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The Heritagescape of *Kichwa* People of *Nizag* Built upon Traditional Plant Usage along a Chimborazo Variant of the Andean Road System or *Qhapaq Ñan*

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Abstract: To document the dynamics of biocultural heritage, we studied traditional uses of plants on a segment of the Andean Road System, or *Qhapaq Ñan*, within the central Andes of Ecuador, home of the *Kichwa* community of *Nizag*. Here, residents preserved a rich diversity of plants within their agricultural fields, or *chakra*, of the Andean landscapes, upholding a culture steeped in traditional knowledge. Wild and domesticated plants are a cornerstone for the community, prompting the development of ethnobotanical management strategies with a conservation approach. The diverse plant uses aim to revalue their culture, fortify their self-identification as an indigenous community, and ensure the transmission of ancestral knowledge. This research aims to ascertain the ethnobotanical applications of this venerable community. Employing participatory action research, semistructured interviews were conducted with 43 community informants to gather ethnobotanical data on the flora applied within their territory, spanning categories such as food, agriculture, crafts, living fences, construction, fuel, ornamental, environmental, technological, and medicinal services. The findings indicate that age, rather than educational level and gender, significantly influences the variation in plant usage knowledge. In total, 142 plant species were cataloged, comprising herbs (58%), shrubs (23%), trees (15%), and climbers (4%). The most represented families were Asteraceae, Fabaceae, Lamiaceae, and Poaceae. Notably, 96% of these species provide some type of environmental service or fulfill a niche within the socioecological system. Medicinal uses were reported for 89% of the plants, while 56% served agricultural purposes, primarily in fertilizer production and forage. Additionally, 44% of the plants are utilized as food, typically consumed fresh. Among the medicinal plants, leaves are the most used part (58%), prepared as infusions and poultices. The prevalent ailments addressed include respiratory and urinary system conditions, with *Borago officinalis*, *Carica pentagona*, *Vasconcellea pubescens*, and *Origanum mejorana* being the most frequently employed plants.

Keywords: heritagescape; ethnobotany; wild plant; *Kichwa* people; *Qhapaq Ñan*; traditional knowledge; conservation

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1. Introduction

From the beginning, humans have maintained close contact with plants, which has allowed them to acquire a rich collection of botanical knowledge [1]. Collecting wild

plants is a deeply rooted custom in the original people's communities [2,3], and it has been a staple activity and identity marker for knowledge holders and medicine persons in mountain communities. Trade networks and pilgrimages have been developed that are associated with collecting and distributing useful species through routes that became iconic in describing ethnoecological characteristics and ethnobotanical applications. Traditional ecological knowledge about the use of plants is thousands of years old and has transcended generations [4–7]. It is estimated that ancestral groups acquired their knowledge by distinguishing between plants that could be used as food and those that caused reactions in the organism [8,9]. Depending on the preparation method, they can act on the physical level in mental and emotional states [10]. Around 50,000 plant species with medicinal uses have been reported to date, corresponding to approximately 10% of those existing worldwide [11].

Plant species are considered high-value resources in health systems. According to estimates from the World Health Organization [12], more than 80% of the world's population uses traditional medicine to meet primary healthcare needs, with traditional treatments involving the use of plant extracts or their active principles [7,13–15]. In the Andean world, plants played a substantial role due to their wide medicinal, nutritional, and ritual use, and the animist conception endowed plants with power, which could be benevolent or malevolent [16]. The Andes region is one of the largest centers of plant domestication in the world [17], it was the scene of civilizations that developed indigenous and traditional agriculture with many native plant species within the altitudinal range that oscillates between 2500 and 4300 m above sea level [18]. The cultivation of these species was the food base of large Andean populations; all their species and varieties currently cover approximately an area of 150,000 ha in the Andes, and it is estimated that about 500,000 indigenous native peasant families have plots of various sizes, with one or more varieties for self-consumption and the surplus for sale or barter [19].

Ecuador is a multiethnic and pluricultural country [20] that signed the Convention on Biological Diversity (CBD) and is one of the most megadiverse countries in the world [21] due to its variety of ecosystems [22]. This megadiversity is due to a combination of astronomical, geological, biogeographical, ecological, and evolutionary factors [23], resulting in numerous useful floras. Approximately 80% of the Ecuadorian population uses plants for therapeutic purposes [24]. The use of wild vegetation is strongly associated with sociocultural factors of the existing ethnic groups in the country [25], especially indigenous peoples and rural cultures that preserve extensive knowledge of their mountainscape [26–28], constituting an important basis for the conservation of biocultural diversity and sustainable use [29–31].

The short distance that separates the ecological levels in the equatorial region, and particularly on the mountain slopes of its two mountain ranges, eastern and western, is an important geographical feature in the consolidation of the notion of territory among the original peoples of ancient Ecuador. The fundamental principles of Andean economic organization (reciprocity and redistribution) were subject to good management and control of the vertical distribution of the ecological floors. The origins of this agro-ecological tradition in the study region were detected, south of *Nizag*, as early as 240 AD–1438 AD in a very steep cultivation area distributed between 2835 and 3026 mt [32] and seem to have continuity in modern times.

Our aim is to fill the information gap regarding the traditional uses of plants by the *Kichwa* people of *Nizag* and their heritization along the variant of the Andean Road System, or *Qhapac Ñan*, in Chimborazo province, Central Ecuador. The road network is of great historical and cultural importance that traverses the Andes Mountains from Colombia, Ecuador, Peru, Bolivia, and Chile to Argentina. Some 780 km and 291 sites of the *Qhapaq Ñan* Andean Road System have been declared World Heritage Sites in the category of Cultural Itinerary by UNESCO in 2014 [33]. A great deal of the current Pan American Highway was built on what became the Royal Road or "Camino Real" in colonial times, following the *Qhapac Ñan*, which in turn followed pre-existing roads of local native

federations, crisscrossing the inter-Andean valleys and allowing to connect them either to the Amazon basin on the eastern slopes or to the Pacific lowlands in the western Andean flanks [34]. The longitudinal route along the main cordilleras sometimes splits into variants to reach important areas. For instance, in northern Ecuador, there are variants that connect Caranqui, Reyloma, and Araque hill at San Pablo's Lake (now known as *Imbakucha*) on one side, while those on the opposite site connect Aloburo, *Yawarkucha* (localities near Ibarra city), *Cuchicaranki,* Zuleta, and *Imbakucha*. In central Ecuador, the road connected the areas of *Cuchaski* with Cotocollao, Quito, Puengasí, Tambillo, Tiopullo, Mulaló, and Ambato [35]. In the Chimborazo province, the *Inka* Road had two variants from Liribamba until reaching *Achupallas* on its way to *Ingapirka* [36]. By exploring the ethnobotanical knowledge and ancestral practices of the rural lifescapes of the *Kichwa* communities in *Nizag*, we engage with the concept of a heritagescape, centered around the route of the *Inka* road variant in the *Nizag* territory. This route connects the lowland western flanks of the Andes with the central highland area of Alausí [32,36].

The *Kichwa* of *Nizag* have maintained a symbiotic relationship with their natural environment, where plants are not only vital resources for survival but also central elements in their worldview and spirituality. Thanks to their great organizational capacity, an adoption of agroecological models was derived, nourished by the heirloom of native agrobiodiversity and ancestral knowledge [37], which is a communal polyculture space with transitory sowing based on respect for the agri–luni–solar calendar, distinguishing sowing and fallow times of the land, with a durability of 2 to 4 years [38–44]. Furthermore, it is a scenario for the accumulation and transmission of traditional knowledge of plant management through a permanent exercise of domestication, reproduction, and selection of plant varieties, promoting sustainable use and conservation of agrobiodiversity. More importantly, it reflects the underlying strategy of trade control of lowland/highland dynamics, making it an important node along the *Qhapac Ñan* near the iconic *Apu* Chimborazo, between the iconic Apu Chimborazo and the region of Urbina to the northwest of the Riobamba Valley. Hence, the *Nizag* nexus is considered a good exemplar of territorial, economic, social, technological, and spiritual cocreation of the changing tropandean mountainscape of the western Andean flank [45]. The land use and management of the *chakra* go beyond being a set of agricultural practices mimicking the verticality of the slopped terrain in the *Chanchan* river basin; they are processes closely identified with the lifescape of indigenous communities and influence their epistemology and ontological worldview [46,47].

However, previous works report the loss of two-thirds of the species present in the *chakra* due to ecosystem degradation, the phenomenon of modernity, the proximity to cities of indigenous communities, and the absence of policies and proposals to revitalize the *chakra* [5,42,48–53]. These have negatively impacted the successful traditional agricultural system of indigenous communities, showing a progressive loss of genetic diversity with a tendency to maintain the so-called "commercial" species and, in addition, turning toward monocultures [45]. Because of this transformation, the chain of transmission of plants' traditional knowledge is at risk [54–57], generating the inevitable loss of valuable knowledge and local identity [58].

In recent years, ethnobotanical studies have increasingly focused on finding ways to express the value of plant species to rural people [59]. So much so that, in various international forums, such as the Chiang Mai Declaration, the WHO, the CBD, and the FAO Action Plan, the urgent need to preserve biological resources and knowledge has been highlighted [60]. The *Kichwa* of *Nizag* maintain current, detailed knowledge of the local flora, acquired through generations of observation and experience [61]. This knowledge includes the identification of species, their life cycles, and their ecological interactions; however, such knowledge is decreasing, because it is a practice performed more by older adults than by young people. The use of traditional knowledge is due to ease of access, low economic costs, and beliefs. For this reason, research is of great importance to value and rescue knowledge about the traditional uses of wild plants in the rural *Nizag* community, maintaining the trade node associated with the legacy of exchanges between the lowland

coastal plain and the highland territories transected by the *Qhapac Ñan* variant of the *Inka* road.

2. Materials and Methods

2.1. The Study Area

This research was developed in the territory of *Nizag* (Alausí County, Chimborazo Province, Ecuador). *Nizag* is an indigenous community made up of 495 families and 2100 inhabitants ethnically self-identified with the *Kichwa* nationality [62]. It extends to the western foothills of the equatorial Andes Mountain range, between the coordinates UTM 17M 9753056 7409530, precisely on one of the sectors where remnants of the variant of the *Inka* road (*Kapak Ñan* or *Qhapac Ñan*) (Figure 1) connecting the highlands of Chimborazo province with the coastal lowlands of the Guayas gulf are found. The *Nizag* variant was strategic with exchanges of warm and cold agriproducts for both foodstuff and healthstuff. Famous explorers used this road (section *Nizag*—Patarata and *Nizag*—Guasuntos), such as the French Geodesic mission and Alexander von Humboldt's explorations from Chimborazo towards Guayaquil [36]. Also. The *Pilchis* Hill near Achupallas was the symbol of indigenous resistance against Spaniards by community members of Guasuntos, Pomallacta, Lausay, and Suid during their rebellion in 1781 [63].

(**A**) (**B**)

Figure 1. Andean road system or *Qhapaq Ñan*, *Nizag* section: (**A**) Photograph with a wide plan. (**B**) Photograph with a detailed plan.

Sierra [64] proposed that the *Nizag* community is distributed along Dry Montane Thornland at 1035 m above sea level (masl) and along Dry Montane Shrubland from 1400 to 2500 masl. According to the Ministerio del Ambiente [65], *Nizag* is classified as an intervention, which is interpreted by the presence of agricultural mosaics in the area. Acosta Solis [66] referred to it as "Anthropofitia Humboldtiana" due to the acute farmscape transformation exerted in the area, as most of the Andean flanks have experienced since

antiquity [67]. The climate is cold and dry; the temperature ranges between 8 and 10 °C, although in the foothills of Western Cordillera, toward the coastal plains, the climate warms significantly, reaching temperatures of up to 21 °C [68]. At the heights of the mountain range, ambient temperature is cold and humid, with permanent fog shrouding remnant forest patches and most of the hilly cultivated terrain. The rainy season runs from mid-September to mid-January, with precipitation of 153–655 mm/year in an altitudinal range that goes from 1840 to 3160 masl (Figure 2).

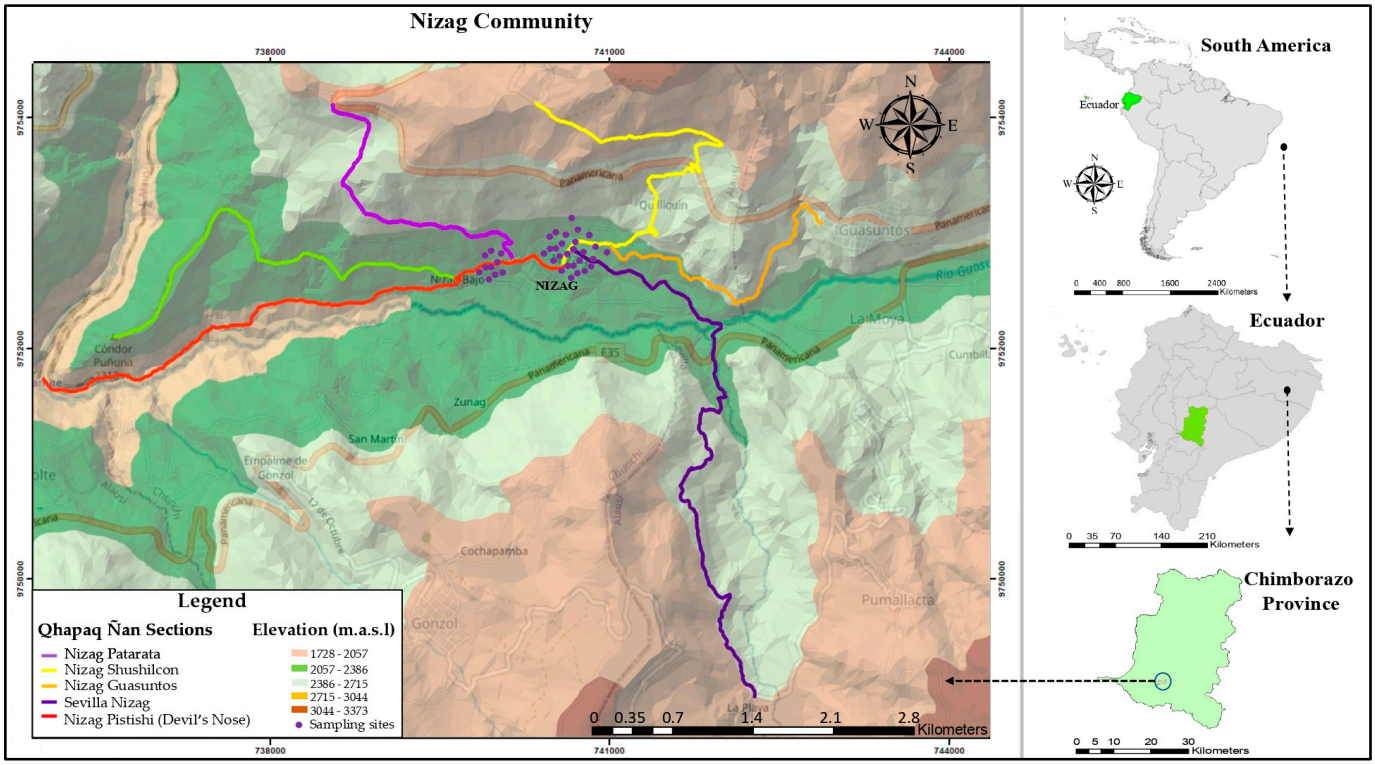

Figure 2. Study area and distribution of *Qhapaq Ñan* sections in the Western Andean flanks of the *Nizag* region.

2.2. Data Gathering

Our main research objective was to identify and document ancestral knowledge about plants, with an emphasis on medicinal plants, which are being lost in different Andean communities that have used and continue to use the main axis of *Qhapac Ñan* and its trans-Andean variants. This research was conducted by collecting information from primary sources through field trips. The data were obtained in relation to the places that each knowledgeable member of the *Nizag* community identified as a source of useful plants within their property or in adjacent areas of use [69] and through the application of an open interview in which, in addition to the identification of different types of flora species existing in the *Nizag* community, a segmentation was carried out considering the useful plants for which information was recorded.

In the field data collection phase for the ethnobotanical study, a total of 3 exploratory trips were made to the study area, with the objective of investigating the plants that are most frequently used, preparing a list of these, and segmenting them into useful plants, that is, those that provide some benefit to the residents of *Nizag*. Data were collected through the application of the ethnobotanical method of [70] and semistructured interviews [71] with Prior Informed Consent as required by the IRB and the International Society of Ethnobiology's Code of Ethics. Information was requested from people over 15 years of age but with a focus on adults over 30 years of ag who still exhibit continuous transmission of information among the population [72], with no identifiable information, following

human subjects' research protocols. According to Alemayehú et al. [73], ethnobotanical knowledge and practice vary within any culture according to age, sex, and educational level. Notwithstanding other demographic markers, much of the knowledge about plants in the study area was obtained from older informants, and to a lesser extent, from younger ones. The list of plants is included in Table A1 (Appendix A).

To fully understand the popular use of a certain genus or species, aspects such as the informant's anonymous data (locality, information about health, diseases, common illnesses, access to health systems) and data on existing plants in the community were considered (i.e., common name, uses, preparation methods, part of the plant used, efficacy) (Figure 3). Additionally, as the interviews were carried out, small samples of plant material and photographic records were collected to taxonomically list, determine, and confirm scientific names.

(A) (B)

Figure 3. (**A**) *Nizag* indigenous woman providing ethnobotanical information on useful plants (*Phaseolus vulgaris*) present in the community. (**B**) Traditional accessories (bags, purses, and mats) made from cabuya (*Agave americana*).

2.3. Categories of Uses

The categories selected were identified because of the answers given by the community members of *Nizag*, as per their perceived relative importance, as follows (Figure 4):

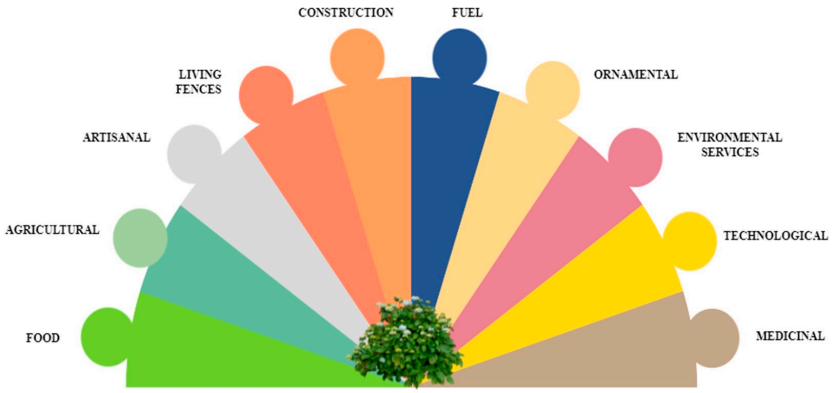

Figure 4. Plant use categories, adapted from Pérez [69], Estupiñán et al. [74], Jiménez et al. [75], and Cruz et al. [76].

- *Food:* Plant species that are consumed as human food.
- *Agriculture:* Plant species with agroindustrial functions that facilitate agricultural and livestock processes. In this category, two subcategories were considered.
  - *Fertilizer:* These are fertilizers that are given from the decomposition of a mixture of plant parts (leaves, stems, flowers) to improve the quality of the soil where the plants grow.
  - *Forage:* Plant species that are grown with the aim of feeding animals.
- *Artisanal:* Plants from which fibers or dyes used to manufacture decorative utensils are obtained and which are generally sold.
  - *Fibers:* Plant fiber is any flexible, elongated, and narrow material that comes from plants.
  - *Dyes* refer to colorants that are derived from plant species.
- *Living fences:* Plantations made in a linear manner with species, which are used as barriers, paths, or lot boundaries.
- *Construction:* Plants that are used to produce supplies for homes.
  - *Timber* includes the plant species from which the wood for planks or beams used in the construction of homes, stables, and car bodies is extracted.
  - *Fences:* Plants whose wood is resistant to weathering are used to separate the plants from the exterior structure.
  - *Roofing:* Plant species that are used for home roofs.
- *Fuel:* Plant species that are used as natural fuel (firewood) for cooking food.
- *Ornamental:* Plants that are used as ornaments.
- *Environmental services* are those functions of ecosystems that generate additional benefits and well-being for people and communities.
- *Technological:* Species that are usually used to provide help; these are transformed to provide mechanical or chemical help in people's daily tasks. It is divided into 2 subcategories:
  - *Tools:* Plants used to make utensils that provide mechanical help.
  - *Cosmetics:* Species used to improve people's physical appearance.
- *Medicinal:* Plants that have preventive and curative properties for diseases or, at the same time, relieve ailments in people. It is divided into fourteen subcategories established according to the systems of the human body, affected region, or disease, as proposed by Hurtado et al. [77], with some modifications that were adapted to the characteristics of the area:
  - *Circulatory system:* Purify the blood, high blood pressure, vasodilator, cholesterol reduction.
  - *Digestive system:* Stomachache, inflammation of the liver, stomach ulcers, gallbladder conditions, antiparasitic, hemorrhoids, diarrhea, intestinal infection, vomit, irritable colon syndrome, carminative, indigestion, gastritis, constipation.
  - *Urinary system:* Bladder pain, candidiasis, kidney disease, diuretic, urinary tract infection.
  - *Female reproductive system:* Menstrual cramps, facilitate labor, emmenagogue.
  - *Male reproductive system:* Prostate inflammation reliever.
  - *Respiratory system:* Pneumonia, throat conditions, expectorant, flu, asthma.
  - *Nervous system:* Headache, insomnia, heartache, sedatives, relaxing, depression, improve the nervous system.
  - *Auditory system:* Earache.
  - *Skeletal system:* Boneache, arthritis, strengthen bones.
  - *Optical system:* Eye infections.
  - *Bacterial diseases:* Syphilis, erysipelas.
  - *Viral diseases*: Measles, tonsillitis.

- *Skin conditions*: Burns, rash, healing, removing calluses, skin irritation, festering wounds, moisturizing the skin, acne, flaccidity, sagging skin, reducing wrinkles.
- *Cultural diseases:*

Evil eye: It is one of the most common evils; this condition can be caused by various reasons, envy toward a person, having sweet blood or very strong eyesight. It mainly affects children and plants [78].

Bad air: It can lodge in any part of the body; it generally occurs when passing near lonely places with stagnant water, ravines, holes, and cemeteries. It is considered one of the ailments caused by evil spirits [79].

Empacho: This is intestinal indigestion. The disease is due to stagnation and partial arrest of intestinal movement caused by something that adheres to the gastrointestinal wall. Contemporary healers express that, if they are not made to remove what is stuck to the intestinal wall, the child may die [80].

Scare: Among the indigenous people, there is a belief that the person's soul was captured because they disturbed the guardian spirits of the land, rivers, or forests, and the soul will remain captive until the fault is atoned for. Also, in many cases, the illness is attributed to a scare caused by an accident or unexpected encounter [81].

Head loss: It is a characteristic condition of infants, who present the fontanelle or "headache" without hardening, in a tender and vulnerable state; the main cause is having subjected the child to sudden and rapid movements or falls [82].

Bewitching: It is an activity carried out of resentment, envy, ill will, or revenge, and it is considered that the affected person can die if it is not treated in advance [83].

- Others: Fever, antibacterial, hemorrhages, rheumatism, anti-inflammatory, antitumor, anemia, hangover, reduce obesity.

3. Results

3.1. Sociodemography of the Informants

The application of the ethnobotanical method of Kvist et al. [70], which consists of obtaining as much information as possible from the population through their active participation, allows access to the reality of the subjects of study by living their daily lives. A total of 43 informants from the *Nizag* community were interviewed; the informants in the study area represented two age groups, the young (>15 <30 years) and the elderly (>30 years), 75% are women, more than 80% are adults or older, and 60% of the informants have a primary education level of study. They are mainly dedicated to agriculture, livestock, and tourism; the latter is in decline due to the ending of the state-run train company ("Ferrocarriles del Ecuador"), directly and indirectly related to tourism, which constituted the main source of jobs in the area.

3.2. Floristic Composition

One hundred and forty-two species of plants (tree, bush, herb, and climber) were identified in the *Nizag* community of the Alausí County, in Chimborazo Province of the central Andes of Ecuador; the identified specimens represent 34 genera and 61 families. Of the 142 species identified, 15% are herbs, 23% are shrubs, 15% are trees, and 6% are climber plants (Figure 5). Herbaceous plants occupied the largest floristic composition followed by shrubs and trees contributing to 96% of the floristic richness of plants used in the *Nizag* community. Likewise, of the total number of families, Asteraceae (18), Fabaceae (11), Lamiaceae (10), and Poaceae (8) were the families with the highest number of species, 52 families have four species each, 2 families have three species each, 12 families have two species each, 10 have three species each, and the remaining families contain a single species (Table A1).

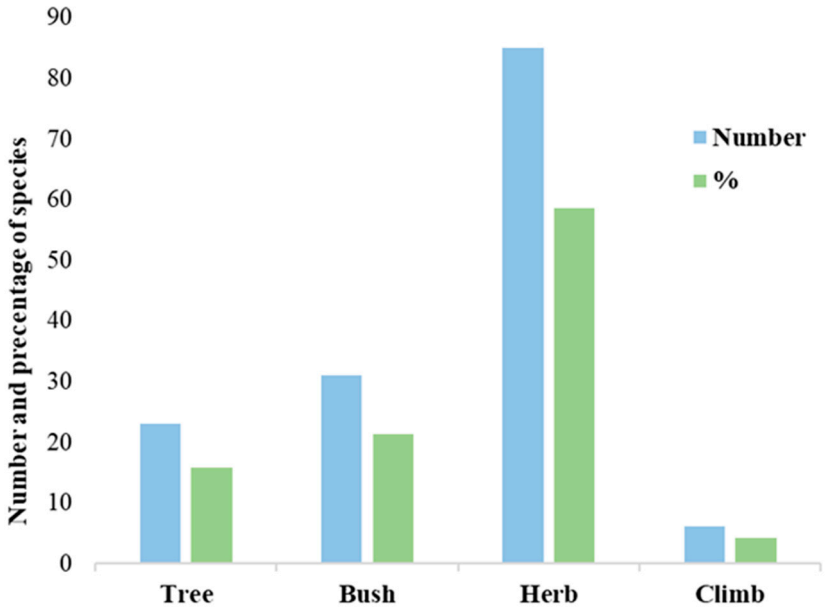

Figure 5. Habit typology of plants used in the *Nizag* community.

3.3. Categories of Use

Of the total species identified, informants mention that 96% of them offer some type of environmental service or fulfill a function in the ecosystem; 89% of the plants have medicinal use and the most common means of preparation is through infusion, with the majority using leaves; 56% has agricultural use mainly for the generation of fertilizer and forage; 44% is used as food, generally consumed fresh, in salads, soups, and juices, in low percentages (Figure 6). The rest is used for construction, fuel, and mainly woody vegetation, which are generally used for the construction of house walls, as well as the construction of fences in patios, as well as corrals for livestock and the processing of charcoal; the technological use is mainly related to manufacturing utensils that provide mechanical help, as well as plants that have a cosmetic use, generally for easy cleaning, hair treatment, used to improve people's physical appearance.

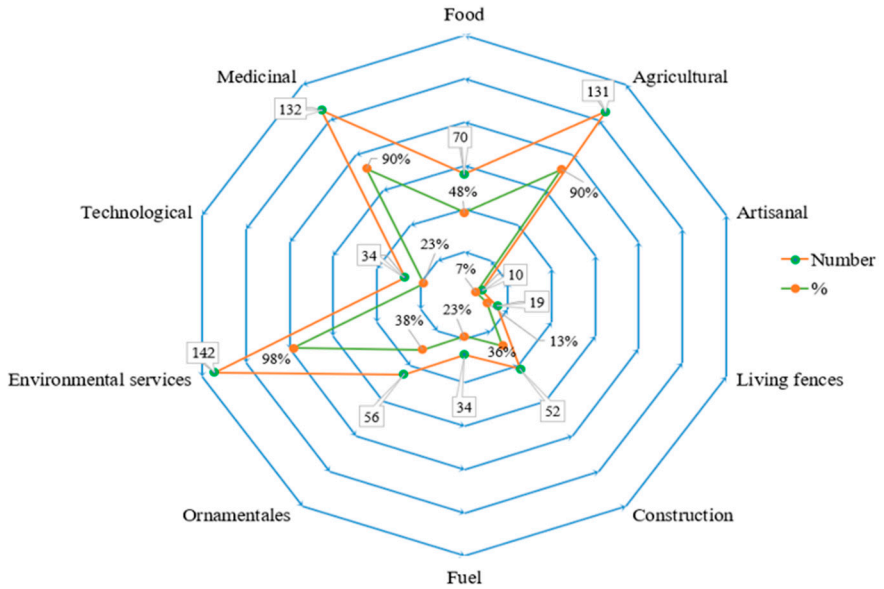

Figure 6. Categories of use of plants found in the *Nizag* community.

3.4. Plant Parts Used as Medicine

Although the use of plants was reported by categories, it is also necessary to identify which parts of them and which way they are used or have been consumed for generations to alleviate different conditions to the human body; from 58% of the plants identified as medicinal, only the leaves are used with the common method of preparation through infusions and as a poultice; 18% of the species use the entire plant, generally in infusions; 14% corresponds to the flower and the fruit, respectively, they are generally consumed fresh, cooked, extracted, or dried; and finally, the stem and root corresponding to 8% and 13%, respectively, are consumed either cooked, infused, or extracted.

3.5. Diseases Treated by Medicinal Plants

The most common diseases treated with medicinal plants include symptomatic conditions of the different anatomical systems: the respiratory system, such as throat conditions, flu, pneumonia, and expectorant; the urinary system, such as kidney conditions and diuretic and urinary tract infection; the digestive system, such as stomach pain, liver inflammation, and diarrhea; and skin conditions such as skin irritation, scarring, and acne. It is important to mention that many plants are used as anti-inflammatory. The plants that are used to treat the greatest number of conditions are *Borago officinalis* (23), *Carica pentagona* (17), *Vasconcellea pubescens* (17), *Origanum mejorana* (16), *Citrus limonum* (18), *Rosa canina* (16), *Verbena officinalis* (18), and *Matricaria chamomilla* (15) (Figure 7).

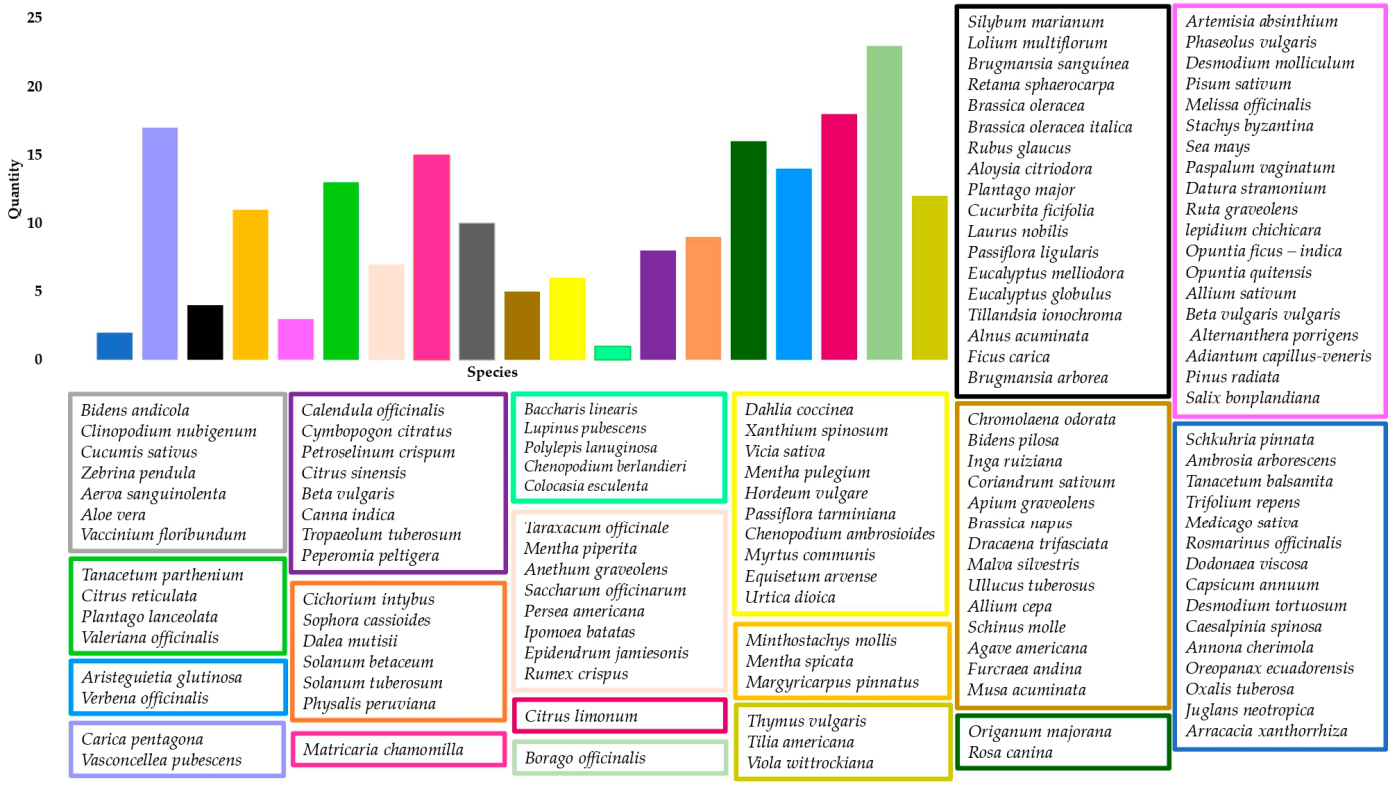

Figure 7. Grouping by color according to the number of diseases treated by species identified by informants in the Nizag community.

3.6. Threats and Management Practices for Conservation

Because the indigenous *Kichwa* people of *Nizag* have an intimate relationship with their natural environment, they are familiar with the threats that useful plants face. Therefore, during the key informant interviews, they were able to identify three main threats: (1) migration from the countryside to the city or to countries like the United States or Spain due to the economic crisis that Ecuador has gone through in recent decades [84], which

causes family dismemberment and loss of traditions, knowledge, and customs, generating a very accelerated change in their cultural patterns [85,86]; (2) soil erosion due to wear and tear of the land parcel or *chakra* due to monoculture; and (3) the expansion of the agricultural frontier, which was identified as an important threat because of the many areas for cultivation and grazing sites, where a great diversity of species commonly used for health conditions were found degraded [87]. According to Alemayehu et al. [73], communities have various ethnobotanical management strategies with a conservation focus. Due to their diverse uses of plants, whether edible, medicinal, ornamental, introduced, or wild, they grow them widely on the *chakra* as weeds, or rather arvensis, growing indiscriminately in the fields and commonly being found in land fences under the shade of trees, and on some occasions, even prohibiting the felling of symbolic nurse trees for the rural population. In *Nizag*, conservation strategies are also being developed, the most representative being through community tourism that seeks to publicize the customs and traditions of the ancestral *Kichwa* nation. Currently, there is an association of women weavers based on derivatives of the Cabuya (*Agave americana*), which gives social agency to their fabrics. Their use of textiles and design appropriations helps re-evaluate their culture, within their self-identification as an indigenous community, and maintain and inherit ancestral knowledge, as well as the possibility of providing new values to their fabrics that are marketed to other destinations.

4. Discussion

In the *Nizag* community, there is a marked reduction in population due to the outmigration factor, which has converted it into a relatively aged community due to the current presence of a larger number of adults (over 30 years old). But, instead, the community has preserved a developed concept of living landscape or "ancestral territory". From colonial times until the recent past, it was known that priests and mestizo merchants were only allowed to enter using the walled access roads, and only during the patron saint's festivities [63]. Therefore, the sections of *Qhapaq Ñan* that have been documented in this region play an important role in the configuration of the spatial concept of territoriality of *Nízag*, both of which (road appropriations and conceptual ancestral territory) were probably conceived during the *Inka* period (XV century). The well-preserved walled roads of *Nízag* are a clear indication that the material culture of this region plays an important role in the cultural perception of territory, as reflected by some scholars [88] and in the agroecological practices with a long historical trajectory [32]. The mountainscape was transformed because the road network (or 'caminerías') of the ancient groups (i.e., *Kañary, Puruwa, Panzaleo*) used in the area started to lose hegemony when the *Inka* road (with two variants in the area) was built upon these mountain pathways and then with construction for the Royal road (or 'camino real') in colonial times and the republican decision to build the railroad linking the coastal plain with the highland valleys along the *Chanchan* watershed, centering Alausí as strategic node, and ending in recent times with the construction of the Pan American Highway—a paved road that allows transit towards southern (i.e., Azogues, Cuenca) or western cities (i.e., Vinces, Guayaquil). The depopulation of the *Chanchan* basin is linked to the stronger hegemony of the newer, faster, modern routes.

Traditional knowledge has been transmitted among indigenous peoples through generations for thousands of years [38]; in general, from parents to children, a situation we report as a deteriorating transmission of knowledge. It was evident that the elderly maintain knowledge about the management and use of plants [89], while traditional grandparents maintain knowledge about farmscape management and its medicinal plants.

Knowledge about useful plants is limited mainly to herbaceous, shrubby, and tree species, which is contrary to the study that identified that farmers from the tropical fringe in the Paramillo National Park in Colombia prioritized timber species as the most representative [74]. The use categories identified by the informants constitute cultural environmental services for medicinal and agricultural applications. The medicinal category confirms other

ethnobotanical studies where the largest number of plant species are used for medicinal purposes [76,90,91].

In recent years, ethnobotany has shown relative importance in homeopathic medicine in the academic field [92], including therapeutic and mystical uses in popular medicine [93]; however, some of these vernacular health disciplines are still associated with empiricism, and there is a lack of chemical, clinical, and epidemiological studies confirming their active principles [94].

In the present study, four key families, Asteraceae, Fabaceae, Lamiaceae, and Poaceae, were identified, which represent 26% of the total number of plants that have medicinal use. this is related to the study conducted by Bussman and Douglas [95], in the province of Loja in the Andes of Ecuador, where they identified that the aforementioned families occupied 27% of the total number of plants registered in the study out of a total of 215 species, while Armijos et al. [96], in their study of little-known medicinal plants of Ecuador, registered that the families Asteraceae and Fabaceae occupied 15. 3% of the total 257 species, and were those with the highest number of species with medicinal uses. The fact that Asteraceae is the family with the highest number of medicinal taxa is not unexpected, since it is one of the most extensive families of large flowering plants, composed of more than 32,000 known species in more than 1900 genera distributed throughout the world [97,98]. Species belonging to Lamiaceae are known for their content of volatile aromatic compounds [99]. The use of these families is mainly related to respiratory, urinary, digestive, and anti-inflammatory conditions. These results are related to those presented by Armijos et al. [96], where they mention that the most used medicinal plants are those used as analgesics, antidiarrheal, anti-influenza, and anti-inflammatory. According to Tinitana et al. [100], the trade of these taxa was linked to the treatment of the most common diseases and ailments, related to the respiratory, genitourinary, digestive, and nervous systems.

In the community of *Nizag*, the presence of four extremely important taxa in the conception of the ancient world could be seen, namely *Echinopsis pachanoi*, *Datura stramonium*, *Brugmansia sanguinea*, and *Brugmansia arborea*, which are known as sacred plants, which usually accompany the rituals of healing [101], and the intense use of psychoactive plants is one of the characteristics of pre-Columbian Amerindian cultures [102].

Echinopsis pachanoi is the first sacred plant found by Andean archaeology, and archaeobotanical remains have been found dating back at least 10,000 years. It is undoubtedly one of the oldest magical plants in South America [103]. According to ancestral wisdom, this sacred plant is the connecting link with divinity and with the energetic side of each person when performing the ceremony ritual. The botanical remains found showed its use by humans and, consequently, showed its relevance in the historical development of the Andean civilization. It was used for recreational purposes but also as an entheogen to facilitate psychoexploration [104].

Datura stramonium, like many nightshades, contains tropane alkaloids that are toxic and dangerous. In different cultures, they were used for medical and healing purposes, as well as for initiation rituals, divination, and magical–religious rites, for their divinatory qualities and for the initiation rites of young people. Currently, this plant is used by Amazonian shamans during healing sessions to scare away the spirits of the sick body [105].

Brugmansia spp., or angels' trumpet, is known as "borracheros", a name related to the uses of the plant that, in general, are associated with its high alkaloid content [106]. *Brugmansia* spp. was used as medicine and hallucinogens, especially by the region's native peoples, both Andean and Amazonian; they were used in religious ceremonies in the temple of the sun to generate a state of unconsciousness in the wives and slaves of the warriors who died, with the aim of burying them alive along with them [107]. In the *Nizag* community, these important plants have been losing their ancestral use to become purely ornamental plants.

The research obtained information on the medicinal use of plants, mainly for respiratory, urinary, digestive, and skin conditions, ailments that are treated mainly with medicinal plants before going to the health centers of each municipality and their drug stores. The

difficulty of obtaining commercial medicine has allowed the search for traditional medicine through the management and use of curative plants found in rural plots [108]. Generally, this is evident in remote areas without access to health centers and pharmacies.

This behavior, in terms of the most used parts, corresponds to the predominant biological forms and the most important categories of use [74]. In the *Nizag* study area, herbaceous plants prevail, which is why this allowed us to identify that the leaves and entire plant are mainly used, which supports the study of preparations predominately by infusions, cooking, and extracts, mainly due to their herbaceous habits [109]. This also confirms several uses of plants from the rural community of Sogamoso, identified via preparation through decoction and infusion, followed by poultice [94].

In the field of research, it is essential to join forces with sustainable agriculture, which includes spaces for the conservation of various useful species, mainly traditional medicinal plants, which will contribute to protecting the Andean flora, and even more so when these territories are associated with construction. Ancestral systems such as the *Qhapaq Ñan,* through a synergy of key actors (civil society in general, governmental and non-governmental organizations), seek to promote the knowledge, recovery, conservation, and enhancement of their cultural and archaeological heritage and environmental aspects associated with it as the articulating axis that promotes the responsible use of cultural and natural heritage from a perspective of sustainable development in the social, environmental, educational, and economic spheres for the improvement of the standard of living of local inhabitants through knowledge, strengthening, and searching for the revaluation of the Andean identity [110].

5. Conclusions

This research was carried out to identify and document ancestral knowledge about plants, with an emphasis on medicinal plants, which are being lost in different Andean communities that have used and continue to use *Qhapac Ñan*'s main axis and its trans-Andean variants. It was observed that in the *Nizag* community, access to conventional medical treatments was difficult due to low economic resources and its distance from health centers; so, the use of plants became one of the options to treat diseases, which is why socioecological and ethnographic surveys must be carried out to register and monitor the agrobiodiversity that guarantees plant use and safety to the consumer. A story map of *Nizag* using ArcGIS can be found in Appendix B.

One important research front is that of the "magic flora" often used by elder knowledge holders and *yachak* (or 'curanderos') that have maintained the repository of most medicinal plants' usages. Like what is recognized as 'natural medicine' practiced by traditional healers in Andean towns, such as *Iluman* in *Imbabura* province, it is possible that some of the surviving practices of home gardens and medicinal products in *Nizag* could generate a revaluation of the Andean identitarian markers associated with the *Qhapac Ñan* and the community at large. It is essential to conserve the medicinal plant species that have been identified to date, as they are at risk of disappearing in some territories due to deforestation and the advancement of the agricultural frontier, which is why it is necessary to establish strategies that allow safeguarding their permanence over time as biocultural heritage. This mechanism is a good alternative that allows the conservation of ancestral knowledge, thus making the heritagization of *Nizag* and its *Kichwa* people an important alternative for sustainable and regenerative development in this tropandean landscape.

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Appendix A

Table A1. Species used by the inhabitants of the *Nizag* community.

Family	Scientific Name	Local Name	Habit	Food	Agricultural	Artisanal	Living fences	Construction	Fuel	Ornamentals	Environmental Services	Technological	Medicinal	Use	Used part	Preparation Mode
Agavaceae	*Agave americana (L. 1753)*	Cabuya negra	b								x		x	su, lax, kc, bna, rhe	st, le	ex
Agavaceae	*Furcraea andina (Trel. L.H.Bailey. 1915)*	Cabuya blanca	b								x		x	su, lax, kc, bna, rhe	st, le	ex
Amaranthaceae	*Chenopodium berlandieri (Moq. 1840)*	Malla	h		x						x		x	ai	le	ex
Amaranthaceae	*Chenopodium ambrosioides (L. 1753)*	Paico	t	x							x		x	st, ant, di, ii, men, an	le	in
Amaranthaceae	*Aerva sanguinolenta (L. 1826)*	Escancel	h							x	x		x	tsi, oitl, kc, diu, uti, pne, tc, he, deps, tons	le	in
Amaranthaceae	*Alternanthera porrigens (Kuntze. 1891)*	Moradilla	h		x						x		x	diu, uti, men	flo	in
Amaryllidaceae	*Allium sativum (L. 1753)*	Ajo	h	x	x						x		x	pne, tc, fl	fru	fe
Anacardiaceae	*Schinus molle (L. 1753)*	Molle	b			x		x	x	x	x	x	x	st, diu, h, rhe, ai	st, le	re, in
Annonaceae	*Annona cherimola (Mill. 1768)*	Chirimoya	h	x			x	x			x		x	cons, an	fru	fe
Apiaceae	*Coriandrum sativum (L. 1753)*	Cilantro	h	x	x						x		x	st, ant, vo, ca, cons	le	in
Apiaceae	*Anethum graveolens (L. 1753)*	Eneldo	h	x	x					x	x		x	st, hem, ca, in, diu, mc, fl	le	in

Table A1. *Cont.*

Family	Scientific Name	Local Name	Habit	Food	Agricultural	Artisanal	Living fences	Construction	Fuel	Ornamentals	Environmental Services	Technological	Medicinal	Use	Used part	Preparation Mode
Apiaceae	*Apium graveolens (L. 1753)*	Apio	h	x							x	x	x	ns, art, mts, rhe, ai	ro, le	ex, in
Apiaceae	*Petroselinum crispum (Mill. 1866)*	Perejil	b	x	x						x	x	x	ptb, hbp, chr, diu, mc, h, ai, an	st, le	fe, in
Apiaceae	*Arracacia xanthorrhiza (Bancr. 1826)*	Zanahoria Blanca	h	x	x						x		x	tc, an	ro, le	co, in
Araceae	*Colocasia esculenta (Schott. 1856)*	Papa china	h	x	x						x			uti	le	in
Araliaceae	*Oreopanax ecuadorensis (Decne. & Planch. 1884)*	Pumamaqui	h				x	x	x	x	x	x	x	lax, rhe	le	in
Asparagaceae	*Chlorophytum comosum (Jacques. 1862)*	Lazo de amor	b							x	x					
Asparagaceae	*Dracaena trifasciata (Mabb. 1948)*	lengua de suegra	b							x	x		x	ptb, kc, diu, tc, h	le	ex
Asteraceae	*Taraxacum officinale (F.H.Wigg. 1780)*	Taraxaco	c		x						x		x	gc, cons, kc, diu, rw, reo, hgr	cp	in
Asteraceae	*Baccharis linearis (Pers. 1807)*	Chilca	b		x			x	x		x		x	ai	le	in
Asteraceae	*Bidens andicola (Kunth. 1818)*	Ñachag	h		x						x		x	oitl, di, kc, diu, fal, he, re, fe, he, rhe	le	in
Asteraceae	*Calendula officinalis (L. 1753)*	Caléndula	h		x					x	x		x	ga, mc, ei, e, b, h, si, an	le	in
Asteraceae	*Chromolaena odorata (R.M.King & H.Rob. 1970)*	Iso	h		x						x		x	b, h, si, rfw, ai	le	ex
Asteraceae	*Aristeguietia glutinosa (R.M.King & H.Rob. 1975)*	Matico	b							x	x		x	st, di, ga, kd, tc, exp, fl, syp, ra, si, rfw, fe, an, ai	le	de
Asteraceae	*Tanacetum parthenium (Briq. 1916)*	Santa María	h							x	x		x	st, la, vo, in, mc, he, sed, art, ra, fe, cd, an, ai	cp	fe, in
Asteraceae	*Schkuhria pinnata (Kuntze. 1898)*	Escobilla	h								x		x	hbp, chr	le	in
Asteraceae	*Dahlia coccinea (Cav. 1795)*	Dalia	h	x	x					x	x		x	st, ca, diu, tc, her, fe	ro, le	in, tu
Asteraceae	*Ambrosia arborescens (Mill. 1768)*	Marco	b								x		x	rh, ai	le	in
Asteraceae	*Tanacetum balsamita (Sch.Bip. 1844)*	Santa María	h								x		x	cd, ai	cp	in

Table A1. *Cont.*

Family	Scientific Name	Local Name	Habit	Food	Agricultural	Artisanal	Living fences	Construction	Fuel	Ornamentals	Environmental Services	Technological	Medicinal	Use	Used part	Preparation Mode
Asteraceae	*Matricaria chamomilla (L. 1753)*	Manzanilla	h		x					x	x	x	x	vas, st, ca, in, ga, cons, bp, tc, sed, ea, ei, si, a, fla, rw	cp, flo	in
Asteraceae	*Silybum marianum (Gaertn. 1791)*	Cardo mariano	h		x						x		x	su, gc, ga, men	se	in
Asteraceae	*Cichorium intybus (L. 1753)*	Achicoria	h	x	x						x	x	x	gc, ant, ca, in, diu, uti, si, a, ai	ro, le	dr, in
Asteraceae	*Bidens pilosa (Griseb. 1753)*	Amor seco	h		x						x		x	la, diu, re, h, ai	cp	in
Asteraceae	*Xanthium spinosum (L. 1753)*	Cashamarucha	h								x		x	diu, uti, pir, ei, fe, ai	cp	in
Asteraceae	*Artemisia absinthium (Mill. 1831)*	Ajenjo	h		x						x		x	ant, men, re	cp	in
Asteraceae	*Cnicus benedictus (Sch.Bip. 1875)*	Cardo Santo	h								x					
Basellaceae	*Ullucus tuberosus (Sperling. 1993)*	Melloco	h	x	x						x		x	st, fal, he, ai, antt, e	le	in
Betulaceae	*Alnus acuminata (Kunth. 1817)*	Aliso	t					x	x	x	x	x	x	men, tc, fl, tons	st, le	in
Boraginaceae	*Borago officinalis (L. 1753)*	Borraja	b		x						x		x	hear, chr, ics, kc, diu, mc, tc, exp, fl, asth, ins, bna, art, tons, si, mts, a, ss, rw, fe, an, ai, ane	le	in
Brassicaceae	*Brassica oleracea (L. 1753)*	Col	h	x	x						x		x	su, ga, an, ai	cp, st, le	fe, dy, co
Brassicaceae	*Brassica oleracea italica (Plenck. 1794)*	Brócoli	h	x	x						x		x	cons, asth, ns, an	flo	co
Brassicaceae	*Lepidium chichicara (Desv. 1815)*	Chichicara	h		x						x		x	fe, an, ai	cp	com
Brassicaceae	*Brassica napus (L. 1753)*	Nabo	t	x	x						x		x	chr, diu, tc, an, rhe	ro	co
Bromeliaceae	*Tillandsia ionochroma (Mez. 1896)*	Bromelia	h							x	x		x	ptb, ant, ai, antt	le	in
Cactaceae	*Opuntia ficus—indica (L. 1768)*	Tuna	t	x	x	x	x				x		x	chr, su, reo	fru	fe
Cactaceae	*Echinopsis pachanoi (H.Friedrich & G.D.Rowley. 1974)*	Cactus San Pedro	b				x			x	x					
Cactaceae	*Opuntia quitensis (F.A.C.Weber. 1898)*	Tuna	h	x	x	x	x				x		x	chr, su, reo	fru, flo	fe

Table A1. *Cont.*

Family	Scientific Name	Local Name	Habit	Food	Agricultural	Artisanal	Living fences	Construction	Fuel	Ornamentals	Environmental Services	Technological	Medicinal	Use	Used part	Preparation Mode
Cannaceae	*Canna indica (L. 1753)*	Achira	b	x	x		x			x	x		x	st, diu, tc, he, bna, b, h, fw	ro, le	in
Caprifoliaceae	*Valeriana officinalis (L. 1753)*	Valeriana	h		x						x		x	hbp, ics, in, diu, mc, pne, tc, fl, asth, he, sed, a, rhe	ro	in
Caricaceae	*Carica pentagona (Heilborn. 1921)*	Babaco	b	x	x			x	x		x		x	hear, hbp, chr, in, tc, exp, fl, ns, re, ei, h, b, h, a, ss, rw, ai	flo, fru	in, ex
Caricaceae	*Vasconcellea pubescens (A.DC. 1864)*	Chamburo	h	x	x			x	x		x		x	hear, hbp, chr, in, tc, exp, fl, ins, ns, re, ei, b, h, a, ss, rw, ai	flo	in, ex
Chenopodiaceae	*Beta vulgaris vulgaris (L. 1912)*	Acelga	h	x	x						x		x	ptb, oitl, kc	ro, fru	ex, in
Chenopodiaceae	*Beta vulgaris (L. 1753)*	Remolacha	t	x	x	x					x	x	x	ptb, art, mts, a, ss, rw, an, antt	ro, fru	ex, fe
Commelinaceae	*Zebrina pendula (Schnizl. 1849)*	Sinvergüenza	h							x	x		x	di, in, ga, bp, kc, diu, uti, ifiw, cd, ai	cp, le	fe, in
Convolvulaceae	*Ipomoea batatas (Griseb. 1859)*	Camote	h	x	x					x	x	x	x	hear, ptb, hbp, chr, oitl, cons, an	ro, le	co
Cucurbitaceae	*Cucumis sativus (L. 1753)*	Pepino	c	x	x						x	x	x	bp, diu, pir, si, mts, a, rw, ss, an, reo	fru	co
Cucurbitaceae	*Cucurbita ficifolia (Wall. 1832)*	Sambo	c	x	x						x		x	oitl, pne, tc, an	st, fru	po, fe
Cyperaceae	*Plantago lanceolata (L. 1753)*	Llantén menor	h		x						x		x	tsi, su, di, kc, uti, pne, tc, exp, asth, ea, h, si, ai	le	in
Equisetaceae	*Equisetum arvense (L. 1753)*	Cola de caballo	b								x		x	gc, kc, diu, uti, stb, ant	cp	in
Ericaceae	*Vaccinium floribundum (H.B.K. 1819)*	Mortiño	h	x		x				x	x		x	hear, chr, bp, ns, deps, si, a, rw, an, reo	le	in
Euphorbiaceae	*Manihot esculenta (Crantz. 1766)*	Yuca	b	x	x											
Euphorbiaceae	*Ricinus communis (L. 1753)*	Higuerilla	t				x		x		x					
Fabaceae	*Inga ruiziana (G.Don 1832)*	Guaba	t	x		x		x	x		x	x	x	su, hem, di, vo, ai	le	in
Fabaceae	*Phaseolus vulgaris (C.Baudet. 1977)*	Fréjol	h	x	x						x	x	x	chr, si, ai	cp, le	in, po
Fabaceae	*Sophora cassioides (Sparre Benkt. 1963)*	Pilo	t				x	x	x	x	x		x	oitl, vo, cand, pir, syp, ra, si, a, rhe	st, le	in

Table A1. *Cont.*

Family	Scientific Name	Local Name	Habit	Food	Agricultural	Artisanal	Living fences	Construction	Fuel	Ornamentals	Environmental Services	Technological	Medicinal	Use	Used part	Preparation Mode
Fabaceae	*Dalea mutisii (Kunth. 1788–1850)*	Iso	b							x	x		x	ptb, ant, ii, tc, exp, fl, fw, cd, rhe	cp, le, flo	ba, in
Fabaceae	*Trifolium repens (L. 1753)*	Trébol	h		x						x		x	st, di	cp	in
Fabaceae	*Lupinus pubescens (Benth. 1861)*	Falso chocho	h		x					x	x		x	ra	le	po
Fabaceae	*Vicia sativa (L. 1753)*	Arverjilla	h		x						x		x	pir, tons, si, mts, ai, antt	le	in
Fabaceae	*Desmodium molliculum (Kunth. DC. 1825)*	Hierba infante	h								x		x	pne, tc, exp	le	in
Fabaceae	*Medicago lupulina (L. 1753)*	Alfalfita amarilla	h	x	x	x					x					
Fabaceae	*Medicago sativa (L. 1753)*	Alfalfa	h	x	x						x		x	ane, fa	le	ex
Fabaceae	*Pisum sativum (L. 1753)*	Arveja	h	x	x						x		x	chr, cons, mea	flo	in
Fabaceae	*Desmodium tortuosum (Sw. DC. 1825)*	Pega pega	b		x						x	x	x	st, di	le	in
Fabaceae	*Retama sphaerocarpa (Boiss. 1840)*	Retama	t	x	x			x	x	x	x	x	x	pne, tc, exp, fl	flo	in
Fabaceae	*Libidibia corymbosa (Britton & Killip. 1936)*	Cascol	t	x				x	x	x	x	x				
Fabaceae	*Caesalpinia spinosa (Kuntze. 1898)*	Guarango	t					x	x		x	x	x	men, fl	le, fru	in
Juglandaceae	*Juglans neotropica (Diels. 1906)*	Nogal	t	x		x		x	x		x	x	x	bna, an	le	in
Lamiaceae	*Rosmarinus officinalis (L. 1753)*	Romero	h	x				x		x	x		x	su, rhe	le	in
Lamiaceae	*Melissa officinalis (L. 1753)*	Toronjil	h								x		x	hear, he, ns	cp	in
Lamiaceae	*Origanum majorana (L. 1753)*	Mejorana	h	x						x	x		x	st, sitl, su, ii, vo, ca, in, ga, cand, uti, ins, ns, sed, re, bna, art, e	cp	fe
Lamiaceae	*Mentha pulegium (L. 1753)*	Menta poleo	h							x	x		x	st, men, pne, tc, re, ei	le	in
Lamiaceae	*Minthostachys mollis (Kunth. Griseb. 1874)*	Tipo	b		x						x		x	st, gc, ant, di, vo, kc, uti, fl, asth, rhe, ai	cp	in
Lamiaceae	*Thymus vulgaris (L. 1753)*	Tomillo	b	x							x		x	hear, st, ca, ga, uti, cm, pne, tc, exp, fal, rhe, ai	cp	in

Table A1. *Cont.*

Family	Scientific Name	Local Name	Habit	Food	Agricultural	Artisanal	Living fences	Construction	Fuel	Ornamentals	Environmental Services	Technological	Medicinal	Use	Used part	Preparation Mode
Lamiaceae	*Clinopodium nubigenum (Kuntze. 1891)*	Sunfo	b		x						x		x	st, ca, mc, fal, pne, tc, exp, fl, h, ai	cp	in
Lamiaceae	*Stachys byzantina (K.Koch. 1849)*	Oreja de conejo	h		x					x	x		x	oitl, uti, cd	cp, le	fe, in
Lamiaceae	*Mentha spicata (L. 1753)*	Hierbabuena	h	x	x					x	x	x	x	st, vo, ca, in, pne, tc, he, ins, sed, re, si	le	in
Lamiaceae	*Mentha piperita (L. 1753)*	Menta	h	x							x		x	st, ant, ca, asth, he, ei, si	le	in
Lauraceae	*Laurus nobilis (Cav. 1801)*	Laurel de castilla	t	x				x	x	x	x	x	x	di, ca, in, an	le	in
Lauraceae	*Persea americana (Mill. 1768)*	Aguacate	c	x	x			x			x	x	x	chr, cons, mts, ss, rw, an, ai	le, flo, fru	po, in, fe
Liliaceae	*Allium cepa (L. 1753)*	Cebolla	t	x	x						x		x	st, oitl, kc, tc, an	cp	fe, co, in
Malvaceae	*Tilia americana (L. 1753)*	Tilo	h					x			x		x	vas, kc, diu, pne, tc, exp, ns, sed, re, bna, art, rhe	flo	infusión
Malvaceae	*Malva silvestris (Pamp. 1920)*	Malva	h		x					x	x		x	su, hem, cons, pne, tc	le	in
Moraceae	*Ficus carica (Miq. 1864)*	Higo	h	x				x	x		x		x	lax, cm, ifiw, rc	st, le	re, in
Musaceae	*Musa acuminata (Colla. 1966)*	Banano	b		x				x	x	x		x	hbp, su, mc, ns, ane	le	in
Myrtaceae	*Myrtus communis (L. 1753)*	Arrayan o mirto	t		x				x	x	x	x	x	ant, di, pne, exp, fl, ai	le, fru	co, fe
Myrtaceae	*Eucalyptus melliodora (A.Cunn. ex Schauer. 1843)*	Eucalipto	t					x	x		x	x	x	tc, fl, asth, re	le	in
Myrtaceae	*Eucalyptus globulus (Labill. 1800)*	Eucalipto Aromático	h					x	x		x	x	x	tc, fl, asth, re	le	in
Orchidaceae	*Epidendrum jamiesonis (Rchb.f. 1856)*	Maywa	h							x	x		x	hear, hbp, kc, diu, uti, ns, re	flo	in
Oxalidaceae	*Oxalis tuberosa (Molina. 1782)*	Oca	h	x	x						x		x	pir, ea	le	extrac, po, co
Passifloraceae	*Passiflora ligularis (Juss. 1805)*	Granadilla	c	x	x		x			x	x		x	st, ii, ns, fe	ro, le	in
Passifloraceae	*Passiflora tarminiana (Coppens & V.E.Barney. 2001)*	Taxo	b	x			x	x		x	x		x	st, su, ii, diu, he, ns	le	po

Table A1. *Cont.*

Family	Scientific Name	Local Name	Habit	Food	Agricultural	Artisanal	Living fences	Construction	Fuel	Ornamentals	Environmental Services	Technological	Medicinal	Use	Used part	Preparation Mode
Pinaceae	*Pinus radiata (D.Don. 1836)*	Pino	t				x	x	x	x	x	x	x	pne, tc, rhe	le	in
Piperaceae	*Peperomia peltigera (C.DC. 1898)*	Pataku yuyo	b							x	x		x	vas, tsi, pne, exp, asth, ea, fe, ai	le	in, ex
Poaceae	*Stipa ichu (Kunth. 1829)*	Paja	h		x			x	x							
Poaceae	*Cenchrus clandestinus (Morrone, Ann. Bot. 2010)*	Kikuyo	h		x											
Poaceae	*Zea mays (Gaertn. 1788)*	Maíz	h	x	x	x					x		x	st, kc, ns	flo	in
Poaceae	*Cortaderia nitida (Pilger Robert. 1906)*	Carrizo o sigse	h		x		x	x	x	x	x	x				
Poaceae	*Cynodon dactylon (L. 1805)*	Grama	h		x						x					
Poaceae	*Cymbopogon citratus (Stapf Otto. 1906)*	Hierba luisa	h	x						x	x	x	x	hear, st, di, ii, in, uti, mts, a	le	in
Poaceae	*Paspalum vaginatum (Sw. 1788)*	Gramilla blanca	h		x								x	kc, diu, ra	ro	
Poaceae	*Lolium multiflorum (Lam. 1779)*	Raigrás	b		x						x		x	st, di, ii, diu	cp, le	in, ex
Poaceae	*Hordeum vulgare (L. 1753)*	Cebada	h		x						x		x	ptb, cons, diu, pir, he, reo	ro, le	in
Poaceae	*Saccharum officinarum (L. 1753)*	Caña de azúcar	h	x	x		x		x		x		x	cons, pne, tc, fl, tons, fe, an	ro	ex
Polygonaceae	*Rumex crispus (L. 1753)*	Lengua de vaca	h		x						x		x	lax, di, diu, uti, exp, h, ane	ro, le	infusión
Pteridaceae	*Adiantum capillus-veneris (L. 1753)*	Culantrillo de pozo	t		x						x		x	st, in, men	le	in
Rosaceae	*Polylepis lanuginosa (Kunth. 1788-1850)*	Polilepis	b				x		x	x	x	x	x	kc	st	in
Rosaceae	*Rosa canina (L. 1753)*	Rosa	h	x			x			x	x		x	st, lax, di, diu, tc, fl, ar, t, ei, ra, h, a, fe, cd, an, ai	flo, fru	fe
Rosaceae	*Margyricarpus pinnatus (Kuntze. 1898)*	Piquiyuyo	b	x	x					x	x		x	st, ant, kc, diu, uti, pne, tc, fl, mea, tons, her	cp	in
Rosaceae	*Rubus glaucus (Benth. 1845)*	Mora de castilla	b	x		x					x		x	oitl, kc, exp, sed	le, flo	in
Rutaceae	*Citrus reticulata (Blanco. 1837)*	Mandarina	b	x				x	x	x	x		x	hear, hbp, chr, st, in, cons, diu, uti, bp, tc, fl, ns, reo	le, fru	in, ex

Table A1. *Cont.*

Family	Scientific Name	Local Name	Habit	Food	Agricultural	Artisanal	Living fences	Construction	Fuel	Ornamentals	Environmental Services	Technological	Medicinal	Use	Used part	Preparation Mode
Rutaceae	*Ruta graveolens (L. 1753)*	Ruda	t		x					x	x		x	ant, men, cd	le	in
Rutaceae	*Citrus sinensis (Pers. 1806)*	Naranja	t	x				x	x	x	x		x	st, ics, in, cons, pir, tc, fl, ns	le, fru	in, ex
Rutaceae	*Citrus limonum (Risso. 1813)*	Limón	b	x				x	x	x	x		x	hear, hbp, chr, st, oitl, ca, in, kc, pir, fl, he, art, syp, fe, he, rhe, ant, reo	st, le, flo	ba, ex
Salicaceae	*Salix bonplandiana (Kunth. 1817)*	Sauce	t					x	x	x	x	x	x	fl, stb, a	le	ba
Sapindaceae	*Dodonaea viscosa (Jacq. 1760)*	Chamana	b		x				x		x		x	bna, ant	le	in
Solanaceae	*Solanum muricatum (Dunal. 1852)*	Pepino dulce	t	x	x						x					
Solanaceae	*Brugmansia sanguinea (D.Don. 1820)*	Guanto	h					x	x	x	x		x	tc, asth, he, cd	le	fe
Solanaceae	*Datura stramonium (L. 1753)*	Chamico	h								x		x	hem, fa, rhe	le	ba
Solanaceae	*Capsicum annuum (Fingerh. 1832)*	Ají	h	x							x		x	ant, cd	flo, fru	fe
Solanaceae	*Brugmansia arborea (Lagerh. 1895)*	Guanto	h					x	x	x	x		x	tc, asth, he, cd	le	fe
Solanaceae	*Solanum betaceum (Cav.1799)*	Tomate de árbol	h	x				x	x		x		x	chr, oitl, tc, fl, tons, si, a, rw, ane	le, fru	po, in, fe
Solanaceae	*Solanum tuberosum (L. 1753)*	Papa	h	x	x						x		x	st, chr, ga, he, si, mts, a, rw, ai	le, flo, fru	po, fe
Solanaceae	*Physalis peruviana (L. 1763)*	Uvilla	h	x							x		x	bp, kc, pne, tc, asth, re, tons, fw, an	ro, st, le, fru	in, fe
Tropaeolaceae	*Tropaeolum tuberosum (Ruiz & Pav. 1802)*	Mashua	h	x	x						x		x	oitl, ant, kc, diu, pir, h, an, ai	ro	in
Urticaceae	*Urtica dioica (L. 1753)*	Ortiga	h		x						x		x	ptb, cons, pir, he, reo	ro, le	in
Verbenaceae	*Aloysia citriodora (Ortega ex Pers. 1806)*	Cedron	b	x				x		x	x		x	st, tc, ins, re	le	in
Verbenaceae	*Lantana camara (L. 1753)*	Supirrosa	h				x			x	x					
Verbenaceae	*Verbena officinalis (L. 1753)*	Verbena	h								x		x	hear, oitl, su, di, vo, mc, pne, tc, asth, he, sed, ra, ha, fe	cp	in

Table A1. *Cont.*

Family	Scientific Name	Local Name	Habit	Food	Agricultural	Artisanal	Living fences	Construction	Fuel	Ornamentals	Environmental Services	Technological	Medicinal	Use	Used part	Preparation Mode
Verbenaceae	*Plantago major (L. 1753)*	Llantén	c		x						x		x	st, diu, mts, ai	cp	in
Violaceae	*Viola wittrockiana (Kappert. 1932)*	Pensamiento	h							x	x		x	oitl, lax, in, cons, diu, pne, tc, exp, ra, si, a, ai	le, flo	in
Xanthorrhoeaceae	*Aloe vera (L. 1753)*	Sábila	b		x		x			x	x	x	x	oitl, su, hem, di, ga, h, si, mts, a, ai	le	fe, po

Legend: Habit: tree = t, bush = b, herb = h, climb = c; use: ns = improve nervous system, fe = fever, he = hemorrhages, ga = gastritis, mc = menstrual cramps, ei = eye infections, e = erysipelas, b = burns, h = healing, si = skin irritation, a = acne, an = antibacterial, ai = anti-inflammatory, st = stomachache, di = diarrhea, kd = kidney disease, tc = throat conditions, fl = flu, ra = rash, vo = vomit, in = indigestion, he = headache, sed = sedative, art = arthritis, cd = cultural disease, hbp = high blood pressure, ca = carminative, diu = diuretic, vas = vasodilator, cons = constipated, bp = bladder pain, ea = earache, fla = flaccidity, su = stomach ulcers, men = emmenagogue, ant = antiparasitic, uti = urinary tract infection, an = antioxidants, re = relaxing, pir = prostate inflammation reliever, hem = hemorrhoids, rhe = rheumatism, iotl = inflammation of the liver, cand = candidiasis, syp =syphilis, ptb = purify the blood, ii = intestinal infection, pne = pneumonia, exp = expectorant, fw = festering wounds, tons = tonsillitis, mts = moisturize the skin, antt = antitumor, ane = anemia, mea = measles, hear = heartache, ins = insomnia, bna = bone-ache, gc = gallbladder conditions, kc =, fal = facilitate labor, asth = asthma, chr = cholesterol reduction, reo = reduces obesity, ics = irritable colon syndrome, rw = reduce wrinkles, ss = sagging skin, tsi = tonsillitis, stb = strengthen bones, hgr = hangover, vas = vasodilator, deps = depression, rc = remove calluses; used part: cp = complete plant, ro = root, st = tallo, le = leaf, flo = flower, fru = fruit, se = seet; preparation mode: in = infusion, ex = extract, de = decoction, fe = fresh, dr= dry, po = poultice, ba= bathroom with plants, dy= dehydrated, re = resin, tu = topical use, co = cooked, com = compresses.

Appendix B

https://storymaps.arcgis.com/stories/00dec4d5a40842d783c6ca16f7a5023a (accessed on 25 May 2024).

Link B1: History maps "The *Nizag* Section of the *Kapak Ñan*".

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