# Food, nutrition and biodiversity in Guatemala's popular markets

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The edible resources obtained from the complex of species and varieties of the natural heritage, the social behaviors originated in their use, and the cultural and biological inheritances represented in the *food fact* are part of the imaginary of societies. The richer the heritage, the more opportunities to forge an identity cuisine based on its consumption. The more profusion in the dishes it embodies, the more genuine the culinary arts and the art of the table.

Feeding is much more than the simple act of eating. Food is a universe of phenomena, processes and social behaviors so extensive that it escapes generalized consideration. It is necessary to break down its composition; This is how the magnificent features that make it up are revealed: *the arts of cooking* as an expression of collective knowledge*, the art of the table* in the daily protocols that expose cultural identity (the "etiquette" of those addicted to "high kitchen") and the modalities of *food provision*, among others.

They are three in a long series of traits of revealing richness. The third, which involves the ways of obtaining groceries, is the one we will follow now given the orientation of the essay. Let's start by remembering that, in Guatemala, a significant part of the collection is done by *collecting* in the wild; From there comes enough raw material for the cuisine legitimized by tradition and the rich archaism of pre-Hispanic cuisine. Another comes from harvesting crops, according to our own agriculture that is nourished by native species and varieties. One more *supply in a popular market*, which for those who do not collect or harvest constitutes the ideal supply center.

The wealth of a market can be suspected: food resources coming from the countryside, family gardens or crops. Products that can be ingested directly or that are ingredients of popular cuisine, processed foods, meals and hors d'oeuvres... and all displayed in explosions of colors, smells and textures, in a social environment enriched in the cultural manifestations of the community.

## Proposition

Guatemala, like few territories on Earth, has such an abundance of *biological resources* that it has become a center of origin and speciation of vegetables of value in food (and in other fields of human life, such as medicine and religion). Samples of its edible natural heritage are found in popular markets. Essentially marketing points for goods useful to Man, in their capacity as samples of Nature they constitute true living museums, with representativeness of what became a resource when incorporated into the human way of life in years, centuries, millennia perhaps of sustained use.

The ethnobiological relationships articulated to food, foodstuffs and meals are reflected in market anthropology. Hence, it is a faithful mirror of communal social relations to the same extent as a space for convergence, transaction and cultural appropriation of species, varieties and breeds of useful plants, wild meat and fish, mushrooms, everything that can be taken to the kitchen and to the table. As if it were easy to discern between its condition as a shopping center, museum, enclave for cultural self-identification or facilitator of social cohesion, its nature as a collection site for the foodstuffs necessary for human life is associated with what the ecosystems once accomplished.

## The popular market

I will try to provide evidence for everyone interpret the value of a *popular market* in the best way, within the framework of the preceding proposition. I have little to achieve if I try to venture into market anthropology, even less if I dare to discuss it. That is why the title of the essay directs attention to the function that I have called *of museum*, in exchange for a qualifier more in line with reality. A market is a living, dynamic exhibition, where human activity revolves around goods that are displayed and sold, marked by the cultural identity of the towns in which it is located. That, necessarily, traps us in the social fabric.

In order to visualize the link between *feeding* and *biological diversity* linked to the structure of a *popular market*, we must note the existence of at least four attributes: 1/ there is commercialized *biological diversity*, 2/ there are *natural resources* transformed into foodstuffs for sale, 3/ the markets have *kitchen-dining rooms*, 4/ there are less formal *food sales*. Primary components whose existence, formation and dynamics are determined by the inhabitants of the community where it is located, those of neighboring communities and to a lesser extent those of distant ones, which make it an area of influence in concentric circles. (Unfortunately, for reasons of editorial space, this essay refers only to the first two attributes, leaving the others for a new opportunity).

For the purposes of the essay, a market is a *center for the purchase and sale of consumer goods*, of any kind. Those that predominate in a *popular market* are food and groceries, which has been maintained

for time immemorial since this was the first motivation for people to meet in appropriate places to sell and buy consumer products. Or exchange, as was the norm in the early days.

On the matter, already at the beginning of the 17th century, the inscrutable "preacher" Thomas Gage had observed: *There is also here* [San Miguel Petapa] *a "tiánguez" (as they call it) or small market where some Indians sell throughout the day its fruits, spices and cocoa, but at four in the afternoon this market is filled for an hour with Indian women who gather there to sell their homemade products (which the Creoles consider a delicacy) such as atol, pinol, blanched bananas, cocoa butter, cakes made of Indian corn, with a little fresh poultry or pork, sprinkled with lots of chili* [1].

Those who have studied this part of commercial history know that *the indigenous people continued with their tiánguez, that is, the traditional market forms: one day of the week, at least, they met in the town square, as in the past in their tinamit, for the purchase and sale of their products. Locally made items (mainly agricultural, but also artisanal, prepared food and other rudimentary industries) were sold mainly in open-air markets. This took place in the main square of the towns... Hence, since then we talk about 'day in the square' and 'going to the square' when it comes to going to the market* [2].

Although for reasons of space planning, collection of taxes and market floor fees, municipal governments have a strong participation in its current existence, in essence the popular markets are expressions of the people. That is why its innate spontaneity is maintained in many aspects, and the majority of sellers and almost all buyers take shelter under its protection.

As the trading space consolidated and communities grew larger, negotiations expanded. The *market* took on a multitudinous character, and by diversifying offers and demands due to increased marketing opportunities, it came to contain even the unimaginable, although depending on location, size and nature. It has never ceased to be a confluence center where people go to satisfy unavoidable transactions, which also allows them to establish communications, eat and participate in socio-cultural identifications.

With frequent changes to the composition of the set of goods for sale, a marked characteristic of popular markets is the predominance of products linked to *food*. In practice, they constitute the ethnobiological complement of *popular cuisine*, the raw material that gives it substance. Popular cuisine should be

[1] *Cf.* Cabezas Carcache, H. 1993. **Agriculture**. p.421-422. *Cf.* J. Luján M. and E. Chinchilla (eds.). *"Dominación Española: desde la conquista hasta 1700."* Vol-II of the General History of Guatemala. Association of Friends of the Country, Guatemala.
[2] Luján Muñoz, J. and H Cabezas Carcache. 1993. *Comercio*. p.458. *Cf.* J. Luján M. and E. Chinchilla (eds.). *Op. cit.*

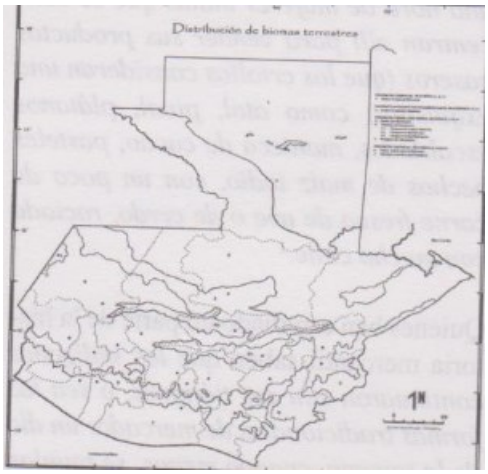
understood here as the cultural *trait constituted by culinary arts, its tangible products and the knowledge it brings together*. Arts, foods and culinary knowledge make up a large part of the cultural heritage of the community.

It is obvious that the *ethnobiological environment* of a community gives personality to its market. In anthropological terms, it is largely linked to the cultural identity of the people. I assume cultural differences in the ethnolinguistic groups: Achi', Akateka, Awakateka, Chalchiteka, Ch'orti', Chuj, Garífuna, Itza', Ixil, Kaqchikel, K'iche', Ladina, Mam, Mopán, Popti' (Jakalteka), Poqomam, Poqomchi', Q'anjob'al, Q'eqchi', Sakapulteka, Sipakapense, Tektiteka Tz'utujil, Uspanteka and Xinka, which are those officially recognized by the State of Guatemala [3].

The spatial distribution of the groups occurs over a complex of ecological units. Based on the hypotheses, a) it is possible to differentiate one ecological unit from another because it has elements (*natural resources*) that are its own and exclusive, and, b) such elements build ethnobiological behaviors dependent on the availability of the resource (*identity natural resource*) in the ecological unit where the considered human community is located, the society-nature link becomes a two-way flow in a mutually linked relationship. A variable that is reflected in the nature of the subsequent market.

[3] Legislative Decree 9-96. Congress of the Republic of Guatemala. 1996. Convention 169 on Indigenous and Tribal Peoples in Independent Countries is approved, Guatemala, March 5, 1996.

It is almost impossible to achieve an acceptable geographic distribution of ecosystems. Setting their size and limits in a continuous Nature, which does not admit borders, is one of many causes. Larger ecological systems, such as *biomes*, allow this with some precision. A biome is the unit formed from a *set of related ecosystems due to their structural and functional characteristics*. Human communities interact with them. They supply part of the resources that people need, and these cause changes in them. Superimposing an ethnographic map on one of biomes (map 1) is a simple way to estimate their relationships.




*Map 1. Distribution of the terrestrial biomes of Guatemala. Original.*

The distribution of the biomes depends of the native vegetation. Knowing what it is should lead us to consider the geological history, biotic dispersions, the nature of the surface relief, the pattern of microclimates and the intensity of ethnobiological relationships. While the geological history of Guatemala can be traced back to the Acadian orogeny of the Middle Devonian (ca 390-370 million years ago), its biota

must be the same with the two marine emersions caused by the Laramide orogeny from the Upper Cretaceous to Lower Eocene (ca 70-50 million years ago).

From there was born, so to speak, the biological substrate for the evolution of heritage. A subsequent contribution of South American biota occurred with the physical consolidation of the Central American isthmus, achieved between the Miocene and Pliocene (about 10 to 2 million years ago). Many biotic dispersions in north-south and south-north directions, establishment of a complex and dynamic geographic relief that modulates meteorological conditions and establishes a rich mosaic of microclimates, soil variability and intense ecological processes resulted in the natural legacy that, for its study, it is called taxonomic diversity. Already established, its permanent change made Guatemala one of the richest centers of biological diversity in the world.

**Basic concepts**

The link created and maintained between human societies and the resources of the ecological environment is so precise and deep that the relationship between people and their environment allows the estimation of *identity natural resources*. Considered a link between cultural identity and biological diversity, such resources are *goods of Nature that currently or potentially satisfy human needs within the framework of the socio-cultural conditions of their community.*

The integrated study of cultural facts and natural identity resources is based on a simple philosophical framework: when Man discovers something useful in Nature, he adopts it and incorporates it into his vital needs. Over time, usage becomes custom, and customs define patterns of *social behavior*. In a cosmos of symbols, Man *identifies* with the useful products of the land and turns them into *collective natural heritage*. In this way, he affirms ties with *Mother Nature*, depending on *cultural identity*.

The term social behavior, borrowed from psychology, represents an overlap with the notions of *tradition* and *custom*. The former *connotes an inherited set of traits* [...] *that individuals and societies ascribe to expressions, beliefs, and behaviors of the present in order to add value to them with an eye to the future*[4]. Customs, on the other hand, are the habitual way of acting or conducting oneself, but also *the set of qualities, inclinations, and practices that shape the distinctive character of a nation or individual*. Referring to a social fact as a tradition implies attributing value and significance to it, as it situates individuals within history and surrounds them with symbolic references. Customs, recalling Max Weber (1864–1920), are practices based on routines and generally equate to habits[5].

Every custom tends to uphold *behaviors legitimized by a normally "immemorial" past; however, they never acquire a*

[4] Bonte, P and M. Izard. 1996. **Diccionario de Etimología y Antropología**. Trad. M. Llinares García. Akal, Madrid.
[5] Weber, M. 1963. **Ensayos sobre sociología de la religión**. Taurus, Madrid. 3 vols

*mandatory nature (such as clothing, culinary, or funeral customs). Deviating from them results in "displeasures" or "inconveniences" due to the signs of disapproval expressed by those who do conform [to them].* [6]

The incorporation of such principles into the realm of biological sciences facilitates the understanding of the interweaving that constructs the fabric of culture-Nature relationships. Such a fabric, in ethnobiology, has allowed the *ethno* aspect to enrich the base material with the sociocultural contributions of the peoples who live it[7]. Applied to market studies through the lens of *biological diversity complemented by cultural diversity,* it supports the understanding of the harmony established by Man with the resources that enable his survival. It also makes comprehensible the statement that he now takes from there the products with which he nourishes himself, replacing ancestral gathering with transaction and, in doing so, establishing particular behavioral patterns.

The goods that give life to traditions and customs, detached from any monetary or mercantilist value, are natural resources *per se.* Once integrated into collective life through food, beverages, crafts, folk art, textiles, raw materials, and spiritual culture, they create a solid, evident, and irreplaceable imaginary. Returning to the course of the essay, it can be inferred that from this context emerges a well-defined social market relationship.

It encompasses the actions of gathering and distributing native foods that, once brought to the kitchen, create dishes as identity-defining as the methods, skills, and recipes used to prepare them. This reflects the fact that Guatemala possesses a natural heritage of such diversity that it became a center for the diversification of species of the highest order. This provided the foundation for ancestral Guatemalan women, with such wealth in their hands, to invent their own agriculture[8] while also creating dishes and meals that to this day define an unparalleled culinary tradition.

Thus, we see popular markets with their elevated and magnificent character. The collection of tangible goods, originating from a unique natural heritage, brings to life the intangible expressions of an imaginary transformed into cultural heritage of equivalent richness and diversity.

The popular market, an enclave where cultural identity merges with material entities that give life to cuisine. Together, they shape a universe where culture and biological diversity unite and intertwine, where the ethnobiological can become almost magical. In cases of great cultural and natural heritage richness, such as in Guatemala, markets of unparalleled magnificence emerge.

[6] Bonte, P and M. Izard. 1996. Op. Cit.

[7] Ethnobotany was the first ethnoscience to emerge as such. Conceived by J.W. Harshberger, it began in 1895 to use its methods and principles to assist archaeologists in studying the plants used by primitive populations, their distribution and diffusion in the past, and, based on that foundation, to suggest uses adapted to modern times.

## Reasons for exceptional biological diversity

*Diversity of life, biological diversity, or biodiversity* is a concept that encompasses the *totality of life expressions on the surface of the Earth.* While the term *life* is difficult to define, its manifestations in organisms or systems within the *biosphere* are relatively easy to appreciate. Given their abundance, they are grouped into four categories to facilitate study: *taxonomic diversity, genetic diversity, morphotypic diversity, and ecological diversity.* Except for the last, the remaining categories offer opportunities for observation in popular markets.

The other three are hierarchically related: the first addresses the variability of *species,* the second considers the multiplicity of *varieties* within a species, and the third examines the diversity of phenotypes or *individual variations* within varieties (or species). The more variability occurs within these three biological levels, the richer the *heritage* that can be described in the *ecosystems* where they develop. This naturally leads to the fourth level: the greater the ecological diversity of the site. If not in Nature itself, much of this can be described through the baskets in the markets.

The theory applied to the knowledge of biological diversity brings us a step closer to interpreting the values inherent in its existence. Two more steps lead us to understand the worth of its presence as resources within reach of Man for satisfying fundamental, material, and spiritual needs, such as food in this case, and its quality as markers of cultural identity. Taken to another level, by unfolding the abundance of natural resources, it exposes the heritage wealth of the State, shows the intensity of the flows of capital and labor, and, ultimately, the intricate social organization it triggers.

To approach this theory, the starting point is to clarify the origin of natural resources. This means, nothing more and nothing less, investigating the origin of species within the territory. In the myths of the monumental *Popol Wuj,* when *Tepew* and *Q'ukumatz* reached an agreement about what would be their work, *it was clearly manifested, as they meditated, that when dawn broke, Man must appear. Then they arranged the creation and growth of trees and vines and the birth of life* [9].

Earlier, I alluded to the non-mythical explanation when I stated that the history of the biota in Guatemala could begin

[8] Girard, R. 1997**. Origin and Development of the Ancient Civilizations of America**. Editores Mexicanos Unidos, Mexico City, D.F.

[9] Anonymous. n.d. *Popol Vuh.* **The Ancient Stories of the Quiché**. Version by A. Recinos, Piedra Santa, Guatemala, 1998.

[10] It is astonishing that the history of the emergences is also considered in the *Popol Wuj: "Like the mist, like the cloud, and like a dust cloud was the creation, when the mountains rose from the water; and instantly the mountains grew. / Only by a miracle, only by magical art was the formation of the mountains and valleys realized; and instantly, the cypress groves and pine forests sprouted together on the surface."* Anonymous. n.d. **Popol Vuj. The Ancient Stories of the Quiché**. Op. cit.

alongside the Laramide emergences of the Cretaceous-Eocene[10]. As the territory rose from the seabed, the repopulation of its surface was achieved through dispersive waves originating from populations in North America. It is quite surprising how accurate the *Popol Wuj* is on this matter when it speaks of cypress groves and pine forests among the primordial elements, which are precisely representatives of the ancient boreal biota that thrived in the original country.

From such dispersions, the initial biological substrate was formed, which gave rise to the evolution of biological heritage. Subsequent contributions from South American biota may have reached the territory with the physical consolidation of the Central American isthmus between the Miocene and Pliocene (about 10 to 2 million years ago). Along with the many dispersive movements in north-south and south-north directions, there was a continuous shaping of the geographical relief, parallel modulation of ecological and meteorological processes, establishment of a mosaic of microclimates, variability of soils, and intense genetic and energetic flows. All of this contributed to establishing the rich natural legacy we have today. Established, its continuous change made Guatemala one of the most exuberant centers of biological diversity in the world.

The essential ecological processes cannot be separated from the holistic nature of the environment; similarly, it is not possible to delineate parcels of the biosphere, but it is feasible to argue about the ideal evolutionary sequence: the foundation lies in the *species*, the more or less numerous they are (*taxonomic diversity*) is of little relevance in this case; organic evolution acts upon them. From this action, *varieties, subspecies, or races* (*genetic diversity*) arise. The living world consists of varieties; pure species are an abstraction. The individuals that make up a conglomerate of varieties (*biological population*) or species differ from each other, so it is statistically unlikely to find two identical specimens (*morphotypic diversity*).

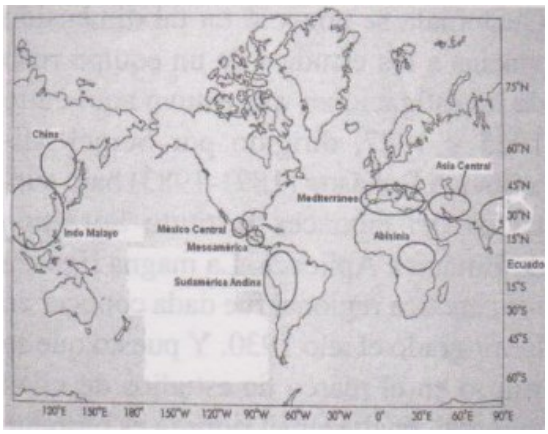
This is the essence of *biological diversity*. In it, the greater the genetic diversity, the more opportunities humans have to satisfy their ways of life. This is precisely the case in Guatemala, and such is the invaluable treasure concentrated in a market. This variability represents *plurality of genes* in natural populations, whose *gene flow of alleles* is real and statistical, leading to a multiplicity of *lineages*. This expression conceptualizes the genetic lines of varieties. In this context, morphotypic diversity, synonymous with *phenotypic diversity* and *individual variability*, is tied to sexual selection and reproductive success, a key factor in the long-term maintenance of food resources.

A notable geographical consequence of genetic variability is the constitution of *centers of diversification and dispersion*, natural areas where speciation and the emergence of varieties occur due to particular conditions of the terrain and its wild populations[11]. Guatemala is one of eight primary centers of global importance for the diversification of edible lineages (varieties). Within each species,

diversification depends on the *genetic complex*, or germplasm, the *natural set of alternate genes, or alleles, that is unique to it and provides potential for evolutionary changes.* Alleles determine different forms of the same phenotypic characteristic. No two species have the same genetic map.

The frequency of each allele tends to vary from one generation to another. The result is physical change in organisms due to changes in their genetic makeup. The distribution of blood groups in humans, or dermatoglyphic indices, skin color, eye color, or hair color mark some variations. A *given population*[12] can give rise, through this process, to *subordinate genetic populations, subspecies, or varieties*[13]. Regions of the world with conditions that promote the development of subordinate populations, which are not many, constitute centers of diversification, or *origin and speciation, from which lineages radiate through natural dispersions.*

Three of the eight primary centers are located in America (Map 2): Mesoamerica, Central Mexico, and the Andean South America (highlands of Colombia to the north of Bolivia). Initially described in terms of their *native species of interest*, essentially *cultivated plants* of agro-food importance, they are, in reality, significant biogeographical units on the ecological plane. In addition to agricultural interest, their exclusive lineages show the value they achieve as geographic spaces of extraordinary configuration in terms of biological diversity.




Map 2. The eight primary centers of diversification of cultivated plants, located based on the studies of Nikolai Ivanovich Vavilov and Sergey Mikhailovich Bukasov. Original.

[11]The concept is equivalent to assuming that in each center a set of lineages is developed, characteristic to it, endemic as classified by biogeography. Therefore, it fundamentally coincides with the areas of endemism described by Joel Cracraft. See Cracraft, J. 1985. Historical Biogeography and Patterns of Differentiation within the South American Avifauna: Areas of Endemism. Cf. P. A. Buckley and others (eds.). Neotropical Ornithology. Ornithological Monographs No. 36. The American Ornithological Union. pp. 49-84.

[12]In biological terms, populations are called *groups of individuals of the same species*, essentially particular genetic lines or germplasms. Within a population, the prevalence of a certain genetic rate fluctuates in statistical frequencies, influenced by factors such as natural selection, genetic drift by chance (very important in small populations), mutation pressure, and differential migration—processes that are altered by the nature and degree of geographic isolation of the group, its density, probabilities of random mating, emigration and immigration rates, etc.

[13]The two most well-known historical subspecies of the human race are *Homo sapiens idaltu* and *Homo sapiens sapiens*, in their order of the Old Man Who Knows from the Middle Pleistocene of Ethiopia, about 158,000 years old, discovered in 1997, and the contemporary Man Who Knows. Cf. White T.D., et al. 2003. Pleistocene *Homo sapiens* from Middle Awash, Ethiopia. Nature 423:742-747.

Guatemala became known in this dimension thanks to the studies of a Russian research team that was here between 1925 and 1927, directed by Sergéi Mijálovich Bukásov (1891-1983) under the auspices of the then Soviet Institute of Applied Botany. The region's vast phylogenetic wealth was presented in Leningrad in 1930. Since it was valued within the framework of world-level studies, celebrating its richness is much more than a poorly disguised chauvinism. The main scientist who coordinated the global research was botanist Nikolái Ivánovich Vavílov (1887-1943). At the end of the monumental work, he identified the eight mentioned centers. The other five are Abyssinia, Central Asia, China, Indo-Malay, and the Mediterranean. Among other centers of lesser importance are Chile and Brazil-Paraguay.

Mesoamerica coincides with the concept established in 1943 by Paul Kirchhoff (1900-1972), who called the region that extends from the center of Mexico (escarpment of the Pánuco and Santiago valleys) to the northwest of Costa Rica[14]. It is a geo-cultural zone of great consistency and extreme importance in the mythical, historical-social, geological, ecological, and biogeographical realms. It is not difficult, consequently, to understand why it constitutes an entity that strongly connects the ethnological with the natural within a framework of much diversity. In geographical reality, Guatemala is situated at the center of Mesoamerica, placing the country at the heart of the area.

In its biophysical environment, the complex variation in the surface relief and the profusion of ecosystems give it the functions of a self-regulated laboratory. It is here where evolution produces the range of botanical varieties that, some collected and others cultivated, go to the markets, the tables, and the icons of popular religiosity in Guatemala.

Varieties and uncultivated species represent the wild genetic material of the heritage, always subject to evolutionary changes, adaptations, and integration into the culture of the peoples. They are trees, cacti, bromeliads, orchids, and others, which constitute a natural legacy that favors the existence of the *gatherer culture.* An inheritance whose wealth is rarely appreciated, yet of unimaginable magnitude. If Guatemala did not have such a plethora of food resources, this way of human life would be of low intensity, but it is so abundant that a large number of gathered products are indispensable raw materials in the kitchen of homes, and they also appear profusely in popular markets.

## The *ethnobiological collective* of biodiversity

The term *ethnobiological collective*, as used in this essay, refers to *the intangible cultural heritage of a group or community, constituted by the relationships that exist between its members and their identity-related natural resources, and by the symbolic, material, and social values that are integrated into the community's collective imagination.*

[14] Aimi, A. 2003. **Art Book. Mesoamerica**. Electa Pocket Edition, Barcelona.

Relationships and material elements that intertwine into a *social heritage* expressed daily and spontaneously through the customs and traditions of the respective group.

If we turn our attention to the spirit that provides context to natural resources, as goods of Nature, in which the temporality of use and exploitation grants them the possibility of being current or potentially so, many will fit into the definition. However, the characteristic of being *identitarian* is only achieved under particular conditions, which individualize those that can be rooted in the collective consciousness for material, spiritual, or social reasons.

They are the select elements of the cultural biological diversity of communities. Therefore, they are more than resources serving the economic system of supply and demand. From geology and geography to ecology, and their interaction with climate and biotic processes, the *continuum* of ethnobiological facts is established, which defines individual behaviors and collective actions. When this relationship between human societies and natural resources is established within the framework of social behavior, it is possible to unequivocally identify the biological species incorporated into the way of life of such societies.

The *set of species, uses, and models of exploitation* constitutes an ethnobiological heritage that resides and is maintained in the popular imagination. They are *collective knowledges.* Wherever one looks, wherever human communities are settled on lands of forests, shrubs, and grasslands, near swamps, lakes, rivers, and coastlines, in mountain, volcano, plateau, valley, or ravine terrains, the relationships between biological diversity and sociocultural development can be discovered. It is an intangible heritage transformed into social legacy, whose manifestations constitute cultural facts of great richness, dimension, and collective relevance.

The composition of species, lineages, landscapes, and morphotypes is to the living world what collective heritage, social spaces, and community relations are to the human conglomerate. An important matter to consider is the transmissibility over time of the variables that define these realms, which creates the foundation to categorize them as *heritage:* natural, cultural, ethnobiological. Regarding natural heritage, it is essential to keep in mind that the biota settled in the country as a result of collateral processes to the genesis of the territory, and that it has spread across the surface in patterns guided by the relief and the processes it modulates.

This allows it to be seen as a *heritage* provided by the arrival, evolution, and adaptation of lineages naturally coming from other ecosystems. In the understanding of the ancestral, ancient natural history becomes blurred. The relationship between geology and culture is the foundation of ethnobiology. When biological diversity and cultural identity are united, the need becomes evident for fair and equitable planning of the use of natural resources, as well as the safeguarding of the history, traditions, customs, and identity of peoples, which form their tangible and intangible cultural heritage. That is, valuing ethnobiological

relationships based on socio-natural principles, not mercantilist ones.

By intensifying reflection on species, varieties, and ecosystems within a model consistent with a conservation biology that does not exclude the continuity of peoples within their own identity, it will become possible to recognize the magnitude of ethnobiological heritage. Its environment will always be influenced by geography and ecology. It is easy to see that these act as auxiliary disciplines of anthropology in the task of defining and explaining a socially inclusive ethnobiological model. A starting point for addressing the challenge of understanding and valuing it could have as a central thesis *the value of natural and cultural history in the dispersion and distribution of living beings over time and space, their subsequent incorporation into the imagination of peoples, and the emergence of sociocultural expressions derived from collective heritage.*



**Edible Biological Diversity**

As can easily be seen, an ethnobiological complement to Guatemalan popular cuisine is the open-air markets, the local markets. These unique gatherings are not only spaces for daily transactions or essential purchases to maintain the rhythm of life; they are also hubs for social interaction, where people converge as if in a forum disguised as a commercial center.

In addition to their invaluable social function, these markets fulfill roles I have highlighted repeatedly: they bring together the finest selection of useful biological diversity and make it accessible to the hands that will transform it into utility. It is an indisputable fact that, if in Guatemala a social scientist, a wildlife geneticist, a biologist, or a naturalist is interested in understanding the local variability of edibles (the raw materials of popular cuisine), a market offers vast opportunities for study.

Often strategically placed in handcrafted cane baskets, on rustic tables, or atop colorful plastic sheets or containers of the same texture, one can find considerable quantities of the most emblematic foods of the region (for the purposes of this essay, one might say: vast quantities of the genetic varieties that shape the eating habits and culinary traditions of Guatemalans; and again, for the essay: these are readily visible to those studying biological diversity).

Fruits, flowers, leaves, roots, tubers, seeds, stems—everything edible from a plant, or entire plants. Mushrooms, animals. The infinite range of varieties created by Nature. Some of the species displayed (for commercial purposes, of course—though only a few, as a complete list would defy any descriptive attempt) are:

**Acerolas.** *Malpighia glabra* var. *guatemalensis*, *Malpighia glabra* var. *acuminata*. Found with its small fruits, resembling nances (they are related), red, slightly fleshy but very juicy and acidic, consumed directly. Traditional consumption; they are sometimes used to make homemade

sweets and artisanal fermented beverages.

**Achiote.** *Bixa orellana*. The deep dependence of popular cuisine (and, to a much lesser extent, textile crafts) on the coloration it provides, as well as its flavor and aroma, makes it indispensable in the markets. Whether as paste or seeds, this native condiment can be seen in all its splendor.

**Avocados, oj'.** *Persea americana*. The development of cultivation is based on genetic materials from its center of origin, particularly Guatemala, where countless genetic materials, known as *criollos*, have been selected and preserved by farmers practicing traditional agriculture[15]. *Persea schiedeana* is the *chucte*, and *Persea tolimanensis* is the *aguacate de mico*; *Persea nubigena* and *Persea steyermarkii* are confined to Cerro Miramundo in Jalapa. The latter three are endangered species[16].

**Anonas.** *Annona macroprophyllata, Annona purpurea, Annona squamosa.* The first comes from lowlands and has small fruits with green skin. The second comes from highlands, has larger fruits with dark, soft skin. The third originates from Alta Verapaz. Others include *Annona cherimola, Annona muricata* (*guanabana*), *Annona primigenia*, and *Annona spinescens.*

Impressive variability in the fruits of a *criollo* avocado lineage, as sold in the market of San Juan La Laguna, Sololá, from whose mountains they originate. Photo by L. Villar Anleu, 07.02.2011.

**Apazote.** *Chenopodium ambrosioides.* This strong-smelling herb, a common seasoning in cooking, is almost always gathered from wild plants or cultivated in small, artisanal family gardens. As a result, there is significant genetic variability in the materials consumed, leading to corresponding diversification in the markets.

**Ayotes.** *Cucurbita moschata.* The genetic variation is so extensive that precise species designation becomes challenging. It is believed that the native variety of Guatemala closely resembles the *güicoy, Cucurbita pepo,* and only slightly resembles the pumpkin, *Cucurbita maxima,* with traits from three other cultivated species. Leaves, which can be eaten in various ways, and seeds—commonly known as *pepita de ayote*—are sold. These seeds complement many

[15] Azurdia, C. (2008). **Agrobiodiversidad en Guatemala**. In: C. Azurdia (Ed.), *Guatemala and its biodiversity: a historical, cultural, biological, and economic approach.* Guatemala: Consejo Nacional de Áreas Protegidas, pp. 404-463.

[16] Martínez Tambito, E. A., et al. (1994). **Proyecto de investigación en Persea spp**. Research reports, Institute of Agricultural Research (IIA), Faculty of Agronomy, University of San Carlos of Guatemala, pp. 73-77.

dishes but do not replace *pepitoria,* derived from *Cucurbita argyrosperma,* which has its unique preparations.

**Badú, ox, makal, q'eq'exq'e.** *Xanthosoma violaceum.* The most desired parts for sale are the corms (underground stems), which can be cooked as a substitute for bread or tortillas or eaten boiled with other vegetables. Consumption is particularly high in the Caribbean region. Similar to it are *malanga, yampí,* and *ñames,* though clear differences exist among them.

**Bejuco de agua, p'aac', uva de monte.** *Vitis tiliifolia.* This rarely appears in markets, but when it does, it is sold in the form of fruit resembling grapes—dark purple to blackish and extremely sour, making them unappealing to some. Nonetheless, there are those who consume them.

**Bledos.** *Amaranthus hypochondriacus, Amaranthus polygonoides, Amaranthus cruentus, Amaranthus caudatus* (*quilete*), *Amaranthus dubius, Amaranthus hybridus,* and *Amaranthus scariosus.* The queen of edible herbs. These are staples in popular markets, sold in bunches at very low prices. Most are harvested from plants allowed to grow as weeds or come from family gardens. In either case, they represent cultural practices deserving of the highest praise and appreciation.

**Cacao, kakaw.** *Theobroma cacao.* The "Food of the Gods" (Gr. *Theos* = god; *bromus* = food, nourishment) can be purchased in markets, both as fruits and seeds. Its presence as a fruit is more due to magical-religious demand than physical consumption, as it is associated with symbolism as food-offerings, a very notable aspect among indigenous peoples of the Highlands.

**Caimitos.** *Chrysophyllum cainito.* A highly prized fruit for its delicate, soft, and delightful flavor. The pulp, usually purple, is sweet and the juiciest among sapotaceous fruits. It is planted in house patios and home gardens; however, it is sold intensively in markets.

**Camote.** *Ipomea batatas.* The high genetic variability visible in markets combines forms with purple or yellow pulp and purple or yellow skins that do not necessarily match one-to-one. The purple variety is currently in serious danger of extinction.

**Cereza.** *Prunus capulli.* A seasonal harvest, when the trees bear fruit, it appears in large quantities in markets. The small fruits are greenish, red, or purple berries, almost black. Sales and consumption are more intense in the Highlands towns, although they are also found in Nueva Guatemala de la Asunción, where they primarily satisfy the taste of immigrants from those communities.

**Chan.** *Salvia potus, Salvia polystachia.* Found as tiny seeds, sold by "measure" or by weight. Its traditional use is as an addition to beverages (preferably lemonade) to release a mucilaginous substance with a very distinctive flavor. It is reputed to have medicinal properties. Its oil was used in the craftsmanship of *morros* and *jícaras*.

**Chaya, xaq'tix, chatate.** *Cnidoscolus aconitifolius.* Found mostly in the markets of Petén, Alta Verapaz, and Chiquimula, although occasionally in several others. The edible leaves (which have stinging

hairs) are cultivated through cuttings. There are many reasons to believe it was a pre-Hispanic food.

**Chicozapote.** *Manilkara zapota.* The popular *chicos* are abundant in both traditional and modern markets. One of the most delicate tropical fruits in terms of flavor. The tree's latex is a raw material for producing chewing gum, and in some Indigenous towns, handmade versions, known as *copal,* are still available and particularly favored by women. When available, *copal* is stored in large glass jars filled with water to prevent it from drying out.

**Chilacayote.** *Cucurbita ficifolia.* The fruits are large, green, or mottled with cream tones. They are plentiful in markets, along with flowers and leaves that are prepared like those of the *ayote,* and seeds used as a substitute for *pepitoria.* Its derivatives, especially homemade sweets, are also sold.

**Chile, iq'.** *Capsicum annuum.* There is virtually no market without chiles, available in all imaginable shapes, sizes, colors, qualities, and price ranges. Their preparations—handcrafted, semi-industrial, and industrial—are also present. The abundance of chiles in *tianguis* even imparts a festiveatmosphere, thanks to their colorful and delicately aesthetic display.

**Chipilín, m'uch.** *Crotalaria longirostrata, Crotalaria vitellina.* With the same intensity it is sought after for cooking, it is found in markets. Fragrant bundles showcase the variability of this group, along with foods made from its leaves, particularly the famous *tamalitos.*

Bundles of chipilín, along with bledo and other edible herbs, tomatoes, chiles, güisquiles, and some introduced foods… The richness of biological diversity in a traditional market! Nueva Guatemala de la Asunción. Photo by L. Villar Anleu, 05.24.2010.

**Chufle.** *Calathea allouia.* The tender edible floral shoots of this herb are sold in small bundles that often seem like artistic creations. Frequently found in the markets of eastern regions, particularly Chiquimula and Jutiapa, they can also appear outside their usual territory, such as at the San Martín market in Nueva Guatemala de la Asunción.

**Coco.** *Cocus nucifera.* Cosmopolitan. Found in every imaginable market, whether as mature or young fruits, separated pulp, or portions of "coconut water." Logically, it is more common in markets near coastal areas, where it is cultivated.

**Chucho, tz'i', nabay.** *Renealmia aromatica.* A delicate native spice from the Zingiberaceae family, it is used in very traditional broths, where the small spherical capsules, about ten millimeters in diameter, serve as seasoning. While not very common, it is also not considered rare.

**Cordoncillo.** *Piper auritum,* also known as wild anise, is an ancient condiment for broths and soups. Its leaves are used. Although most modern recipe books no longer mention it, it is still traditionally used in some communities. In their

markets, while not common, it can still be found occasionally.

**Cox.** *Canna tuerckheimii.* While not edible in Guatemala (its rhizomes and corms are edible in other countries), its leaves, commonly used to wrap tamales in many regions, make it a regular sight in the markets in considerable quantities.

**Coyol.** *Acrocomia aculeata.* Although not abundant or common, it is represented by its edible fruits, sold raw or prepared as homemade sweets. Occasionally, the foliar meristems (hearts of palm) are also available.

**Cuajilote.** *Parmentiera aculeata.* This plant produces long fruits with a sweet flavor, which can be eaten raw or steamed alongside small corn tamales, a highly appreciated dish in rural areas. The variable fruit is commonly seen in markets.

**Cuje, cushín, paterna.** *Inga edulis.* The fruit is a large green legume, with a white, cotton-like pulp that is eaten raw. It is aromatic and very refreshing. It is highly frequent in the markets.

**Frijol, kinaq'.** *Phaseolus vulgaris.* The great variety of beans and species is evident in any market. It is one of the edible native species of the region, and its seeds are omnipresent. In any of the many popular trading centers, the incredible range of biological variations can be studied.

**Guayaba, ikieq', cak, chamxuy, pata'j, p'ox.** *Psidium guajava, Psidium friedrichtalianum.* Its intense biological variation is reflected in the broad representation found in popular markets. In these markets, it condenses the powerful cultural assimilation that has occurred around this native food.

Black and red beans, along with avocados, jocotes, tomatoes, and homemade sweets (in the background) at the market in the city of Chiquimula. Photo: L. Villar Anleu, 03.17.2010.

**Güicoy.** *Cucurbita pepo.* All expected varieties can be seen in popular markets, serving as clear evidence of the diversification that the species has reached in its ecosystems.

Small güicoy and pumpkins, both showing strong variation in fruit shapes. They are alongside avocados, which, as can be seen, belong to two different varieties. The jocotes complete the picture of native lineages at the Chiquimula market. Photo: L. Villar Anleu, 03.17.2010.

**Güiscoyol**. *Baxtris major.* The fruits, highly appreciated, come from the collection of wild palms, although in a few cases, it has been planted. It is somewhat easily found in markets, even outside its natural range. As is common with palms

linked to food, the foliar meristems (heart of palm) are also extracted and sold.

**Güisquil.** *Sechium edule.* This species is almost completely domesticated and, with its wide genetic cultivation variability, reaches the markets displaying the same diversity. Three edible sections of the plant are available: fruits, tubers (*ichíntal*), and tender shoots. There is also a supply and demand for cooked products. It is truly marvelous to observe the diversity found in the markets: large, medium, and small fruits; green, white, and cream-colored; spiny, smooth, rounded, elongated, and pear-shaped...

**Güishnay, wixna'i.** *Spathiphyllum phryniifolium.* Since the southern flank of the Volcanic Cordillera offers optimal conditions for its growth and harvest, it is in the nearby markets where it is most commonly found. The edible part sold is the floral spathe, cylindrical and gently aromatic.

**Hierba de toro.** *Ocimum campechianum.* This herb from the Lamiaceae family resembles Asian-African basil in appearance and scent, although it has a more intense aroma. It is used to season meats, stews, and casseroles, making it a frequent find in markets.

**Hierba-mora, majcuy.** *Solanum americanum, Solanum nigrescens.* Also known as *quilete*, this herb grows as a weed in cornfields, among beans, shrubs, and vacant lots. It is cared for in family gardens and yards and is even planted in pots. Its high consumption ensures its wide diversification in popular markets.

**Mushrooms.** This natural delicacy is found seasonally. Varieties include *q'antz'uy* from San Juan, part of the *Amanita caesarea* complex; *shara* (*Lactarius deliciosus*); *q'anxul* (*Cantharellus cibarius*); "trompa de coche" (*Hypomyces lactifluorum*); and *xiq'inche'* or tree ear (*Schizophyllum commune*), among countless others. During *mushroom season*, which typically coincides with the rainy season, their presence evokes vivid imagery of shadowy, damp, magical jungles.

**Iximché, ujushte, ramón.** *Brosimum alicastrum, Brosimum costaricanum.* These seeds or their flour are occasionally found in markets near their primary growth zones. They are used to prepare soups, porridges, buns, pancakes, cookies, tortillas, or a coffee substitute beverage.

**Izote.** *Yucca guatemalensis.* During its season, markets are filled with its flowers, highly demanded for their traditional culinary use. Otherwise, it is more common to find long, thin strips of shredded leaves, called *chiyutes*, used as binding material (for instance, tying a bundle of onions).

**Jaiba (crab).** *Momordica charantia.* In local cuisine, the fruits serve as a substitute for peppers: they are stuffed with minced meat, coated in egg batter, fried, and served with watery *chirmol* (similar to stuffed peppers). This dish is beloved by the Guatemalan palate but is never sold ready-made. The fruits can be found in popular markets, though some also prepare them as salads.

**Jícama.** *Pachyrhizus erosus.* A very ancient Mayan crop from the early agricultural cycle focused on tuber production. Its roots form succulent,

globular tuberous bodies[17] that are the edible part, commonly found in markets.

**Jocote, jobo.** *Spondias purpurea, Spondias mombin.* This highly variable species produces fruits that are plentiful in markets, reflecting their variability. Their abundance makes it possible to conduct botanical studies of the species based on market offerings alone. Geneticists link regions with a wide variety of a single genetic line to its origin; S. M. Bukásov [8] highlighted the high local variability of this species.

**Kanaq'.** *Chiranthodendron pentadactylon.* A tree whose aromatic leaves are used to flavor tamales and sacred ceremonial tamalitos in Indigenous communities such as Panajachel and Patzún. These leaves can be found in the corresponding markets, sold in carefully tied bundles.

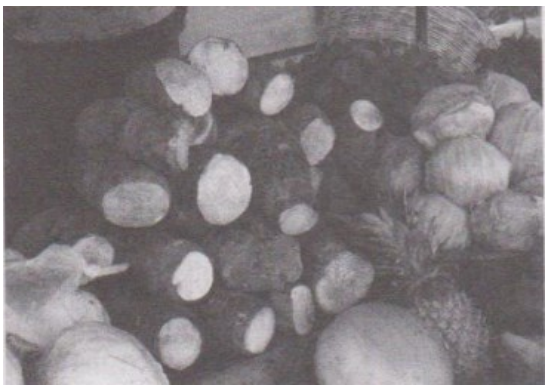
**Loroco.** *Fernaldia pandurata.* A climbing plant whose fragrant flowers are a traditional ingredient in popular cuisine. Its distinctive aroma and flavor make it a highly appreciated condiment, widely available in markets, especially toward late summer and early autumn.

**Madrecacao, matarratón.** *Gliricidia sepium.* A tree whose edible part is its delicately pink flowers, added to brothy soups and various traditional fried dishes. Particularly common in the eastern part of the country, markets in that region are abundant with these flowers, which are considered a staple.

**Maguey.** *Agave americana, Agave sisalana, Agave guatemalensis, Agave huehueteca, and Manfreda fusca.* Primarily used for textiles today, it can be found as "loose pita," ropes, or artisanal derivatives (cordage). The sacred-festive form of the Kaqchikel *ki' pakap* is sold in the popular market of Sololá between Good Friday and Holy Saturday.

**Corn, ixim.** *Zea mays.* Like squash, chayote, beans, and chili, corn is available in every imaginable form. All varieties, all colors, all foods, all drinks... It can be found as fresh corn, on the cob, shelled; heirloom or genetically modified. Its universality and biological variability are integral to the markets.

**Taro.** *Colocasia esculenta.* This edible corm, whose consumption has spread throughout almost the entire country, can be purchased in various markets, including those in Guatemala City. There, the San Martín de Porres Market is supplied by the Zona Reina in Quiché, the mountains of Alta Verapaz, and the forests of Izabal.



Taro at a market stall in San Martín de Porres Market. Guatemala City. Photo: L. Villar Anleu, 01.12.2011.

[17]Girard, R. 1977. *Op. cit.*

[18]Nukasov, S.M. 1981. *Las plantas cultivadas de México, Guatemala y Colombia.* Traducción de la edición inglesa por J. León. Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Programa de Recursos Genéticos CATIE/GTZ, Turrialba, Costa Rica.

**Chamomile apple.** *Crataegus pubescens.* The small, pome-like fruits ripen in early autumn and last well into winter. This is when they can be found in markets. Another option is to purchase them as homemade sweets or artisanal jelly. During the season, they are quite common.

**Maxa'n, moxa'n.** *Calathea lutea.* This herbaceous plant can grow up to two meters tall, and its large leaves are harvested for wrapping tamales, paches, pre-Hispanic stews, and other foods. It is available in markets in large quantities year-round, but it is far more abundant in the lead-up to major religious-popular festivities, especially around Christmas.

**White sapote.** *Casimiroa edulis.* A seasonal fruit, it is not always present in markets. Being a Mesoamerican species with a limited distribution, the variations in the fruit seen in popular markets largely reflect the species' variability in the wild.

**Tomatillo.** *Physalis philadelphica.* It has at least twenty wild relatives, each with its own internal genetic variations. The edible berries exhibit this diversity, so it is not surprising to find fruits of various sizes, colors (green, purple), flavors (acidic, slightly sweet), and shapes (round, semi-oval) for sale. Due to its unique contributions to certain dishes, particularly stews (like pepián), as well as some chirmoles and sauces, its availability is almost always guaranteed.

**Nance.** *Byrsonima crassifolia.* Markets are not only filled with the intense aroma of nance fruits when in season but also with their color variations. While most are yellow, some lean towards green or red. Other differences include size, flavor, acidity levels, and more.

**Yam.** *Dioscorea* sp. The edible portion is the corm, and its consumption rises significantly in the Caribbean region, where it is frequently found. In other areas, it can be rather scarce.

**Orejuela.** *Cymbopetalum penduluflorum.* The flower petals are sun-dried and sold in certain markets, such as in Cobán, a hub for their trade and distribution. They are used in atoles and black recado, part of very ancient indigenous preparations.

**Pacaya.** *Chamaedorea tepejilote.* The immature inflorescences and foliar meristems are consumed. The former are the most common in markets. Significant differences exist between cultivated and wild varieties, with much diversity in between. All these variations reach the *tiánguez* (markets).

*Pacayas* in the Chiquimula market, sourced from wild varieties. Notice the remarkable slenderness of the floral structure, which reaches the edible portion. Photo by L. Villar Anleu, 03.17.2010.

**Potato.** *Solanum tuberosum.* For geneticists, it is an advanced cultivar with highly managed varieties. It produces tubers of many shapes, sizes, and consistencies. Due to this diversity and its high demand, markets reflect a significant degree of variation. Native varieties are commonly found in the markets of Quetzaltenango, San Marcos, Huehuetenango, Totonicapán, and Sololá.

**Papaya.** *Carica papaya.* The intense consumption of papaya, combined with advanced cultivation techniques and the use of wild varieties, results in fruits displaying significant variability in markets. Beyond visible differences, numerous chemical distinctions underline its presence, making it a living reservoir of valuable raw material.

**Pataxte.** *Theobroma bicolor.* Deeply rooted in the magical-religious imagination of indigenous communities and the syncretized realm of popular religiosity, pataxte is also highly appreciated for its delicate flavor. As a result, it is commonly found in markets, regardless of the considerable distances it may need to travel.

*Pataxtes* for sale in the popular market of Sololá city. Photo by L. Villar Anleu, 04.23.2011.

**Pepitoria.** *Cucurbita argyrosperma.* Pepitoria refers to the seeds of various squash species, with those from *C. argyrosperma* being the most representative, easily recognized by their scalloped edges. They can also come from other squashes like ayotes, güicoyes, and chilacayotes. A basic ingredient in traditional dishes such as *iwaxte*, *pepián*, and tamal recados, or sprinkled over fruits, all forms of pepitoria are readily available in markets.

**Pericón.** *Tagetes lucida.* A wild aromatic herb with well-known medicinal and culinary properties. After traditional harvesting ceremonies in the fields or from common cultivation, it is dried and tied into bundles. These bundles are what reach the markets and are frequently found.

**Piloy.** *Phaseolus coccineus.* With significant variations in texture, shape, size, and color patterns, piloy beans are not only indispensable but also abundant in popular markets. This indirectly reflects their high consumer demand. They are sold as dry beans or incorporated into dishes they characterize, such as *xep'itos* (small tamales).

**Allspice.** *Pimenta dioica.* Mostly found inside shops adjacent to markets, native allspice berries are an essential part of the spice and seasoning inventory in marketplaces. Their presence is a given and constant.

**Pineapple.** *Ananas comosus.* Pineapples are so well-known, versatile, and widely consumed that their fruits exhibit as many varieties in the markets (*tiánguez*) as there are consumption needs. Being such common knowledge, repeating it here is unnecessary.

**Piñuela, muta.** *Bromelia pinguin.* Its presence in the markets is represented by its edible parts: fruits and flowers. Flowering occurs from late May to October, and fruiting from August to November. It is a preferred food in the eastern region, where markets (*tiánguez*) are often rich in it. Chiquimula strongly identifies with its consumption, which is why its inhabitants are called *muteros.*

**Pitahaya.** *Hylocereus undatus.* The fruits of this creeping cactus are what reach the markets. Globular in shape, their red skin peels off easily to reveal the abundant and juicy pulp, an incredibly vivid fuchsia color speckled with thousands of tiny black seeds. A delight to the palate, it is a true delicacy and highly nutritious. There is significant variation in the fruits available at the markets.

**Pito, tz'ite', machetillo.** *Erythrina berteroana.* The red flowers, resembling machete blades, are consumed. The floral diversity found in the markets reflects the high wild variability of this plant. Flowering occurs in autumn, and the flowers are sold in bundles. Occasionally, bright red seeds appear in the markets, valued for their mystical and magical-religious uses, particularly in divination practices (*tz'ite' arts*).

**Quilete.** *Sinclairia sublobata.* The leaves of this shrub, which grows one to two meters tall (rarely up to five), are edible. They are prepared in soups, added to beef broths, or fried in various ways. Its intense consumption generates high demand, which is evident in the large quantities sold in popular markets in bundles tied with *chiyute.*

**Samat.** *Eryngium foetidum.* Known as *xamat*, escorzonera, culantro de chucho, or culantro de costa, this herb thrives in forest clearings. It is an indispensable component of *kaq'iq'* and other ancient indigenous dishes. While it remains available in markets, it is not as commonly sold as its traditional use might suggest. However, its biological variations are easily observable.

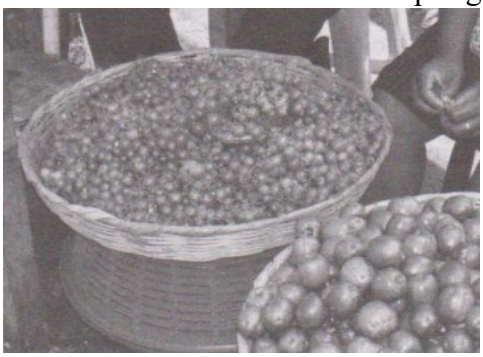
**Saúco, sauco, tz'oloj.** *Sambucus nigra* subsp. *canadensis.* This plant's leaves serve as aromatics, its small fruits are used to make jellies and jams, and it has recognized medicinal properties. Though a rare find, it occasionally appears in markets.

**Tepejilote.** *Carludovica palmata.* A shrub that can grow up to three meters tall in forested areas, its young fruits and foliar buds are edible. They are often consumed in soups and fried dishes. It is not uncommon to find it in the popular markets of communities near its growth areas, particularly in the highlands of the Volcanic Cordillera.

**Ternera.** *Euterpe precatoria.* The tender foliar meristems of this plant are edible, consumed raw or roasted in their harvesting areas, or cooked into dishes such as soups. Sharing a fire with someone on warm, rural afternoons while roasting *ternera* buds over embers is considered a sublime expression of Guatemalan social customs. It can be found in markets.

**Tomatillo, tomatillo de culebra.** *Solanum lycopersicum* var. *cerasiforme.* A native genetic line of great importance to traditional culinary practices, the tomatillo often grows as a tolerated weed in fields or is carefully cultivated in home gardens. Its acidic berries are widely used in *chirmoles*

and *recados*. It has a strong presence in markets from mid-autumn to late spring.



**Tomatillo.** *Solanum lycopersicum* var. *cerasiforme.* With its kaleidoscopic alternation of colors, the tomatillo entices the taste buds simply by appearance—how much more when devoured visually! Often sold alongside *jocotes tronadores* in the markets, such as La Perla de Oriente in Chiquimula. *(Photo by L. Villar Amleu, 03.17.2010.)*

**Tuna.** *Opuntia ficus-indica.* The fruit of various cacti species, *tunas* are highly prized for their distinguished flavor and medicinal properties. Their morphological variation is immeasurable, delighting those who study them amid the lively chaos of a market. Consumers enjoy this diversity, finding a type of tuna to suit every palate.

**Vainilla.** *Vanilla planifolia.* Apart from a few pods that sporadically reach markets in the Q'eqchi' region and occasional plants sold more for ornamental purposes than culinary use, vanilla products are rarely seen. This is due to the high industrialization and artificial synthesis of its essence.

**Yampí.** *Dioscorea* sp. A close relative of the ñame, sharing similar market representation. Its distribution is strongly marked in the Caribbean region, where it holds cultural and culinary significance.

**Yuca.** *Manihot esculenta.* The significant representation of yuca and its derivatives in markets across Guatemala parallels its high levels of consumption. Alongside this abundance, there are also notable displays of biological diversity. Cooked yuca has become synonymous with a market staple, reflecting its essential role in daily diets.

**Zapote.** *Pouteria sapota.* The sheer variety of zapotes in the markets is astounding! Large or small fruits, round or elongated shapes—such diversity mirrors what is found in nature. Its green-skinned relative, the highland "injerto" (*Pouteria viridis*), is also present. Additionally, *zapuyulos* (its seeds) are highly versatile, with numerous culinary and medicinal applications.

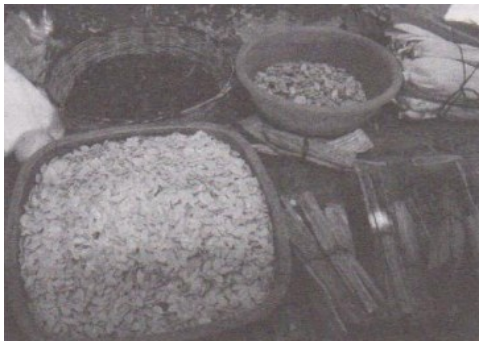
**Zunza, zunzapote.** *Licania platypus.* Another tropical fruit richly represented in markets, particularly those along the Pacific coast and in highland towns with strong commercial ties. Its variations in form, size, and flavor underscore its importance to the region's biodiversity and culinary traditions.

It is undeniable that countless other plants—herbs, shrubs, or trees—whose leaves, flowers, seeds, stems, or roots enrich the inventories of Guatemalan markets have been left out of this brief narrative. However, the examples provided sufficiently illustrate the richness of the *tiánguez* and their role as representatives of the country's extraordinary biological diversity.

### Biodiversity for Religiosity

Guatemala's deeply syncretized popular religiosity draws on various biological resources to craft its expressions of faith. The symbols provided by these resources

are deeply embedded in the cultural imagination of its people. As a result, due to strong identity-driven demand, these resources flow into markets in harmony with the timing of magical-religious festivities.



*A small, very unique, and rich stand at the Panajachel market. Pumpkin seeds in the foreground, chayote seeds behind them (black, in the wicker basket), pinewood sticks, dobladores, cox leaves (top right corner), and beans. Photo by L. Villar Anleu, 04.04.2010*

When this happens, the *tiánguez* are filled with the species appropriate for the occasion. One can genuinely speak of a *Christmas market* or a *Lenten market*, of the *Day of the Saints market* or the *Conception market*. Sometimes, the specialization becomes so great that, physically, the seasonal sales are located in separate, isolated spaces. But in most cases, the separation is more metaphorical than spatial, and in the same environment of everyday sales, it accommodates and enriches itself with the items that the celebration demands.

With a plethora of biological diversity in its composition, a Christmas market bursts with colors and scents through the species that tradition has fixed. Even though they all spring up together, each individualizes the symbolism it gives to the celebration, each one contributes its own, but it is their conjunction that sublimates the consciousness and transports people to the sacred. Such a market becomes a place where goods are acquired that will form the core of unity in the home, elements that will bind the earthly family together and bring them closer to the Divine Family.

Here, there are heaps of *maxa'n* leaves for the *envuelta* of tamales, and over there, bundles of *cibaque* to tie them. Because the foods and beverages that customs have sanctified rely on a pantry of resources. The space that holds banana leaves, *maxa'n* leaves, or *cox* leaves to wrap the tamales overflows with freshness. The *cibaque* that ties the culinary wrapping is indispensable and must be nearby, because, given the symbolic reference it carries, it cannot be any other fiber that holds the cover. In the market, there must also be the customary pork lard for tamales, corn for the dough, rice if it is customary to add it, tomatoes, peppers, olives, and plums.

The *caliente de piña* (hot pineapple drink) cannot be missing from the homes. It doesn't matter if the trend in Nueva Guatemala de la Asunción calls it *ponche*, the fact is that, as a seasonal beverage, it has its supply of ingredients in the market: pineapples, chichicastecas apples, plums, raisins, cinnamon, and sugar. But tradition is tradition, and many will also want to fight off the cold of the season with a steaming cup of hot chocolate. There it must be, in handcrafted tablets... because it's tradition!

On this side, red poinsettias, and on the other, chamomile flowers that have stolen the color of gold; alongside them, pine networks for watering and pine worms for decorating. *Pacaya* leaves for solemn adornment and *para de gallo* flowers that

will accompany them in their symbolic function. Poinsettia flowers dye the people's pupils red, just like the flowers of *gallitos* (little roosters), while from the leaves that tradition has fixed in the celebration, countless shades of green emanate. Small trees, branches, and *chiriviscos*. Moss, white *pashte* and crafts made from species of the countryside.

As always, crafts convey their magic by adapting to the sacred celebration. Works of art born from the hands of anonymous artisans who, transforming fragments of Nature, give them new life, infusing them with the magical-religious soul through which the devout will recreate the manger where Jesus was born. Little shepherds made of corn husks, *cibaque*, moss patches, piles of white *pashte*, pine nets, *pata de gallo* flowers, and chamomile garlands. Advent wreaths crafted from branches of fir trees, oat stalks, or wheat. Small mangers made with thin, flexible, sturdy wooden twigs, joined to wooden pieces and roofs made from the inflorescences of wild grasses. With the softness of the fluff of an ethereal velvet, bouquets of flowers from these grasses await their turn to be taken and placed on the floor of the tiny mangers, waiting for the divine image of the Child.

The little trees have their own place in the market. Small pines or pine branches, precious fir trees, or a persistent *chirivisco*. Almost invariably, they share space with nets of stripped pine, pine worms, *pacaya* leaves, and turtle shells. This is because popular religiosity still maintains the deep-rooted practice of striking turtle shells during *posaditas* and processional prayers. Stalls exude the freshness of the autumn breeze, as gracious as the devotion with which walkers infuse their steps while visiting them, as distinguished as the goods they offer, and noble because these will be used to celebrate the birth of the Son of God. The biological wealth, recalling some of the species previously mentioned, includes:

**Cox.** (*Canna tuerckjeimii*). A terrestrial herbaceous plant whose leaves are frequently used to wrap tamales. In towns of the western highlands, there is a marked preference for its use, sometimes even surpassing that of *maxa'n*. Large bundles of these leaves, stacked within view, are a common sight in the inventories of Christmas markets.

**Chamomile.** (*Crataegus pubescens*). Previously mentioned when discussing edible varieties. It is brought up again as an indisputable Christmas symbol in Guatemala's popular religiosity. The long strings called *hilos de manzanilla* are an essential motif in the season's iconography, and in many places, the fruits are also sold for making *caliente*, the energizing beverage ingrained in tradition.

**Maxa'n, moxa'n.** (*Calathea lutea*). Linked to Christmas cuisine because its leaves are used to wrap tamales. Their size is ideal for this purpose, and their underside produces a wax that is an undeniable practical advantage. Like *cox*, it is sold in bundles and is in high demand in Christmas markets.

**Mosses.** These have not been adequately studied in the context of markets and religiosity, so little can be said in this regard. However, their abundance in Christmas markets showcases the splendor of their natural diversity, presenting an excellent opportunity for further research.

**Pascua** (*Euphorbia pulcherrima*). A native species and the quintessential Christmas icon, from which many varieties have been developed through genetic manipulation. They are indispensable in the *tiánguez,* appearing in red, yellow, or white varieties, as potted dwarf plants or cut flowers from garden plants.

**Pashte blanco** (*Tillandsia usneoides*). An epiphytic bromeliad widely used in the country for numerous applications. It holds a special place among Christmas resources, especially in decorating gifts and, more notably, in adorning Nativity scenes, cribs, altars, and Christmas trees.

**Pata de gallo** (*Bromeliad app.*). Various species of "gallitos," as they are also called, have become deeply rooted in Guatemalan Christmas traditions. Their presence in seasonal icons is as abundant as their availability in markets.

**Pinabete** (*Abies guatemalensis*). This species, a tree of high-altitude temperate forests, is critically endangered but has been deeply embedded in the spiritual world of Guatemalans since pre-Hispanic times. It is the preferred *Christmas tree* due to its stature, delightful aroma, and symbolism. Small trees, branches, and *Advent wreaths* are available through both legal and illegal commerce.

**Pine** (*Pinus spp.*). There are no studies defining the most common species found in markets. Preliminary identification points to *Pinus oocarpa* as one of them, along with *Pinus ayacahuite, Pinus maximinoi,* and *Pinus montezumae* in Highland towns. Trees, branches, needles, cones (*chincuyas*), and manufactured products, such as *pine worms* and *chompipitos* made from cones, are available.

**Turtles.** In the markets, particularly during Christmas, they represent an underexplored field of study with great potential. Few attempts have been made to document them. In 1970, a biologist named Mittermeir reported species from the genera *Kinosternon, Staurotypus,* and *Trachemys,* to which *Dermatemys* should also be added. Among the eleven freshwater species in Guatemala, the following can be found: *Dermatemys mawii* (white turtle), *Rhynoclemmys aereolata, Rhynoclemmys pulcherrina, Trachemys scripta* (canjicja), and possibly *Kinosternon leucostomum* (casquito) and *Staurotypus triporcatus* (three-keel turtle).

**Corn Husks.** (*Zea mays.*) The leathery-fibrous covering of the corn cob is in high demand because it is used to wrap *chuchitos* and *tamalitos,* cherished seasonal foods. Corn husks are also used in manual crafts of great expressive richness and deep cultural roots, such as creating the little shepherd figurines found in many Nativity scenes.

The biological diversity that sustains the secular expressions of the sacred Lenten cycle can be found in popular markets, which aptly take on the identity of *Lenten markets.* These markets bring together elements meant to embody the symbolism through which popular religiosity commemorates and glorifies the life, passion, death, and resurrection of Jesus Christ. Since food has long been a symbolic cornerstone of great prominence, many ingredients (abundant, no doubt) and resources needed to prepare them are available, along with other elements specific to the season.

There are two types of food in this celebration: the *offering-food,* presented to honor the Lord, and the *sacralized food* consumed by believers as part of customs and traditions preserved within the social imagination.

The first is part of the tribute that humans offer to divinity to gain its favor. Given the profound emotional value of sharing what is enjoyed, magical thinking associated what is pleasant for humans with what should please God. Foods that delight humans must also be pleasing to divinity, such as certain native fruits and others introduced over the years. Examples of the former include pataxte, cacao, and coconut; of the latter, aromatic peaches, bananas, mangoes, and oranges. Over time, a variety of vegetables and legumes were also added. Offering them to Jesus during Lenten rituals could be done through four *ephemeral icons* of intense symbolism: Arches, *Carpets, Gardens, and Processional Images.*

The *sacralized food* serves other mystical functions. These dishes belong to the same imaginary framework that governs the unconscious practice of collective religiosity. Though of worldly origin, they are prepared under syncretic principles blending Paleocatholic practices with the magical-religious canons of ancestral indigenous cosmogonies. Their integration into sacred celebrations has transformed their mystification into tradition. Thus, Lenten preparations such as dried fish dishes, Holy Week Bread, chocolate, and white honey consumed in adherence to seasonal customs have acquired the character of sacralized food.

In general terms, there are two types of dried fish: one made from small species, such as those scientists call *Atherinella, Poecilla,* and *Poeciliopsis gracilis,* prepared and consumed year-round. The other, composed of moderately large species, is quintessentially Lenten and includes various benthic or coastal pelagic fish, as well as some freshwater species. Due to their culinary versatility, abundance, flavor, and market acceptance, some examples from the Pacific include snook (*Centropomus robalito*), sierra mackerel (*Scomberomorus sierra*), snapper (*Lutjanus guttatus*), milkfish (*Chanos chanos*), bluefin tuna (*Thunnus thynnus*), barracuda (*Sphyraena*), catfish (various species), tropical gar (*Lepisosteus tropicus*), and blacktip shark (*Carcharhinus limbatus*). From the Caribbean, there are common snook (*Centropomus undecimalis*), jack (*Caranx hippos*), and snapper (*Lutjanus spp.*).

Various fishing communities are responsible for catching, cleaning, salting, and drying these products. In the Caribbean, this work takes place in Livingston, Puerto Barrios, and numerous villages and hamlets of Punta de Manabique. In the Pacific, communities like Las Lisas, Hawaii, Monterrico, Iztapa, San José, La Barrita, and many others are involved. Established trade routes transport these products from fishing hubs to markets and, from there, to kitchens. Once again, markets act as convergence points and hubs where these remarkable examples of national biological diversity come into view.

Another symbolic Lenten reference is the corozo palm flowers. So strongly associated with Lent, the entire season is evoked by their scent. When a market smells like Holy Week, it smells like

corozo. The flowers begin their journey to sacredness in the collection fields, and the faithful find their supply centers in popular markets. From there, they may end up on a home altar, a church altar, scattered on a carpet, or adorning a garden or processional platform. They might also be used in a vigil or a processional cortege.

Incredibly rich in biodiversity are the Lenten markets, but a deeper consideration of them exceeds the editorial space available. For now, they must remain momentarily in the inkwell.


**Summary**

In Guatemala, the opulence of its inherent biological diversity, which constitutes an exceptional natural heritage, is showcased in its popular markets, which, in all their manifestations, retain the grandeur of the ancient *tianguez.*

These are not merely points of trade, nor are they simple enclaves of capitalist expression. Instead, they are centers of social convergence and human relationships. The products and elements of this heritage represent a selection of natural resources through which people create ethnobiological bonds.

This holds true for everyday markets as well as those that amplify their magnificence during times when religiosity demands it. During these periods, they become filled with natural resources that are emblematic and adorn Christmas and Christmas Eve, Lent and Holy Week, All Saints' Day, the Feast of the Immaculate Conception...

The biological diversity embedded in the popular culture of Guatemalans has three homes: the ecosystems from which it originates, the markets where it is showcased, and the spiritual universe of humanity.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