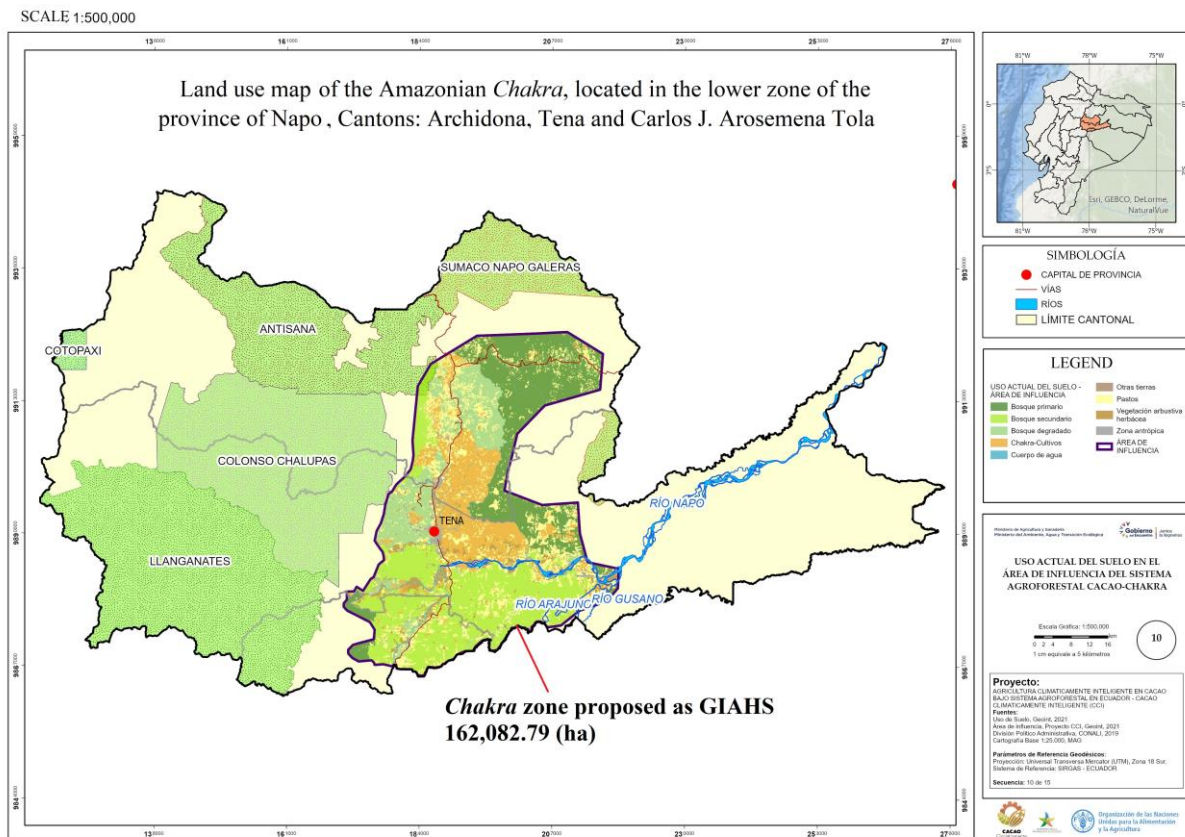


Figure 62: Map land use of the area of influence of the Chakra with cocoa in Napo, Ecuador.

Traditional knowledge is very important to maintain the *Chakra*: ‘When cassava branches are not accommodated and spread over the area, production will be more distant and the family will suffer from hunger’. The person who wishes to have the gift of sowing and produce, takes advantage of the presence of the *Chakramama* to ask for this gift and receive it from the ‘paju’. ‘First they plant the cassava sticks together, holding hands, so that they can start the gift transfer and then, they rub their arms and release the guinea pigs from their fingers’. (Rengifo, 2000).

Other way of transferring knowledge is through the delivery of good seeds and practices in the *Chakra*, accompanied by advice. An example could be: ‘At the time of harvest, the open footprints in the ground should be filled with the same soil, otherwise it will affect the

Chakramama after birth'. At harvest time the roots of the cassava should be cleaned and the shoot veins cut, and all this should be gathered in one place in the *Chakra*'.



Figure 63: Map land use of the area of influence of the *Chakra* with cocoa in Napo, Ecuador.
Photo: FAO Ecuador – GEF Napo 2018

4.5.4. Settlements and associated built structures

The proposed area as GIAHS has a large historical culture and the intangible cultural heritage is related to those manifestations and expressions of knowledge, wisdom, techniques and practices that have been transmitted between generations according to social and natural contexts and in dynamic processes linked to the memory, heritage and belonging of the Amazonian Kichwa and Kijus communities. These assets include traditional wisdom such as the uses and meaning of several plants such as Wantuk, python (*Grias neuberthii* J.F. Macbr.), guayusa (*Ilex guayusa* Loes) and ayahuasca; traditional productive techniques and knowledge of fishing, traps for hunting animals, and chonta cultivation, among others (INPC 2015).



Figure 64: *Ilex guayusa* Loes (Guayusa). Photo: Roxana Tanguila. 2021.



Figure 65: *Grias neuberthii* J.F. Macbr. (Phyton) Photo: Roxana Tanguila. 2021.

Archaeological properties correspond to the oldest vestiges (sites or objects) left by the ancestors of the current local populations. These evidences show the life of human groups, as well as the structures of their houses, ceremonial and administrative centers. They also include villages, hamlets, isolated residences or seasonal sites such as campsites oriented to different microenvironments where specific resources were exploited. Archaeological properties can be found on the surface, buried or underwater (INPC, 2015). Archaeological properties include petroglyphs, surface (open-air) settlement, agricultural terraces (agricultural technology) and architectural ruins.



Figure 66: Petroglyphs of Mondayacu, located in Archidona, Napo province, Ecuador.



Figure 67: Cassava harvest using fiber baskets made from Amazonian forest products, Pumayacu community. Photo: MCYP 2014.



Figure 68: Community house in San Virgilio, Pastaza. Photo: Héctor Reyes, 2013.

4.5.5. Sustainability and resilience

For a long time, the Amazon has been considered an inhospitable and little explored space, with limited or non-existent agricultural systems; however, many studies suggest (Valdez, 2018; Lanaud, 2012), that agriculture in the Amazon has been developed for at least 5000 years (Lanaud, 2012), where the process of domestication and use of countless species of the forest that became fundamental for human food, the sustainability of ecosystems, and the enrichment of nature and deities is recognized as astonishing.

It cannot be ruled out that the extensive development of agriculture in the high Andean region has also been strongly influenced by Amazonian farming systems and, above all, by the exchange of species and varieties of the forest domesticated in Amazonia.

According to the *Kichwa* cosmovision, agriculture and raising areas enable the diversification of human, natural and even divine communities. Likewise, the agricultural landscape does not cancel out but rather enriches the natural landscape and society and diversifies. For the *Kichwa* culture to do “*Chakra*” is a ritual that expresses the human commitment to life recreation through the *Chakra* as the place where plants, animals, soil, water, climate are raised, and which expands into the landscape through dialogue and conversation with other *Chakras* and territories.

The resilience and connectivity between protected areas and the Amazonian *Chakra* it is very notorious and important to know, likewise with the relationship of the human resource represented with the local communities settled in the zone of influence of the Amazonian *Chakra*. One of the main characteristics of the Amazonian *Chakra* system is its contribution or impact on ecological and cultural connectivity¹³ mainly in the territory of the province of Napo. Connectivity expressed through ecological networks in which the recognition of socio-economic and cultural dimensions in sensitive ecosystems is essential; since, the proportion of territory included in the National System of Protected Areas, gathers a 68% of the territory in protected areas, grouped mainly in the Sumaco Biosphere Reserve. In this sense, it is worth remembering that connectivity, as a function, is also typical of social systems, which base their existence on complex networks in which flows of matter, energy and information operate. On the other hand, the Amazonian *Chakra* systems, based on the interrelationship between cultural practices and a specific natural environment, depend on and create numerous environmental services whose guarantee depends on the functional continuity of the ecosystems that form them (Herrera, 2013).

Functional attributes such as high levels of biodiversity, exchange of species between cultivated and non-cultivated areas, or resilience in terms of the capacity of the ecosystem to recover after a disturbance, require the maintenance of connectivity between the elements of

¹³ The idea of connectivity is based on an approach that is essentially systemic and functional in a landscape framework (Herrera, 2013)

the ecosystem (Herrera, 2013). With this description, the contribution of the Amazonian *Chakra* is evident, as it contributes positively in terms of strengthening and in some aspects recovering the ecological connectivity between protected areas in the region.

4.5.6. Threats and challenges

- The annual evaluation and planning process should be carried out every year, especially to verify how the dynamics of the *chakra* evolves, as well as the producers who will join the producer associations in the future.
- Up to now, there is a multi-temporal study of the *chakra* zone in the three main producer associations, Kallari, Wiñak and Tsatsayaku, which facilitates decision making, however, it is necessary to seek funds to expand this study to the producers of the new associations that are gradually joining the Corporation.
- To manage spatial information especially on the sites where the new *Chakra* will be located to promote deforestation-free systems.
- Encourage holistic research of the system, focusing on the economic benefits for self-consumption represented in savings and for the sale of income-generating products, to face the threat of the increase of monocultures in the area.
- The consumption of *Chakra* products should be promoted as a challenge.

V. ACTION PLAN FOR DYNAMIC CONSERVATION

5.1. Executive summary of the Action Plan

The Action Plan for the conservation of the proposed GIAHS site is managed by the Corporation of Amazonian *Chakra* Associations for the next 5 years. The elaboration mechanism counted with the participation of the Corporation's partners, leaders and technicians of the institution, working virtually and in person.

The document is based on an analysis of the current situation of the organizations that are part of the Corporation, using the SWOT¹⁴ analysis tool, an instrument for analyzing the strengths, opportunities, weaknesses, and threats currently perceived by associates, managers, and technicians. The contribution of the aforementioned actors contributed to obtaining information based on the daily life and experience of those who participated and are an active part of the organization.

After the SWOT analysis, the strategic maneuvers and strategies that will strengthen the management of the proposed GIAHS were developed through the *Chakra* Amazónica Corporation of Associations, based on 4 points of view such as potential strategies, strategies to face challenges, organizational protection strategies and conservative strategies. It was articulated so that the Corporation's partners set annual objectives to strengthen institutional management.

The institutional values and policies that will define the institution's personality during the execution of the strategic plan were developed, and the institutional mission and vision were also created. The Corporation's strategic map was structured as an instrument that provides a graphic overview of what is to be achieved in the area of influence of the proposed SIPAM.

For the annual objectives and strategies of the action plan, the general activities to be carried out during the five-year life of the strategic plan were specified, as well as the indicators and annual goals to measure the progress of the planning process, thus structuring the qualitative and quantitative elements necessary for monitoring and evaluating the management to be carried out by the Corporation's management. Planning is the starting point and the tool to respond to the needs of the institution's members.

5.2. Description of the Corporation (Organization diagnosis)

The corporation of associations of the Amazon *Chakra* was legally constituted by the Ministry of Production, Foreign Trade and Investment and Fisheries, with Resolution 0029 of July 23, 2021, domiciled in the Province of Napo, Canton Tena, Tena parish, in the street Guaychillacu and s/n, corner, is constituted by 5 partners, these are: Association of Cocoa Producers of Carlos Julio Arosemena Tola, Tsatsayaku; Wiñak Artisan Association; Inti Association; Association of Agricultural Production Ally Guayusa; Association of Agricultural, Livestock and Fish Production of Napo, Kallari. These organizations are first-

¹⁴ The acronym stands for strengths, weaknesses, opportunities, and threats.

degree and recognized by institutions that have established their correlation with them, which makes the corporation a second-degree organization.

The main purpose established for this Corporation was to solve the challenges that each of the participating or associated organizations had in common. In turn, each of the corporation's partner organizations has more than 500 male and female members who participate in the corporation's main activities related to the production, storage, processing, and marketing of products such as cocoa, bananas, cassava, guayusa, and vanilla, among the main products.

Currently the Corporation has a letter of agreement with the "Forest and Farm Facility" (FFF) of the Food and Agriculture Organization of the United Nations, FAO, which establishes the commitment to institutional strengthening of the Corporation of Associations of the Amazon *Chakra*, to consolidate a representative body in the Amazon that promotes the conservation of their ancestral system. This experience is the starting line of external financing for the fulfillment of its objectives.

5.3. Mission and vision (Strategic direction)

The mission of the organization is "To promote the conservation of the ancestral Amazonian Chakra system, promoting its products and differential value at local, national and international level, promoting the sustainability of production and the quality of life of partners and producers".

The vision is "To become the best partner of grassroots organizations to position the Amazon Chakra, its products and grow together".

5.3.1. Institutional policies

The organizational policies refer to the guide with which the directors and partners will be oriented to manage the organization, these guidelines contribute to the decision making process when there are difficulties or negotiations with other actors. The Amazon *Chakra* Corporation will have the following policies:

- a) To watch over the Amazon *Chakra* as a natural and territorial patrimonial resource: this policy seeks that the established corporate system executes actions inherent to the applicability of the Amazon *Chakra* in different areas such as the construction of public policy, investments, projects, education, research, among others.
- b) Apoyar Support the Corporation's members in achieving their objectives: The Corporation will be a management entity that will constantly be helping its partners meet their objectives, generating synergy among them and complementarity.
- c) Generar Generate services based on the Amazon *Chakra* for partners and local and national organizations: The Corporation will carry out a continuous training process

to strengthen the capacities of its partners, based on this, these partners will be able to provide services among partners, as well as to the society outside the corporation.

5.3.2. Institutional Values

The values constitute the personality of the Corporation, among those that guide the institutional management are the following:

Respect: Once the institutional procedures have been approved, the members of the organization will abide by them and contribute to their compliance. In addition, consideration will be given to the opinions of the members of the organization.

Responsibility: It will constitute the moral obligation to comply with the established mandates in which the partners and directors of the corporation work as a single body to achieve the objectives and goals set.

Commitment: Promise and obligation contracted by the associates and directors for the fulfillment of what is proposed in the different planning, execution and control bodies of the Chakra Amazónica Corporation.

Honesty: Quality that will serve as a bastion in all the activities developed by the corporation in unity with its associates.

Humility: Virtue that the Corporation will have to learn the necessary processes that are developed in the environment of this organization in order to apply those that correspond and benefit the associates and the population that is related to the Amazon Chakra.

Perseverance: To give sustainability to the institution in the different activities that are executed in favor of the Amazonian chakra.

5.4. Strategic map

The proposed strategic map establishes the Corporation's mission through the objectives to be achieved each year and then the institutional vision, taking into account institutional policies and values. This item will describe the strategic objectives proposed:

- a) To have basic organizational design and management tools: In the first year of the organization's management, the aim is for it to have organizational management tools that will enable effective institutional administration. 5 tools are considered to be built during the first year: updated bylaws, internal regulations, management model, strategic plan, annual operating plan. Over the following years, new management and organizational design tools can be included.
- b) Position *Chakra* Amazónica Corporation locally and regionally through project management: In the second year, the institutional objective has to do with the direct

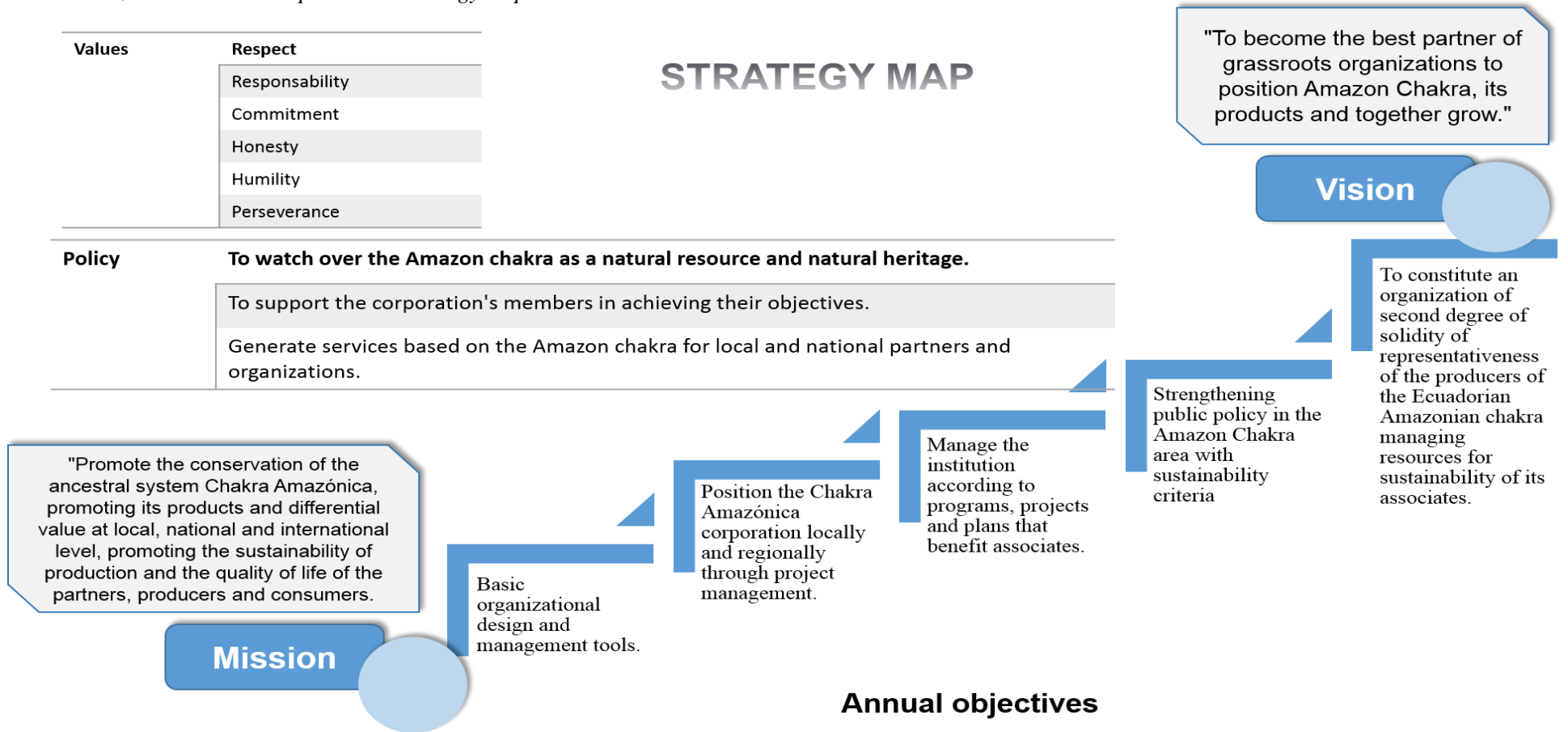
execution of at least two projects, for this purpose it is also established to train the actors in project development and to have a consolidated team for this activity. Projects will be designed each year.

- c) Manage the institution according to programs, projects and plans that benefit the associates: With a growing institutional and organizational life, the corporation will have the capacity to implement programs that encompass projects, which establishes an organizational consolidation. The Corporation will have established institutional service plans for its members and external partners. Its main indicator will be based on the economic amounts that enter the Corporation, product of the programs, projects, service plans, among others.

- d) Strengthen public policy in the area of the Amazonian *Chakra* with sustainability criteria: The Corporation is a private organization that will be in constant search of the positioning of the Amazonian *Chakra* in the technical, political and institutional scope, in first instance in the province of Napo, Sucumbios and all the Amazonian region. With the organized primary sector will raise public policy proposals to be discussed at the level of competent local governments with the agricultural productive sector, as well as in the Ecuadorian laws through the National Assembly or in the Ministries that correspond to the proposal of public policy. It will also review that public policy that has been managed with other actors to give its points of view according to the experience of its partners. The indicator will be the number of public policies approved with the management, monitoring or review of the Corporation.

- e) To constitute a solid second degree organization representing the producers of the Ecuadorian Amazonian *Chakra*, managing resources for the sustainability of its associates: In the fifth year the Corporation will consolidate all the activities related to the benefit of the associates, an aspect that will be reflected in the growth of its associates and in the accompaniment developed by the Corporation in order to diminish institutional negative impacts. The indicators will be established with the number of associates in the Corporation, as well as the number of associates in the base organizations; on the other hand, the amount of economic income generated for the Corporation through projects and the implementation of services will be considered as an indicator.

Figure 69: Amazonian Chakra Corporation's strategy map



5.5. Amazonian *Chakra* strategies

The strategies will support an adjustable process during the 5-year life of the strategic plan. The strategies have been divided into 4 items (Figure 3):

1. Potentiating strategies
2. Strategies to face challenges
3. Organizational protection strategies
4. Conservative strategies

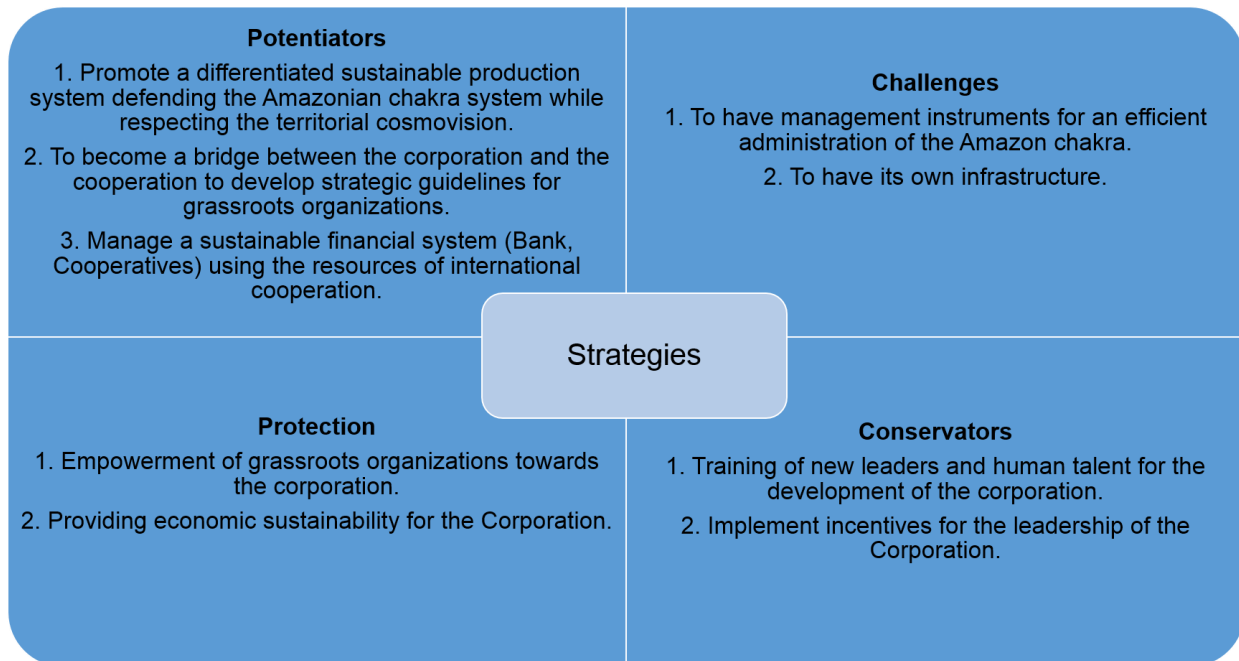


Figure 70: Strategies of the Amazonian Chakra

5.5.1. Empowering strategies

The main strategic maneuver has to do with promoting the technical and economic sustainability of *Corporación Chakra Amazónica*, for which 3 strategies of interest are proposed:

- a) Promote a differentiated sustainable production system defending the Amazonian chakra system while respecting the territorial cosmovision: This strategy highlights the organizational approach of the corporation and its associates who will direct their production to environmentally friendly methods, recognizing the territorial biodiversity, as well as the cultural system that exists around production in the Amazon region. Through the strategy, work will be done in the management of public policy in favor of the Amazonian *Chakra*.
- b) To become a bridge between the corporation and the cooperation to develop strategic guidelines for the base organizations: The Corporation will be a connection instance

that interprets the priority and common demands that its associates have to be transferred through managements and projects for the international cooperation, this will allow to have agreements, conventions and other documents of similar importance that generate tangible commitments.

Manage a sustainable financial system (bank, cooperative, savings banks) using resources for this purpose: The access to fresh resources by the Corporation's associates and its members is a continuous limitation to undertake the efficient management of the Amazonian chakra, therefore the strategy is to look for the best mechanism for the Corporation's associates to have economic resources to meet the needs of the members of the grassroots organizations. It is important to generate research and search for experts to contribute in obtaining information for the corresponding procedure.

5.5.2. Strategies to face challenges

The design of these strategies is based on creating, executing, and generating lessons from the main tools for efficient organizational management; two strategies are proposed:

- a) To have a management instrument for efficient organizational administration: The management instrument will be based on a series of tools that the Corporation will have to implement throughout the life of the institution and the life of the strategic planning. These instruments design management, as well as contribute to generating the organization's work path. It is important to emphasize that managers must constantly use these tools, adjust them if necessary and maintain them, including at times of change of administration, so that management procedures are not altered.
- b) Having its own infrastructure: This strategy is a challenge for the members of the Board of Directors; it is believed that this real estate can contribute to the Corporation's management positioning and serve multiple purposes for the benefit of its members.

5.5.3. Protection strategies

Protection strategies seek to empower the Corporation's associates and develop elements of economic sustainability that will have a direct impact on meeting institutional objectives. Two strategies are proposed:

- a) Empowerment of grassroots organizations: a fundamental task will be for the Corporation's associates to know, contribute and generate commitment to achieve the objectives that the organization has set for itself.
- b) Provide economic sustainability to the Corporation: The proposed strategy focuses on the permanent search for economic resources for the organizational strengthening of the Corporation, this in addition to the development of projects, will take into consideration the approach of services offered by the institution to its associates or external clients. It will also take into consideration the generation of a contingency fund to support grassroots organizations in times of difficulty.

5.5.4. Conservatives strategies

The Corporation shall implement education and project management systems for the benefit of its associates, for which purpose the following strategies are established:

- a) Training of new leaders and human talent for the development of the corporation: Formal and non-formal education contributes to the growth of knowledge of the people involved, this is the bet that *Chakra* Amazónica Corporation proposes as a strategy, to train the different levels of the organization in topics that potentiate its associates; on the one hand in leadership, in order to have all the time with suitable people for the management of the organizations and on the other hand to improve the skills of its associates in different topics that lead to the success of the Corporation.

- b) Implement incentives for the Corporation's management: A conservative strategy is to provide incentives to the Corporation's directors, which may be financial or non-financial. At the moment the directors do not have a salary to dedicate their time one hundred percent to the organization, if corrective measures are not taken, this can lead to a decrease in actions and fatigue of the management team.

5.6. **Balanced scorecard**

Table 1 shows all the strategies necessary for the management of *Corporación Chakra* Amazónica, as well as the general activities to be carried out during the life of the strategic plan and its indicators with their respective annual goals. It should be taken into consideration that the strategic planning starts in July 2022. However, the analysis of compliance must be carried out in the last month of each calendar year, i.e. the management will be evaluated in December of each year.

The weekly, monthly, quarterly and annual planning of managers, technicians and other possible stakeholders must be developed according to the strategic plan. The technical teams of the projects executed by the Corporation and contracted by the Corporation will plan and evaluate based on the policies set forth in the corresponding projects and review compliance with them in the scorecard, which is the product of strategic planning.

Table 21: Strategies planning scorecard for the Corporation of Associations of the Amazonian Chakra

Critical success factors (strategies)	General Activities	Indicator	2022	2023	2024	2025	2026
1. Potentiating strategies							
1.1. Promote a differentiated sustainable production system defending the Amazonian <i>Chakra</i> system while respecting the territorial cosmovision.	1.1.1. To influence differentiated public policy in favor of the Amazonian <i>Chakra</i>	Number of public policies in which the Corporation has had an influence	1	1	1	1	1
	1.1.2. Build a proposal for a regulatory framework on the Amazon <i>Chakra</i> to obtain the SPG Chakra Seal.	Number of PGS accredited organizations belonging to Corporación de Asociaciones <i>Chakra</i> Amazónica	-	2	2	1	-
1.2. To be a bridge between the corporation and the cooperation to develop strategic guidelines for grassroots organizations.	1.2.1. Mapping of cooperation actors on an ongoing basis	Number of stakeholder maps constructed and revised for the management of the Corporation	1	1	1	1	1
	1.2.2. Project development	Number of projects financed per year	1	2	2	2	2
	1.2.3. Socio-entrepreneurial diagnosis of grassroots organizations	Number of diagnoses prepared	1	-	-	1	-
	1.2.4. Strengthen the socio-entrepreneurial organizational system of the corporation's grassroots organizations.	Number of grassroots organizations with business tools that have been contributed for implementation	-	2	2	-	-
	1.2.5. Participate in national and international events for resource management.	Number of events in which the Corporation participates	2	2	2	2	2

	1.2.6. Generate alliances with cooperation agencies	Number of partnerships that strengthen the institutional management of the Corporation and its grassroots organizations	2	3	4	5	6
1.3. Manage a sustainable financial system (bank, cooperative, savings banks) using resources for this purpose.	1.3.1. Propose financial alternatives	Proposal document raised	-	1	-	-	-
	1.3.2 Identify suitable proposals	Approved proposal document	-	1	-	-	-
	1.3.3. To have management instruments for the administration of the financial system.	Number of tools built	-	2	2	-	-
	1.3.4. Implement the financial system for the sustainability of the corporation.	Operational financial organization	-	-	1	-	-
2. Strategies to face challenges							
2.1. To have a management tool for efficient organizational administration.	2.1.1. To have a legislative and functional legal framework in place.	Number of instruments approved and operational	2	-	-	-	-
	2.1.2. Operational and financial planning	Number of approved operational plans based on the strategic plan	1	1	1	1	1
	2.1.3. Have technical personnel according to the needs of the Corporation	Number of contracts signed for full-time technical staff and consultants	5	5	8	10	12
2.2. Have your own infrastructure	2.2.1. Manage agreements with GAD's to obtain land	Number of agreements signed	-	1	-	-	-
	2.2.2. Design infrastructure	Approved architectural plan	-	1	-	-	-
	2.2.3. Manage economic resources for the construction of the building	Built work	-	-	1	-	-
3. Protection Strategies							

3.1. Empowerment of grassroots organizations	3.1.1. Socialize strategic plan	Number of organizations with a strategic plan socialization report	5	-	-	-	-
	3.1.2. Socialize annual operating plan	Number of organizations with a socialization report of the annual operating plan	5	5	5	5	5
	3.1.3. Socialize associates of grassroots organizations activities of the Corporation	Number of files with monthly socialization reports of directors towards grassroots organizations of the Corporation's activities	6	12	12	12	12
	3.1.4. To be accountable	Accountability document approved	1	1	1	1	1
3.2. Provide economic sustainability to the Corporation	3.2.1. Generate new economic approaches for the sustainable use of natural resources	Number of chains analyzed based on biotrade	-	1	1	1	1
	3.2.2. Implement service offer for associates and external	Dollar amount	-	2.000	2.500	3.000	5.000
	3.2.3. Generate an institutional contingency fund	Dollar amount	-	-	-	-	20.000
4. Conservative strategies							
4.1. Training of new leaders and human talent for the development of the corporation	4.1.1. Implement the leadership training system	Number of leaders who complete the process	15	-	-	-	-
	4.1.2. Propose and execute a training plan for managers, organizations, technicians.	Number of trainings per year	1	3	3	3	3
4.2. Implement incentives for the leadership of the Corporation	4.2.1. Propose a normative	Proposal Document	1	-	-	-	-
	4.2.2. Proposal Approval	Approval Document	1	-	-	-	-
	4.2.3. Annual execution and validation	Annual Incentive Usage Report	-	1	1	1	1

Table 22: Participatory Guarantee System (PGS) of Amazonian Kichwa Chakra Seal

Participatory Guarantee System - Amazonian Chakra - Seal SPG Chakra Seal										
Objective:	Revaluing the <i>Chakra</i> production system									
	Promote the conservation and recognition of the principles of production around the <i>Chakra</i>									
	Develop a marketing strategy that revalues and gives additional value to chakra products									
Scope:	Guarantee that all products from the <i>Chakra</i> meet the production standards of an ancestral production system									
Inputs for formulation	Ancestral production system “Amazonian <i>Chakra</i> ” Provincial ordinance Participatory guarantee system									
Shares in value:	GIAHS recognition process									
GPS stakeholders	The actors that make up the SPG sello <i>Chakra</i> and drive the operation and implementation of the Action Plan are: Social: Corporation of Associations of the Amazon <i>Chakra</i> Public: Provincial Government of Napo; Ministry of Agriculture and Livestock; Agrocalidad; IKIAM University, PRO Amazonia Cooperation: FAO, GIZ; WWF; Maquita Foundation; ENGIM; FECD; COPADE; Pachamama Foundation									
CHAKRA SEAL ACTION PLAN										
Axes	Instruments and processes	State			Strategic Timeline			Rapid Budget estimation		
		Developed	In process	To develop	Year 2022	Year 2023	Year 2024	USD 2022	USD 2023	USD 2024
NORMATIVE	1-Manual for the implementation of the chakra seal (crops) 2- Structure 3- Management model 4- Process for awarding the <i>Chakra</i> seal 5- Accrediation of observers	X								
	Updating the code of conduct		X		X			\$5.000,00		
	Updating the management model			X		X			\$5.000,00	

	Updating of processes and Manual		X		X			\$3.000,00			
	<i>Chakra</i> seal regulations			X	X			\$5.000,00			
	<i>Chakra</i> seal regulations			X	X			\$5.000,00			
	Manual for the awarding of the <i>chakra</i> seal for value-added products			X	X			\$7.000,00			
	Process diagramming			X		X			\$5000,00		
SUBTOTAL								\$25.000,00	\$10.000,00	\$0,00	
OPERATIONAL	Seal construction										
	Similar criteria with other certifications (BPA, Organic, Rainforest, SPP)			X		X		\$7.000,00	\$5.000,00		
	Research and support for the <i>Chakra</i> seal criteria					X			\$8.000,00		
	Construction – seal backs					X	X		\$5.000,00	\$3.000,00	
	Sistematization of <i>Chakra</i> documents (research, projects, etc)					X			\$4.000,00		
	Certifying the <i>Chakra</i> seal in the SAE			X	X	X		\$3.000,00	\$3.000,00		
	Implementation										
	Build the <i>Chakra</i> seal implementation plan			X		X	X		\$10.000,00	\$5.000,00	
	Organizing <i>Chakra</i> seal files in organizations		X			X		\$3.000,00	\$3.000,00		
	Organize the data of the associations producers in a digital database		X			X		\$3.000,00	\$3.000,00		
	Internal socializations on the <i>Chakra</i> seal in each organization		X			X	X	\$2.000,00	\$2.000,00	\$2.00,00	
	Traceability system			X		X	X		\$25.000,00	\$20.000,00	
	Evaluation										
Construct the seal evaluation plan:			X		X			\$4.000,00			

	documents for observers, records, etc.										
	GPS capacity building, Overseers, observers		X		X	X	X	\$1.000,00	\$1.200,00	\$1.200,00	
SUB TOTAL								\$19.000,00	\$73.200,00	\$31.200,00	
COMMUNICATION	Registration – Intellectual Property chakra seal		X		X			\$3.000,00			
	Communication strategy for the SPG Sello <i>Chakra</i> : creation of an IT platform, promotional material, layout of manuals, procedures, etc		X		X			\$2.000,00			
SUB TOTAL								\$5.000,00	\$0,00	\$0,00	
MARKETING	Marketing strategy (national in-store positioning)			X		X	X		\$20.000,00	\$20.000,00	
	Incorporation of enterprises with the Chakra seal in the Chakra chocolate and tourism initiative		X		X	X		\$5.000,00	\$3.000,00		
SUB TOTAL								\$5.000,00	\$23.000,00	\$20.000,00	
SUSTAINABILITY	<i>Chakra</i> seal sustainability study			X		X			\$6.000,00		
	Define a sustainability strategy			X		X			\$22.000,00		
SUB TOTAL								\$0,00	\$28.000,00	\$0,00	
TOTAL								\$54.000,00	\$134.200,00	\$51.200,00	

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