

Food Autonomy: Use and Conservation of Edible Plants in a Marginalized Context in the State of Hidalgo (Mexico).

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ABSTRACT: *The performance of economic activities of small agricultural producers has been little studied. The article is part of the practical response to the global problem of destruction, fragmentation and isolation of the habitat with the predominance of human beings. The natural environment of the Sierra de Pachuca, in the transversal part of the municipalities of Actopan and Atotonilco El Grande, in the State of Hidalgo (Mexico), is being destroyed unprecedentedly. The objective is to analyze the use, management and conservation of plants gathered which are used for consumption and trade. The information is obtained through direct observation and interview. The major findings described all the species of plants that are used and preserved for food and trade. In the same vein, the territory and time in which the ancestral knowledge adapts to climate changes which affects the existence of the biodiversity and forest conservation is observed, last fundamental resource for the collective practice of preservation, which is seen congruent with the environmental protection. The article is the result of the research project entitled "use of the territory and population dynamics, subsidies for environmental planning and regional development".*

Keywords: *Agriculture, ecology, food autonomy, marginalization, peasants*

I. INTRODUCTION

In Mexico, after the crisis during the first years of the 1980s, with the restructuring of the economic policies, the neoliberal measures have had devastating effects on the countryside as development, rural programs have been removed plus subsidies and supports to the agriculture family have been discontinued. In addition, constitutional changes took place which allowed the sale of ejido and common lands, which deeply altered the dynamics of countless families and communities. This caused mass bankruptcy of peasants and small farmers. In view of this process, the agrarian crisis worsened, characterized by the loss of food and labor autonomy (Otero [1]; Bartra [2] Tétreault [3]).

In consequence of this process the growth of inequities was observed, the crisis of employment was intensified and the environment deteriorated (Castles and Thin [4]. These are some of the motives for which Pablo Vargas [5] has proposed that in the era of the global development the socio-spatial disparities have been deepened in Mexico, a process to which the rural communities are in a position of great disadvantage and exclusion.

In this context, the food processors have an increasing interest because it is a world scale problem, but which is solved at local and household level. In recent years, in Latinamerica, the academic point of view in this topic sustains a constant struggle in the search of knowledge and social justice.

According to Emanuel Gómez [6], the concept of food autonomy is recent. It means the capacity to reproduce the culture in an inherited territory and collectively handled, it is to do with one of the main contributions of the indigenous movements in Mexico. In 2016, in the Sierra de Pachuca (Hidalgo, Mexico), we have observed a type of process that can be identified as antiglobalization, in which, from the arrival of the Spanish in America, the population, without the intervention of any person, has preserved areas of forest and wetlands in a common territory that is recently of Ejidal type. They exploit products that in turn are regenerated in the same microenvironment, consumed and sold at nearby urban markets. This way, the medicinal herbs and edible species constitute their diet and a survival strategy to which they dedicate more than half of their time to carry out their main economic activities. The communities of study are of very high alienation, indicator in which the low levels of revenue and schooling are accentuated.

Nevertheless, in the region of study the forest has been destroyed without precedents. The human being is responsible for the extinction of this vital resource; for the extinction of species; for the deterioration of the air, water and soil quality. In recent times, the extraction and smelting of minerals such as gold, silver and lead were the starting point of damage to the environment.

From colonial times until our days, after the depreciation of metals, the demand for wood has been tied fundamentally to the construction industry. In the XIX century, coal and firewood had a high demand, when, in the rural Mexico other sources of energy such as electricity and gas were still scarce, which led practically to the extinction of wide forested areas (Gonzalo Chapela [7]).

Based on sources such as the records of the Codex Mendocino, the registration of the emperor Moctezuma and the events by Sahagún in his General History of the Things of the New Spain, there is proof that the mining and metallurgy activity was part of the main activities in the pre-Cortés cultures (Joaquín Muñoz [8]). Given the absence of a resistant and hard metal such as iron, activity was made with the available resources. Vestiges in the States of Guerrero, Queretaro and elsewhere in Mexico show that mining operations in pre-Hispanic times employed the method of roasting, consisting of heating the rock wall where the metal was, fracturing it through the sudden cooling with water (Joaquín Muñoz [8]).

The extraction of silver and gold had the purification and transformation technique entailed for this material. The benefitted process for metals was not different from that used by the Europeans. Exposure to heat and smelting of the mass extracted from rock allowed the separation of metals and slag. This technique only changed after the introduction of the Spanish furnace during the XVI century, increasing the amount of benefitted metal.

The extraction of gold and silver in Mexico initiated since 1525. The peak of development and the highest productivity of deposits occurred precisely in this century when the majority of the most important deposits were discovered, outstanding those from Zacatecas, Guanajuato, Guerrero and Hidalgo. Nevertheless, the bonanza extended until the XIX century (Riat Puche [9]).

With the discoveries of mineral resources, king Felipe II "... issued, in Valladolid, the Pragmatics and Decrees in January, 1559, where it is indicated that the gold, silver and mercury mines would be incorporated to the royal heritage (it would only be exploited by individuals by means of royalty fees)..." (Riat Puche [9]). In the case of mining in Hidalgo, in 1772 the records of the Caja de Pachuca, the building where taxes were collected for the Crown, offer production data from Pachuca, Real del Monte, Atotonilco el Chico (today Mineral del Chico), Capula (municipality of Mineral del Chico), or lead mining sites in the community of Santuario de Mapethé (municipality of El Cardonal), El Cardonal and Plomosas (municipality of Actopan) (Daniel Guzmán [10]).

Certainly, the mining production was linked to the exploitation of the timber resources, the required amount of wood had to be proportional to the production of gold and especially of silver. The mining work, besides excavating the ground to extract the metals, it also required the necessary heat to separate it, melt it, transform and transport it to the centers of concentration of capital.

Moreover, the severe exploitation of mineral and forest resources led to a significant loss of the regional biodiversity and a proportional retraction of the traditional knowledge associated with the food and medicinal use of plant species, which affected the practices of both collection and usage of plants and the subsequent registration of such resources. Therefore, there is the demand for understanding and documenting the species that are still used, how they are used, where and for what purpose.

In conformity with previous studies on the use of edible plants not cultivated in Mexico (Garcia [11], Basurto et al. [12], Casas et. al. [13], Villa [14] and Bye [15], the mistaken notion that the diet based on such practices is monotonous has been denied, noting that its consumption brings a significant diversity of flavors, scents and textures, in addition to nutrients such as vitamins, minerals and fibers. These studies also raise that the gathering of food is a current practice and with a strong cultural root, since it is linked to the set of processes that define the peasant economy of survival, revealing the multiple use of biodiversity.

In addition, it is suggested that there are agro-ecosystems which are basic for food autonomy in rural communities in Mexico. It was further added that the registration of the sustainable use of the edible species also contributes to the maintenance of biodiversity, and that the biodiversity, once strengthened, tends to benefit both the environment and human population health (Fanzo et al. [16]).

Therefore, there is still lacking more complete information concerning the gathering and the current consumption of these plants and their role in the population's diet and food autonomy in vast regions of Mexico. There is also still lacking information about the nutrient value of these plants, their forms of preparation and consumption, therefore, to document the associated traditional knowledge, it is justified to the extent that it is part of the Mexican cultural heritage as also because it helps to conserve biodiversity plus part of the survival strategy of many families who live in a well-known marginalized situation.

Historical background of Food Autonomy

In the Universal Declaration of Human Rights, adopted in 1948, article 25 contains the first international regulations which crystallized legal thinking on human rights and the human right to food: " Everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing, housing and medical care and necessary social services..."

This precedent highlights the importance of the decree of world order so that the population's food diet is placed above the interests of the economy, a set of laws which is an enabling framework for the environmental sustainability for the new generations of peasants.

Research on this topic highlights the Nuquí (Department of Chocó, Colombia), in which the agrobiodiversity of plants was identified and analyzed, as well as its relationship with usage, handling practices in flooding banks and terraces of the rivers, plus gullies and estuaries. In this place, farmers, apart from having areas dedicated to the main economic activities such as fishing, hunting and gathering of fruits, roots and leaves, as well as mining and extraction of forest products, plantain production in marginal lands complement their diet. This fruit has a special economic, cultural and ecological value, given that this is a fundamental piece in the food safety of the population, and it also complements other vital functions, for it not only provides food to the population, but it is also a source of survival of wildlife (Zuluaga and Ramirez [17]).

In Cuba, given the crisis conditions in the economy due to the fall of the socialist bloc and after the U.S. embargo, at the macro level, the State policy suggested to the peasants the transition to the agroecology as a good alternative to increase production. The key to success consisted in two central aspects: first, the level of organization reached with the intervention of the National Association of Small Farmers (ANAP); second, the level of schooling of the peasants, who opted to change their farming practice. With this, the transition was quick and successful, using a methodology based on the collective production, according to the environment and without the use of imported chemicals (Rosset, Machin and Roque [18]).

In the European context, things have taken a similar tenor. For example, in the United Kingdom, the "quality" in the production and consumption of agricultural food was found closely related to the nature and the local connection of supply chains of production. In Wales, taking as a point of departure the study of the supply chains of food, and based on the convection theory, this ensures that the quality of agricultural production is determined qualitatively by the negotiating process which is developed in the local market (Murdoch, Marsen and Banks [19]).

In Spain, Beatriz Montiel and colleagues [20] analyzed the impacts on olive oil production with the Delphi method. When comparing the region of high slope (ecologic) and the conventional region (technicized) they found that the first case has a clear advantage over its counterpart. It also stands out that the olive grove in general provides non-productive functions as the major value which the landscape acquires; it stops erosion and desertification, it increases rural employment and reduces carbon dioxide when combined with other economic activities such as livestock. However, currently, the risk of abandonment of this economic activity is high, so that it is suggested a need to assess the type of marginal supply of goods and services, commercial and non-commercial which this good provides. It should also be borne in mind that Spain is the main producer of olive oil on the planet and that even though the type of high mountain trees is the lowest in productivity; it is the predominating for obvious reasons.

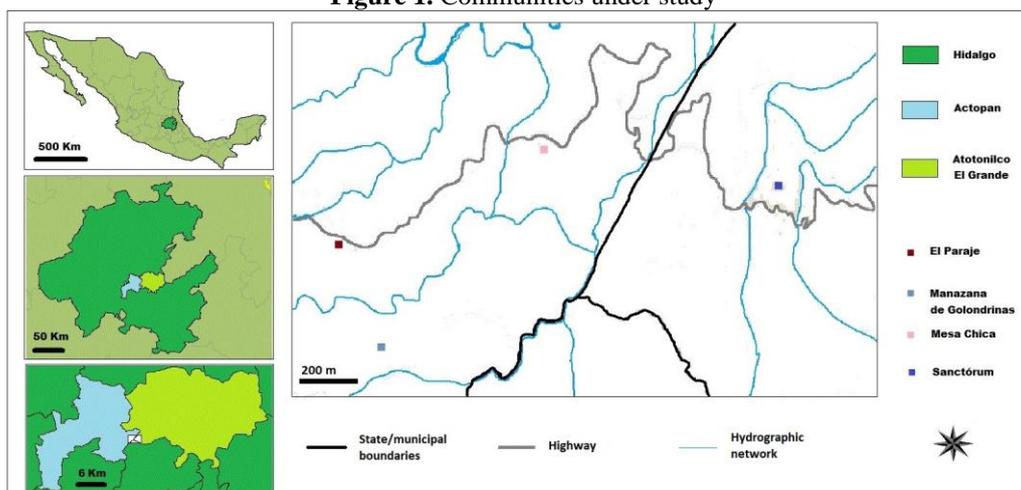
In the state of Hidalgo (Mexico), Perez and Villavicencio [21] reported 611 species of plants, of which they counted 461 for medicinal use, 236 edible, 149 ornamental and 73 of pesticide type. Regarding to the latter in the order of importance, it was found that all are obtained by gathering and are used more for the purposes of personal consumption and to a lesser extent for commerce, that the fruit is the vegetable part most widely used, then, flowers outstand. In particular, for the localities of study (Actopan and Atotonilco el Grande) edible plants of the desert were documented, such as the maguey, cactus, yucca, yucca grandiflora, yucca filifera, amaranth greens, common myrtle and Schinus molle. However, the study did not document plants collected, perhaps because the woodland was not considered in the study, a fact which appraises our work more, before the need of new information that enriches the biotic knowledge.

Finally, the obligatory reference to the topic is Jerzy Rsedowsky and Laura Huerta [22] in their study of the mountain mesophilic forest, emphasizing the existence of connections from one forest type closely related which extends from the state of Hidalgo (Mexico) to Canada. In general, the common elements that the study area in Hidalgo were trees of the pteridophytes type, among which abundant species of Lycopodium, of Selaginella, Hymenophyllaceae and Cyatheaceae. Secondly, the floristic composition outstands, where the family Orchidaceae is the most abundant. In turn, fungi are cited for its importance as a food source for the population.

Study Area

This study is located in four localities of the Sierra de Pachuca in the State of Hidalgo, namely: Manzana de Golondrinas, The Paraje and Mesa Chica, in the municipality of Actopan, and Sanctórum in the municipality of Atotonilco El Grande, all interconnected by a dirt road.

Figure 1. Communities under study



Source: Own elaboration. Information prepared with the use of the online system of the digital map of Mexico

INEGI:

<http://gaia.inegi.org.mx/mdm6/?v=bGF00jIzLjMyMDA4LGxvbjotMTAyLjE0NTY1LHo6MSxsOmMxMTFzZSJ2aWNpb3N8dGMxMTFzZXJ2aWNpb3M>. Geographical Location: Manzana de Golondrinas (98° 49' 5.08" W, 20° 17' 1748" N, altitude 2000 msnm), El Paraje (98° 49' 20.85" W, 20° 17' 46.6" N, altitude 1933 msnm), Mesa Chica (98° 48' 9.93" W, 20° 18' 15.01" N, altitude 1998 msnm), Sanctórum (98° 46' 38.06" W, 20° 18' 5.18" N, altitude 1839 msnm). Information

Sociodemographic characteristics

In 2010, the communities of study were of small size; all defined as rural and high social and economic backwardness. Based on the indicators in Table I, it is interesting to observe the depopulation as its general feature, then, outstands the demographic imbalance evidenced through the level of masculinity because, alternately, the 4 localities have surplus of men and women as a result of migration and mortality; even, the acute process of ethnic differentiation between them is remarkable, since the closest to Atotonilco El Grande (Sanctórum) has almost one fifth of the population who speaks otomí, the indigenous language, while for the rest, this mark has practically disappeared.

Table I. Population, gender, and percentage of indigenous people in the localities of study, 2010.

Localities	Total population	Sex ratio	People with three or more years who speak indigenous language (%)
Manzana de Golondrinas	41	105,0	0,0
El Paraje	92	87,8	1,1
Mesa Chica	44	109,5	2,3
Sanctórum	314	84,7	18,8

Source: Census of Population and House - INEGI, 2010.

In accordance with the index of marginalization of the National Population Council in 2010, communities across the mining region are characterized mainly in that they have a high degree of marginalization, a disadvantageous situation, very difficult to reverse in the coming years (Table II).

Table II. Degree of marginalization in the communities of study, 2010

Localities	Degree of marginalization	State place
Manzana de Golondrinas	Very high	85
El Paraje	Very high	306
Mesa Chica	High	549
Sanctórum	High	743

Source: National Population Council, 2010. Calculations based on data from INEGI, 2010.

The index of marginalization is elaborated by the National Council of Population (CONAPO) since 1993. It takes into account 9 percentage indicators: residents in private homes without piped water, residents of private homes without restroom nor drainage, residents of homes with dirt floor, residents of private homes without electricity and the residents of private homes with overcrowding level, the illiterate population over the age of 15, population over the age of 15 without complete primary education, the population that resides in communities with fewer than 5000 inhabitants and the occupied population with an income of up to two minimum wages.

In this regard, the indicators and the social gap index show the difficult conditions under which communities of this region live, characterized by a medium or high degree of lag. These data highlight the high percentages of illiterate, which reaches 33.3% in Manzana de Golondrinas, the percentage of people over 15 with basic incomplete education, reaching 62.9 % in El Paraje, 69.4% in Sanctórum, 77.7% in Mesa Chica and 77.8% in Manzana de Golondrinas. The percentage of people who live in homes without toilet or restroom, which do not have piped water or drainage, in addition to the percentage of people who live in housing without electricity, or even in a community where almost all have electrical energy, half do not have a fridge, an item needed for the conservation of food (Table III).

Table III: Indicators and degree of social gap in the communities of study, 2010.

	Mesa Chica	Manzana de Golondrinas	El Paraje	Sanctórum
Illiterate people over 15	11.1	33.3	17.7	20.1
Population over 15 with incomplete basic education	77.7	77.8	62.9	69.4
Population not entitled to health care	13.6	24.4	17.4	23.9
Homes which do not count with toilet or restroom	45.4	100.0	66.7	68.6
Homes which do not count with piped water from the public water network	45.4	88.9	66.7	95.7
Homes which do not count with drainage	54.5	100.0	71.4	72.9
Homes which do not count with electricity	72.7	100.0	90.5	5.7
Homes which do not count with refrigerator	100.0	100.0	100.0	50.0
Degree of social gap	Medium	High	High	Medium

Source: National Council for evaluation of the Social Development Policy. Calculations based on data from INEGI, 2010.

The Social Gap Index is a weighted measurement established by the National Council of Evaluation of the Social Development Policy (CONEVAL) that summarizes four indicators of social scarceness (education, health, basic services and spaces in the house) into a single index which has its purpose to order the observation units according to their social scarcity. The estimate of this indicator has as the source of information data from the Census of Population and Housing, 2010 (INEGI) and was developed under the statistical technique of the main components which allows to sum up to an extent the different dimensions of the phenomenon under study. The five strata in which the index is distribute: very low, low, medium, high and very high social backwardness. Stated briefly, the studied communities are characterized both by its location in the Sierra de Pachuca, in the state of Hidalgo, as by the insufficient satisfaction of the basic daily needs of many of its families, a fact that constrains its inhabitants to search for alternative behaviors able to liven up their marginalization conditions and social gap, as is the case of the use of their traditional knowledge.

II. MATERIALS AND METHODS

In this work, each of the 4 communities of study that are located in the cross sections of the Sierra de Pachuca, in the far north, was visited once a month. It was, then, during the 2016 that we were there 3 times interviewing the population that gathers the edible plants. During these visits was asked the name of the plant, its use, the part used and sold, the harvest season, the place and time spent as an important family activity. Adjacent to the houses stand out the corn and bean fields, vegetable gardens, and fruit trees, outside products with no trace of contamination. However, as we could observe, at the stream basins, preferably at places where the topography offers more time of shadow than sun, there is a greater concentration of oak and pine trees, and is the territory where the population supplies raw materials for daily consumption.

On the other hand, we also followed the persons of study to the markets and flea market where products are traded (Actopan, Real del Monte and Atotonilco El Grande). The field work included the location and the establishment of the rapport with people who shaped the study universe, mostly conformed by women (two per community); the process which enabled the entry and research in the communities. During this phase of work, the direct observation allowed to register socioeconomic conditions of the population, as well as to carry out routes and collection of information on the land and places where they grow and reproduce plants which they eat and trad.

III. RESULTS ANALYSIS

In the Sierra of Pachuca, after several cycles of forest destruction and its biodiversity, mainly related to the process of exploitation and transformation of silver ore, the scarce resources that are preserved still serve as a food source and income generation for families characterized in marginalization situation.

The activities of gathering, preservation and consumption of plants in the communities of study are part of the practical response to the problem of territorial isolation of marginal regions of the economy. The process of fragmentation of the habitats as the case study is resolved through the consumption and trade of the products and goods in the most prosperous regions. This survival strategy has led to the most vulnerable population to attend the markets of Actopan, Atotonilco El Grande, Pachuca and El Real del Monte, dedicating an average of 4 days of the week for the development of these activities, which indicates that this practice is not at all marginal as it appears at first sight if we follow the proposal of Andrew Bennet [23], who suggests to stop considering the habitats as isolated entities and view them as territories connected in ecological corridors. In these, what draws attention in the place of study is the central connectivity of the trade processes and conflicts with visitors because there is a monitoring process that aims at the continuation of the habitat from which they are fed.

The local explanation of the persistence by conserving the forest and its products comes from the population attachment to the earth. At this place, the proximity of the people with nature is observed according to their way of life. In this regard, there are studies such as those of Jose de Jesus Hernandez [24] which suggest that the economic value that the investment in the landscape construction has been too recent. However, the symbolic value of recognition and identity of the territory in central Mexico has occurred for over more than two thousand years. The first example that supports this idea is the petroglyph of a typical flower with which the city of Teotihuacan was recognized for more than two thousand years and has been found represented in constructions of the Maya people of Guatemala and Honduras (Vázquez [25]). A second example is the study of Alvaro Mayorga [26], which documents the meaning of the names of towns in the Otomí family in Hidalgo, focusing on the meaning of the landscape. In this case, the names emphasize: a place where prickly pears abound, a place of cactuses, place of herons, place of ravens, a place where water springs, etc. Table IV contains the list of edible plants that are gathered in situ for consumption and trading in the 4 communities of study. The species are presented with its scientific name and the harvesting season.

Table IV. Species harvested by the family organization in 2016

Plants	Scientific name	Gathering season
Oyster Mushrooms	<i>Pleurotus ostreatus</i>	January to December
Avocado	<i>Persea americana</i>	August and September
Apple	<i>Malus domestica</i>	September and October
Pear	<i>Pyrus</i>	September and October
Capulin cherry	<i>Prunus salicifolia</i>	July and August
White sapote	<i>Casimiroa edulis</i>	July and August
Hawthorne	<i>Crataegus mexicana</i>	December and January
Walnut	<i>Juglans regia</i>	October to December
Plum	<i>Prunus domestica</i>	July and August
Peach	<i>Plectranthus amboinicus</i>	December and January
Rosemary	<i>Rosmarinus officinalis</i>	December and January
Oregano	<i>Origanum vulgare</i>	August to October
Wild yam	<i>Dioscorea composita</i>	August to October
Lemon verbena	<i>Aloysia citrodora</i>	January to December
Lemongrass	<i>Cymbopogon citratus</i>	January to December
Mexican marigold	<i>Tagetes lucida</i>	August to October
Moss	<i>Bryophyta</i>	December and January
Hay	<i>Tillandsia usneoides</i>	December and January

Source: Interviews and fieldwork.

During the visits to the communities a total of 21 edible plant species were recorded, 12 are native and wild, the rest has been introduced. The gathering is seasonal and depends on the phenology of the species, climate and precipitation. For example, mushrooms stand out in order of importance. This resource is the one that most feeds the population, it is gathered all year provided whenever 5 continuous days of rain occur on

average. Indeed, at the place of study the forest is the supermarket of the residents. People do not have to wait sales seasons, which promote consumption or a greater circulation of money, for example, in Mexico "El buen fin". Here, for the peasants, the "good weekend" is the rainy season, and, if it is the case like this which there is rain throughout the year, even in cold season it is a period of bonanza since there is an abundance of mushrooms to eat. On the contrary, when the phenomenon of "El niño" occurs, as suggested by Alfonso Klauer [27], then occurs a difficult time, it is when these peasants do not have what to eat, because the supermarket of the forest is empty, there is no production of mushrooms.

Mushrooms are the main edible resource at the place of study. This is a very delicate and fragile system that collapses when there are dry seasons. No one seems to care when the rain does not come from social and ecologically more vulnerable regions such as the place of study. Neither the people from here knew about the season of the "good weekend" since we asked at the time of its occurrence, responding that they were not even aware of it. The place of study hardly reaches the radio signal and is isolated from the rest of the services of the modern world. The precipitation dependency is strong since it is the basis of their diet. Perhaps this is due to the cultural importance that the Christ venerated in the church of Santa María Magdalena (Actopan, Hidalgo) has, close to the communities of study and is recognized as "the Lord of the rain".

At the Manzana de Golondrinas and El Paraje, the Mexican marigold (*Tagetes lucida*) and rosemary (*Rosmarinus officinalis*) is so abundant that it seems to have been sown. While in Sanctórum and Mesa Doñaná there are special places where you can find oregano.

Among the harvested and traded species also stands out the soil for plants, the seasonal flowers such as those used in the celebration of the deceased during the first days of November, plus moss and hay that are marketed in the winter season.

The presence of medicinal plants call the attention for two reasons, for the conservation of ancestral knowledge and the importance as a therapeutic resource for daily treatment of diseases, covering a wide range of possibilities for physical ailments. Without being a central theme of our work, we were able to record the Mexican loosestrife, flea bane, olive trees, Santo Domingo, golden weed, white balm mint, yellow balm mint, purple balm mint, white sapote leaves, , eucalyptus leaves, guava leaves, hierba del sapo (*Eryngium carlinae*), stinking goosefoot, chamomile, Rue, spearmint, corn silk, and boater bush.

In accordance with Hostettmann and Marston [28], indigenous and rural communities have a millennial traditional knowledge on the use and management of natural resources present in their environment. Such knowledge allows multiple applications of these resources for the satisfaction of human needs; among which are noticeable for medicine and food.

The species of fruit trees found supplement the diet of the population, which in its turn are traded in small volumes and is not seen at any of the 4 communities that specialize in some type of product by its abundance. These include the Mexican hawthorn, white and yellow sapote, walnut, capulin cherry, apple, pear and peach.

As seen, the study population is reproduced through the food sector on a type of marginal market in the forest. According to Gonzalo Chapela [7] the world market is primarily tied to the construction industry, both by the incorporation of wood and material derivatives in its construction, as well as the demand for furniture and accessories which dwellings, shops and offices demand. In this regard, the observation of the behavior and policies related to this economic sector is crucial for the future of the forest industry.

In the specific case of Mexico, due to its richness in diversity of traditional knowledge, the customs of its people reflect a broad use of edible plants through practices that remain of utmost importance as alternatives in the diet of rural and indigenous populations, especially in contexts of high and very high marginalization (Lopez et al. [29]).

In the system of peasant economy in the place of study the current use of milpa for the cultivation of crops such as corn, beans, pumpkin is also noted. But more important is the transition to an economy of the cultivation of vegetables in which locally, they have learned to produce and preserve the baby marrows, cauliflower, mint, radish, broccoli, squash, green beans, beans, chili peppers, and cactus.

In the framework of security and conservation analysis of scarce resources at the time in which the population feels threatened can mean a conflict, hence, the next scene evidences the defense of the territory, the fundamental fact of the social practice of according to Jean Camaroff [30], when, through experience modifies the sense of collective action. In the same meaning, according to Guzman-Blocler [31], the conflict makes it possible to see the differences in a dynamic that is based on domination and resistance.

The result of the relations that are established between the environment and the inhabitants of the communities of study give rise to a unique and revealing situation of conflict when the security of the edible raw materials is at risk. Let us take a look at how they keep away strangers in the process in which they have achieved the conservation of its limited resources for survival:

- Don't pluck out the "pericón" with everything and root! Do we go to your land and harm your prickly pears? (Mrs. Mary, Manzana de Golondrinas, 2016).

The loss of biodiversity also entails the loss of traditional knowledge associated with the use of plant species, which affects both these practices as its used documentation and resources, being that the communities which are most in need are also the most affected; without a doubt it deals with rural and indigenous communities (Alves and Rosa [323], Biodiversity International [33]).

According to Garcia [11], studies by authors such as Basurto et al. [12], Casas et al. [13], Villa [14] and Bye [15], about the use of edible plants not cultivated by rural and indigenous populations of Mexico have refuted the mistaken notion that their diet is monotonous, noting that consumption brings a significant diversity of flavors, smells and textures, in addition to nutrients such as vitamins, minerals and fibers. These studies also suggest that the gathering of food is still a current practice still and with a strong cultural foothold, since it is linked to the set of productive processes that define the peasant economy of subsistence, revealing the biodiversity's multiple use carried out in the communities.

With the expansion of agriculture, the human influence on the natural vegetation of Mexico is in general highly destructive, an inadequate use and anarchical use of the earth (Jerzy Rsedowsky [22], the peasant, not finding an affordable way to take advantage of the forest, has little appreciation for it.

In Mexico, after the crisis at the beginning of the year 1980, with the restructuring of the economic policies, the neoliberal measures have had devastating effects on the field since rural development programs were eliminated also subsidies and support for family agriculture were terminated. In addition, constitutional changes occurred which allowed the sale of ejidales and communal lands, which altered in depth the dynamics of countless families and communities (Otero [1], Bartra [2], Tetreault [3]).

Within this process the agrarian crisis in Mexico worsened, characterized by the loss of food and labor autonomy as agricultural products has been subject to international competition. This fact caused a massive bankruptcy to peasants and small farmers (Otero, 2004; Bartra, 2006), and as a result the growth of inequalities was seen, as well as the agravo in the employment crisis, along with significant advances in the environmental deterioration (Castles and Delgado [4]).

Therefore, with regard to the edible plants that are still gathered and consumed in Mexico, there is the demand to know which species are still consumed, how they are utilized, for what purpose and which populations use them. It is also important to document the traditional knowledge associated with the use of these plants, either because they form part of the cultural heritage of the country as well as because they help to conserve biodiversity and are part of the survival strategy of families (Lopez et al. [29]).

These agroecosystems are important for food safety of the communities of study. In this regard, the plant record as well as the uses and customs associated with them contribute to other families and communities to have access to nutritional use of a significant diversity of species with which they can supplement their diet.

Furthermore, the sustainable use of edible species recorded also contribute to the maintenance of the biodiversity, once strengthened, benefits agriculture and food production due to that it maintains soil healthy by containing the necessary nutrients, therefore this process is directly related to health benefits of the population (Fanzo et al. [16]).

In addition, biodiversity is necessary in terms of resilience, especially on those aspects related to climate change as a greater incidence of pests, diseases and long periods of drought or flooding, therefore the genetic diversity present in the local genetic resources is required for the population's food safety at global level (Lopez et al. [29])

In the era of free market of people and goods, Pablo Vargas [5] has argued that, in Mexico, the social and spatial disparities have deepened; causing rural communities to be in a situation of disadvantage and exclusion. According to Bennet [23] and Parsons [34] among others, if we consider that the territories are interconnected in a same system, this analytic category allows to highlight the isolation process of the communities studied. This exemplified through the organization of the differences as noted by Frederick Barth [35], in what has come to be in practical terms a limited indigenous border at the community of Sanctorum and interpreted also in the demographic imbalance which is not regionally compensated and is organized at family and local level, for, in 2010, in 2 communities there are more men and in the other 2 more women were counted.

IV. CONCLUSIONS

In this study, edible and tradable plants of the population that have lower social levels in the Sierra of Pachuca have been registered. After hundreds of years of exploitation of silver ore and lead, the damage to the forest seems irreversible; to this we must add the bad agricultural practices such as the cultivation of corn in high slopes. As argued by Thomas Serrano and colleagues [36], the cultivation of corn and bean is the human economic activity currently responsible for the deterioration of the soil, which decreases the generation of oxygen and water, the same as in the Sierra Otomí-Tepehuá in the state of Hidalgo. However, in the Sierra de Pachuca, the scarce population maintains habitats with forest and wetlands in ejidal lands which provide plant resources that are used for trade in the more prosperous regions, taking advantage of ancestral knowledge.

This situation of relative exclusion made the traditional knowledge, in terms of the gathering plus the food and trading use of plants, to continue as a daily alternative practice and as part of broader strategies of survival in the family and community. Thus, this practice is not only important for the issues of food autonomy, conservation of the forest and the local biodiversity, as they make reference to traditional knowledge which emerges as a significant contribution of the Mexican cultural heritage and, why not, of humanity.

With reference to the register of the resources, uses and customs, new possibilities of mitigation and resistance around the negative consequences of globalization can be observed, such as the growing socioeconomic exclusion and environmental degradation. This work serves as a local parameter and can be useful to motivate the documentation of practices and similar resources in other regions, especially in contexts where there is recognition of social disadvantages, environmental deterioration and there is evidence of food autonomy.

Based on the referred bibliography, in the socio-demographic indicators presented and in the field work carried out, we can conclude that globalization, in a systematic manner with its great structural strength excludes the community of study from the benefits of money circulation, goods and merchandise; hence, locally, only consumption patterns of goods and food products of the so-called junk food are observed. With time, this process goes through a learning stage, perhaps in a form of pressure, coercion, or if you want to see it as a kind of social order; then, only until then, people, equally per system, secretes everything and builds its borders by means of differentiation. In this case, the demographic imbalances stand out which are not compensated locally, however, the distance between them is not greater than 5 kilometers; or in another case, at the community of Sanctórum, more than one fifth of the population is a speaker of indigenous language otomí, while in the other three, this indicator has practically disappeared.

Our proposal can be other than to follow Spierenburg and colleagues [37], opt for the preservation and growth of the forest with the reduction of land devoted to agriculture, replacing equalled the production of corn for a product such as rice. In this regard, it is exceptionally interesting that less than 5 linear kilometers away from the community of El Saucillo, as documented by Emmanuel Galindo and colleagues [38], at any of the studied locations we did not observe the use of watersheds of streams and rivers to contain in a sort of terrace land for planting, since the cultivation plots are located on slopes adjacent to the houses of villagers, and, in the short term, the grounds become unusable for cultivation. However, this plan is not so easy to follow, since in communities of the Sierra de Pachuca the population is very suspicious and their common behavior is to resist new ideas due to the low level of schooling, an aspect very different from the Cuban experience which we have previously referred, where schooling was a key factor for the success of a new Agro-ecological project (Rosset et al. [18]).

In 2016, we are still fortunate to be able to observe the conservation of vegetation which depends on factors such as a certain amount of rain, the limited solar radiation received and by the defense of raw materials by peasants.

Traditional knowledge, regarding the gathering and use of food plants, a practice according to the biodiversity, demands new studies to characterize and register the endemic species that take into account the changing conditions and a variety of factors that keep alive the habitat at the border of the temperate forests of high humidity of the Sierra de Pachuca. In turn, it is urgent to implement a forest recovery program for the mesophyll mountain forest so that the biological richness can be recovered and strengthen in new conditions, since nothing has ever been done in its favor.

The work suggests using raw materials, valued locally as part of survival strategies in the family and in the community in contexts of high and very high marginalization, mainly regarding food autonomy. Until now, the connectivity with other contexts is based primarily on small trade. It is possible to imagine a more integrated world, in which we are all in a win-win situation, some consuming healthy foods without a minor show of pollution and others improving their material conditions of life, all this without jeopardizing the enjoyment of resources for the new generations.

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